

Final Report

Citrus industry health and nutrition education program

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Citrus industry health and nutrition education program (CT21006)

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Public summary

This 2-year project (2022-2024) 'CT21006 Citrus Industry Health and Nutrition Education Program' addresses the ambition to 'Increase domestic consumer demand for Australian citrus through improving knowledge, attitudes and purchase intent.' (Strategy 4: Outcome 2 in the Citrus 2022-2026 SIP). Using the investment of the industry's national R&D levy funds to educate health professionals (HPs) about the nutrition benefits of citrus to support their recommendation to their clients/followers (the end consumer) is a key SIP success pathway.

The project was strategically executed across three pillars; strategic planning & evaluation, resource development, and communication & education and leveraged the scientific findings of concurrent project CT21004 'Scientific review for classification of unsweetened citrus juice in the Australian Dietary Guidelines'. Key outputs included a robust collaborative strategic plan; the development of ten HP resources (fact sheets, infographics, social tiles, educational animations, recipe booklet), establishment of an online resource hub and engaged HP database, an engaging communication plan (including ten EDMs), digital outreach campaign and six educational activities (two FOODiQ hosted webinars, one AUSACTIVE webinar, two conference oral presentations, and one conference trade display; and ongoing evaluation via two audience sentiment research (ASR) surveys at baseline and project end, and post-webinar evaluations.

All intermediate and end-of-project outcomes were successfully met. In only 12 months of actual targeted education and communication (following 12 months of resource production and strategic planning), the project effectively enhanced HP awareness and knowledge about the nutritional benefits of citrus and its juices. It also increased confidence in discussing these benefits and correcting misinformation. HPs impacted by the project were 1.2 times more likely to recommend citrus fruit and twice as likely to endorse citrus juices compared to those not involved. The project made significant strides in shifting perceptions of citrus juice from predominantly negative (28%) or neutral (45%) to overwhelmingly positive (70%).

This project clearly demonstrated that top-of-mind awareness and knowledge of the nutrition and health benefits of citrus are important drivers of recommendation, hence validating efforts to invest in education of HPs, as a valuable strategy to unlocking and driving industry growth. While this project has been a successful first step in educating this important stakeholder influencer group, further consistent investment is recommended to ensure sustained behaviour change and specifically for juice the critical mass needed to support paradigm change in negative perceptions. To build on the project's successes and address these challenges, it is recommended to develop and execute a comprehensive Citrus Nutrition and Health Strategic Blueprint with a 10-year horizon. By establishing this long-term framework, decision-making regarding future funded projects, including recommended directions and ensuring they are strategically aligned and synergistic can be enhanced.

Keywords

Health professional; Citrus; Education; Communication; Health; Nutrition

Introduction

This 2-year (2022-2024) Hort Innovation project 'CT21006 – Citrus Industry Health and Nutrition Education Program' contributes to outcome 2 of the Citrus Strategic Investment Plan 2022-2026 which aims to contribute to demand generation and growth via improving knowledge, attitudes, and purchase intent. This project aims to meet this outcome via educating health professionals (HPs) about the nutrition and health benefits of citrus and its juices to support their recommendation to their clients/followers (the ultimate end consumer).

In our current digital era, even as people increasingly rely on the internet for nutrition and health advice, health professionals (HPs) continue to be a highly trusted and favoured source of information. With the overwhelming amount of both accurate and misleading content available online, individuals are looking for straightforward, reliable, and credible guidance. HPs play a crucial role as knowledgeable experts, providing valuable insights that improve consumer understanding and impact their choices. Thus, building credibility with HPs is essential for strengthening any related consumer communication efforts.

In our review of the current landscape, we identified a significant opportunity to reframe the role of citrus fruits and their juices in health and nutrition discussions. Citrus fruits—such as oranges, lemons, grapefruit, limes, and mandarins—have long been celebrated primarily for their high vitamin C content. This focus, while important, has inadvertently overshadowed the broader nutritional benefits these fruits offer. Health professionals (HPs) often recognise the value of vitamin C but tend to overlook the diverse range of other essential nutrients and bioactives present in citrus. Moreover, the health perception of 100% citrus juice remains contentious, with many viewing it negatively.

The opportunity lay in addressing this gap by reintroducing citrus fruits and 100% citrus juice to health professionals with a refreshed perspective. Our review revealed that while citrus is well-known for vitamin C, there is a broader narrative to be shared about its comprehensive health benefits. Citrus fruits contain unique flavonoids and other bioactives that support immune, cardiovascular, and brain health, which are often underappreciated.

Similarly, 100% citrus juice, often dismissed as merely high in sugar, deserved a reevaluation. Our comprehensive undertaking of an umbrella review of the evidence base of juice on health indicated that it can be part of a healthy diet without contributing significantly to issues like obesity. On balance, it has largely neutral or positive health benefits, with limited evidence of harm. By updating health professionals with evidence-based insights, there was an opportunity to correct misconceptions and highlight the true value of 100% citrus juice as a minimally processed, nutrient-rich component of a balanced diet. This holistic strategic opportunity aimed to renew interest and appreciation for citrus, encouraging health professionals to integrate these beneficial foods into their recommendations and improve public understanding of their true health benefits.

Methodology

The project targeted Australian health professionals (HP). It was strategically developed and executed across 3 key pillars; strategic planning & evaluation, resource development and education & communication. The scientific support for the project was underpinned by both previous Hort Innovation project CT20004 – Citrus Health and nutrition literature review and concurrent project CT21004 – Scientific review for classification of unsweetened citrus juice in the Australian Dietary Guidelines. The project was conducted with a continuous improvement mindset with modifications to the project implemented based on learnings from activations and research insights.

Strategic planning & evaluation

The initial phase of the project involved finalisation of key project planning elements in conjunction with Hort Innovation, including the project risk register, program logic, and monitoring and evaluation plan. Communication to Hort Innovation on project progress including outputs and outcomes were provided 6 monthly through benchmarking reports.

As part of the monitoring and evaluation plan, and to help inform strategy and evaluate the effectiveness of the communications plan, a detailed audience sentiment survey (ASR) was designed. The research was planned strategically throughout the project; project start (Oct 2022), and project end (August 2024). The ASR sought to help establish current and changing attitudes, knowledge and propensity to act of health professionals with regards to Australian citrus and 100% citrus juice over time. The surveys consisted of a detailed questionnaire designed to extract both qualitative and quantitative data from the responses. Each question was crafted around a core objective to ensure information collated was robust to help inform and guide the overall approach. Each person who participated in the research was incentivised through a chance to win mechanism.

A snapshot at baseline served to provide a benchmark of HP knowledge, attitudes and behaviour around citrus and 100% citrus juice, with the snapshot at project end allowing a comparison and assessment of project effectiveness, insights and learnings. The project end survey captured knowledge levels of the nutrition and health properties benefits of citrus and 100% citrus juice related to key project communications and behaviour around recommending citrus and 100% citrus juice, including facilitators and barriers.

At project commencement, FOODiQ undertook an iQ3[®], a proprietary strategy development process with key stakeholders including Hort Innovation R&D manager and industry stakeholders (See Appendix 1). This process gave both FOODiQ, as the program delivery partner, and the industry stakeholders the opportunity to discuss and align on the key issue/s that needed to be solved and collaboratively determine the most optimal pathway to achieve the desired outcomes. The working group collaboratively reviewed the current consumer, regulatory, industry and scientific landscape to identify the issue, gaps and key operating themes and then determine the strategic opportunities for audience targeting, key messaging, and deliverable outputs (including resource development, educational events and communication activations).

Based on FOODiQ's commitment to continuous improvement, the project strategy was reviewed ongoing, and the plan strategically adjusted accordingly. These strategic changes were aligned with the Hort Innovation R&D Manager, along with the Project Reference Group (PRG) as needed.

Resource development

Throughout the project, collateral was developed as the key mechanism to educate HPs and increase their knowledge and understanding on the nutrition, health and culinary properties of citrus and 100% citrus juice. Along with specific resources to improve HP knowledge, collateral was developed to support the dissemination of this knowledge to their clients. Based on the FOODiQ learnings from HP surveys, different types of collateral were developed to help support engagement and interest in the key messages including a recipe booklet, four fact sheets, two infographics and linked social tiles and three animations. Strategically developed over the 2 years, the collateral served as new 'news' to maintain interest and an ongoing conversation with the project's owned HP database.

Communication & Education

A **database** was initially established at the start of project when people participated in the ASR. The database served as the project's central core target audience with a key objective and outcome to continuously build the database throughout the project. This database was developed during the project via recruitment of HPs attending FOODiQ and partner webinar educational events, HP conference, and social media lead generation mechanics.

An **educational activity plan** of events including webinars and conferences were planned at project start, and an **ongoing periodic communication and end-of-project digital activation** program was developed and executed to target both HPs

and growers throughout the 2 years. The communication plan to HP included regular EDMs to the database along with an HP targeted digital activations campaign at the end of phase one and two utilising social media, relevant third-party channels and key opinion leader influencers. For growers, periodic communication via the Citrus Australia news and podcast channels, and face to face presentation at the annual conferences (2023 and 2024) was undertaken to keep them informed and inspired on the project's progress and milestones.

Results and discussion

Educational events

A total of six educational activities were held during the project, including two FOODiQ HP webinars (one citrus fruit focused and one 100% juice), one AUSActive member webinar (100% juice focused), an oral presentation of the Umbrella review juice research (output CT21004) at the Dietitian Australia Conference 2023 and Nutrition Society Australia Conference 2024 and an educational trade display at the Dietitian Australia 2024 conference. See **Table 1** for results.



FOODiQ Citrus Webinar
November 2023



FOODiQ Juice Webinar
June 2024



AUSActive Juice Webinar
June 2024



Dietitian Australia Conference
July 2023



Nutrition Society of Australia Conference
December 2023



Dietitian Australia Conference
August 2024

TABLE 1: Summary survey results from educational events

	Audience	Event 'Excellent or Very good' Overall	Event Useful	Event Engaging	Informative	Learnt something new
FOODiQ Webinar (Citrus Fruit)	381* (102 live) 310 views	100%*	100%*	97%	100%	NA
FOODiQ Webinar (Citrus Juice)	368* (105 live) 345 views	89%*	94%*	97%	100%	100%
AUSActive Webinar	135* (75 live) 67 views	89%*	95%*	98%	100%	100%
Dietitian Australia Conference 2024	Delegates 585	Resources disseminated 350*	Database sign ups 39*			

*KPI = 200 register * Target = >90%. *Target = 600 resources, 80 signups

Digital activation campaign

Two digital outreach activations were implemented to drive awareness of the resources available, and the hub and key messages; one at the end of phase one, which was focused on citrus fruit and the other at the end of phase 2, focused on 100% citrus juice. The campaign utilised paid social media, channel advertising, and KOL activation. See **Table 2** for results.

Channel Communication

Dietitian Connection	Australian Practice Nurses Association	Australian Natural Therapists Association	AUSActive
 <p>CITRUS & HEALTH for healthcare professionals</p> <p>Science Update: How healthy is 100% juice?</p>	 <p>CITRUS & HEALTH for health professionals</p> <p>Want to help your patients with healthy eating?</p> <p>Time for a REFRESH on 100% juice?</p>	 <p>ANTA eNews</p> <p>CITRUS & HEALTH</p>	 <p>100% Juice Myths</p> <p>Unravelling the Juice Myth</p>
December 2023 & June 2024	November 2023 & June 2024	February 2024	June 2024

Paid Social Media

Phase 1 (Citrus Hub): October 2023



Phase 2 (Juicy Myth Hub): July-August 2024



KOL Influencer

Activation: July 2024



Over the past 12 months, HPs have been directed to the HP hub. In this time there were over 3334 unique visits and 1307 downloads on Citrus Australia Nutrition and Health webpage and 2207 unique visits and 680 downloads on FOODIQ Global Citrus hub.

TABLE 2: Digital Outreach Campaign Performance

	Audience	Open rate %	Reach	Total clicks	CTR %
DC Citrus Hub	11,937	40%	4789	103	2%
DC Juice Myth-bust	12,223	46%	5624	587	10.4%
ANTA Citrus Hub	7000	27.6%	1931	208	10.8%
APNA Citrus hub	29,631	29.52%	8746	162	1.9%
APNA juice myth-bust	20,255	29%	8489	353	4.1%
AUSACTIVE Juice myth-bust	10,000	49%	4900	111	2.3%
TOTAL	91,046	KPI: >80,000 emails delivered to HCPs, >25% open rate			
	Impressions	Reach	Total clicks	Av CTR%^A	Sign up database
Social media (HP) Fruit	53,888	25,745	1531	2.8%	10
Social Media (HP) Juice myth-bust	162,000	60,852	1618	3.3%	30
	Video play	Watches 50%	Watches 100%		
Animation	84,650	77,669	54,753		

DC=Dietitian Connection; ANTA = Australian Natural Therapists Association; APNA = Australian Practice Nurse Association; ^Average CTR = 2%

Health Professional Database

The HP database was originally commenced at start of project with initial acquisition via the baseline audience sentiment survey. The database has grown throughout the project via recruitment strategies at webinars, conference and the digital outreach campaign. At project end, the HP database sits at a total of 1197 subscribers. This was triple compared to baseline 393 and more than double the project end projection with an additional 804 subscribers added (KPI: +300).

Electronic Direct Mail (EDM)

Ten electronic direct emails were sent to the Citrus HP database throughout the project to maintain a connection and keep citrus top of mind for HP subscribers. The EDMs open rates ranged from 17-70%, with most performing well above average open rate (25%). Open rates were lower than average on the citrus fruit and very high on the citrus juice focused content, indicating a higher engagement on the juice topic. See **Table 3** for results.

TABLE 3: EDM open rates

	Topic	Date sent	Open rate
EDM 1*	FOODiQ DB Recruit	20 th January 2023	46.7%
EDM 2*	Immunity Factsheet	28 th June 2023	23%
EDM 3	Brain health factsheet	22 nd July 2023	17%
EDM 4	Heart health Factsheet	29 th September 2023	19%
EDM 5*	Webinar 1 recruit	8 th November 2023	20%
EDM 6	Webinar recording	8 th November 2023	58%
EDM 7	Webinar 2 recruit/Juice paper	29 th May 2024	35%
EDM 8	Webinar recording	7 th June 2024	64%
EDM 9	Juice resources/animations	6 th August 2024	71%
EDM 10	ASR	23 August 2024	70%

*EDM sent to FOODiQ database. Open Rate Target = >25%

End of project Evaluation

An audience sentiment research (ASR) survey was undertaken at project start and end. Being cross-sectional independent surveys direct comparison is limited but allows for directional shifts. For the project end survey, data is sub-analysed by those who were impacted by the project (accessed resources) and those who were likely not have been (did not access resources). The 'not accessed' sub-group represents another 'baseline' measure comparison. The survey aimed to assess HP knowledge, awareness and confidence in Australian citrus and 100% citrus juice nutrition and health benefits for project evaluation. Full results are in the full report in Appendix 3. See Figure 1-10 for key results.

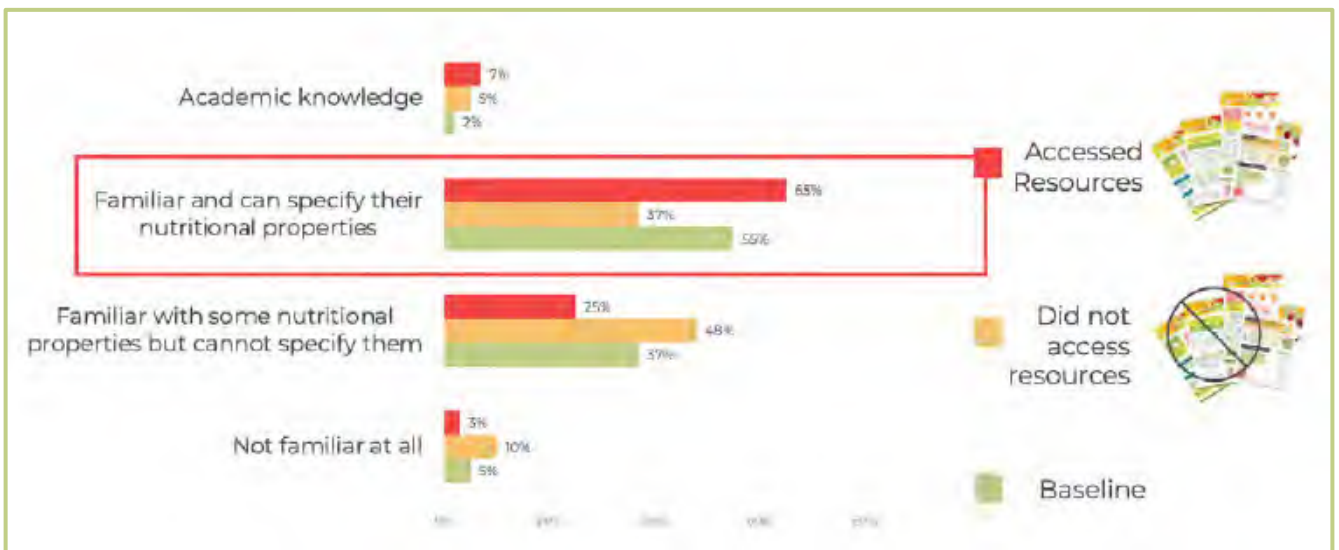


FIGURE 1: Health professional familiarity (% of respondents) with nutrition and health benefits baseline Vs project end (accessed versus did not access resources)

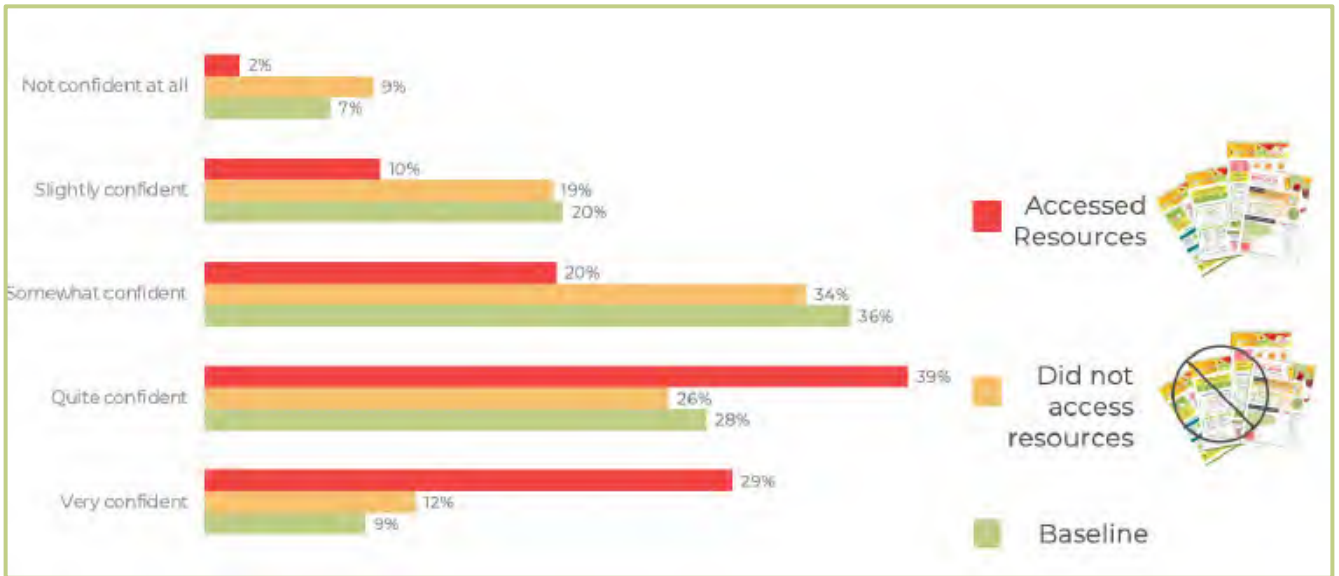


FIGURE 2: Health professionals' confidence (% of respondents) in discussing nutrition benefits at baseline and project end (accessed versus did not access resources).

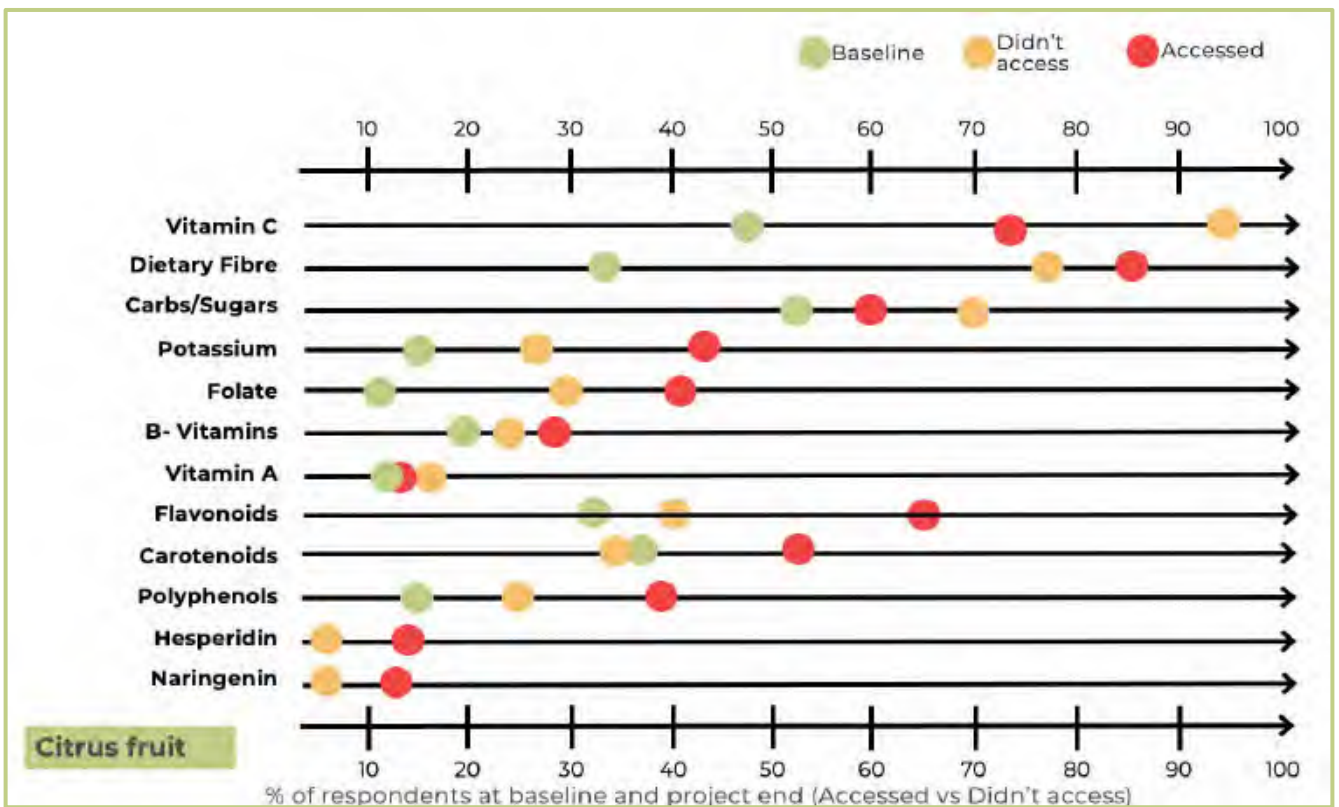


FIGURE 3: Proportion of health professionals aware of specific citrus nutrition benefits baseline Vs project end (accessed vs not accessed resources)

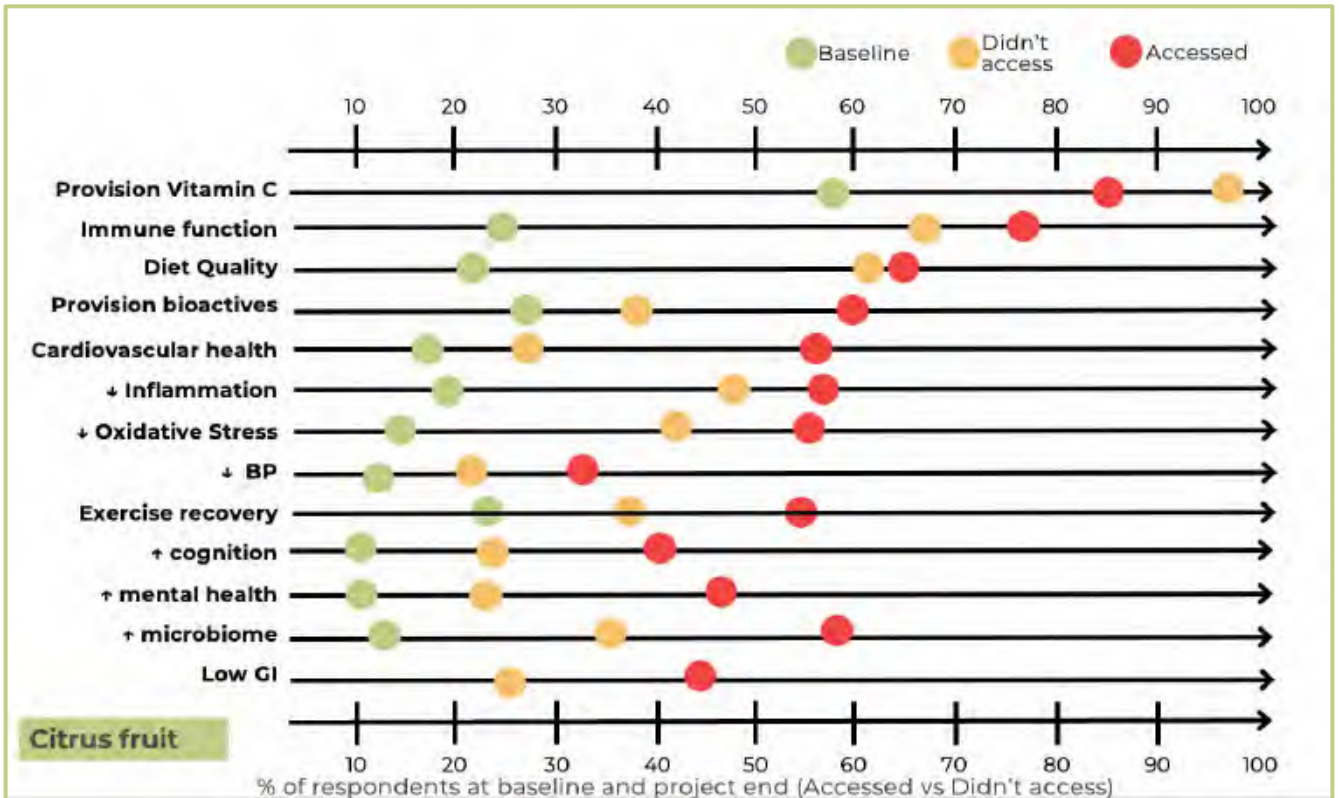


FIGURE 4: Proportion of health professionals aware of specific citrus fruit health benefits baseline Vs project end (accessed vs not accessed resources)

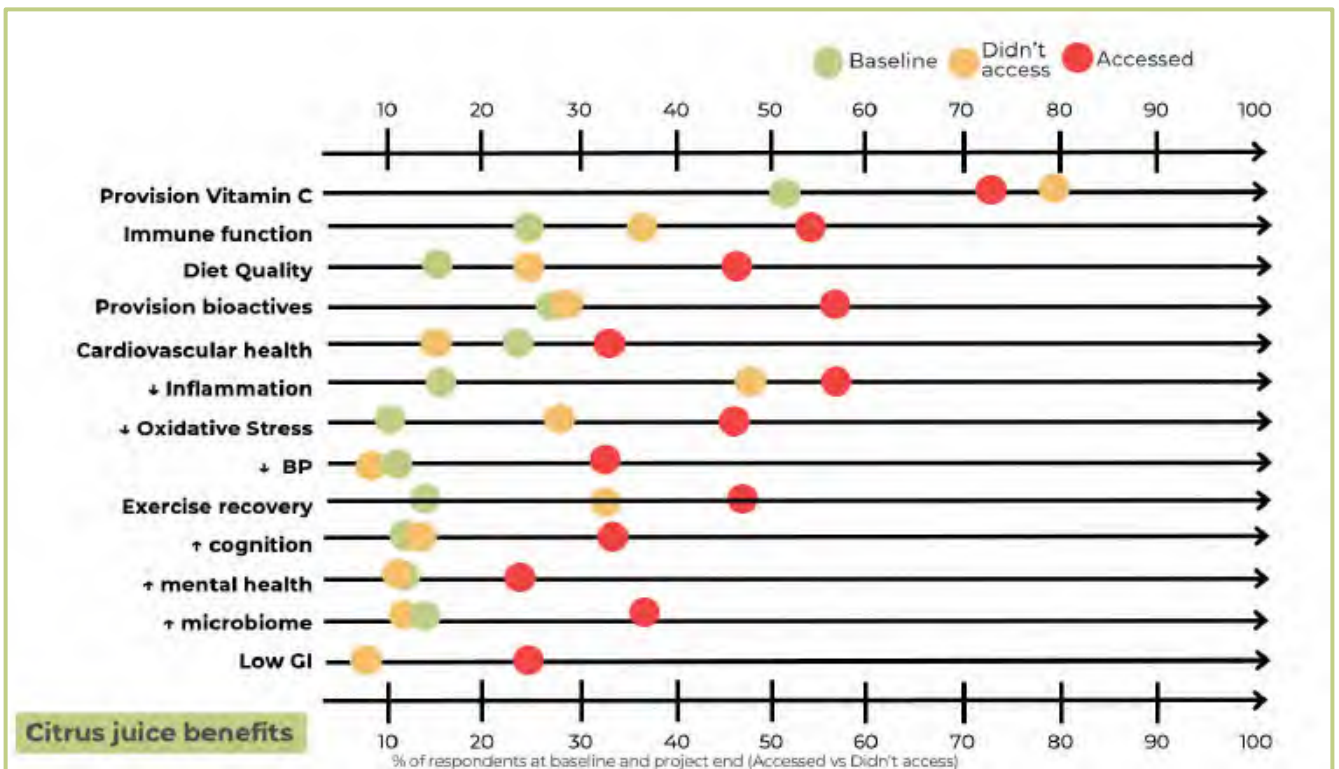


FIGURE 5: Proportion of health professionals aware of specific citrus juice health benefits baseline Vs project end (accessed vs not accessed resources)

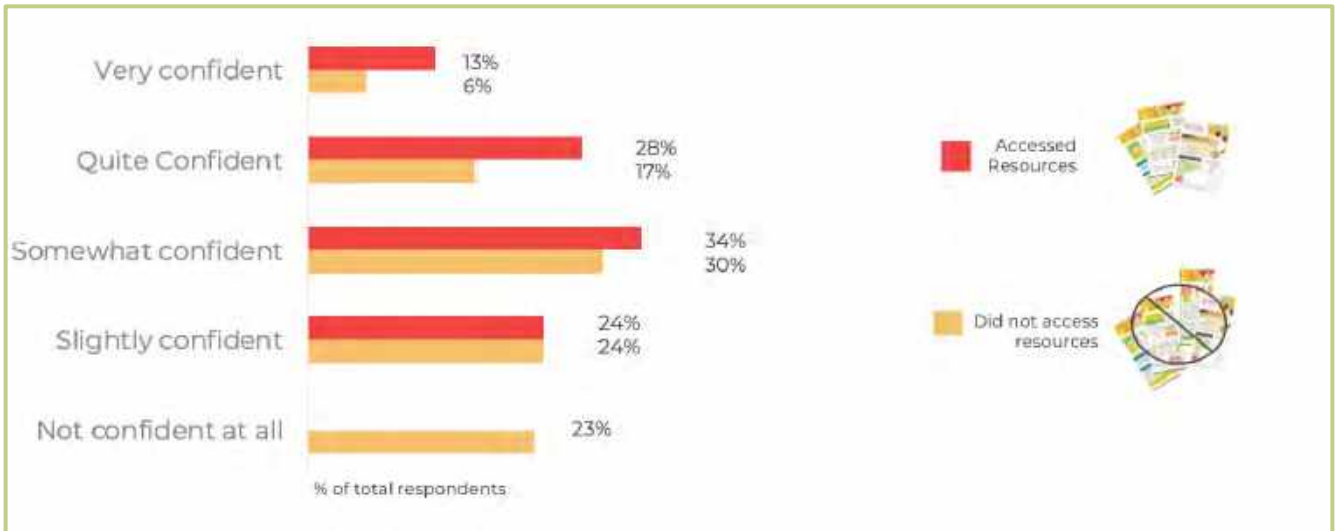


FIGURE 6: Health professionals' confidence (% of respondents) in correcting misinformation on juice at project end (accessed versus did not access resources).

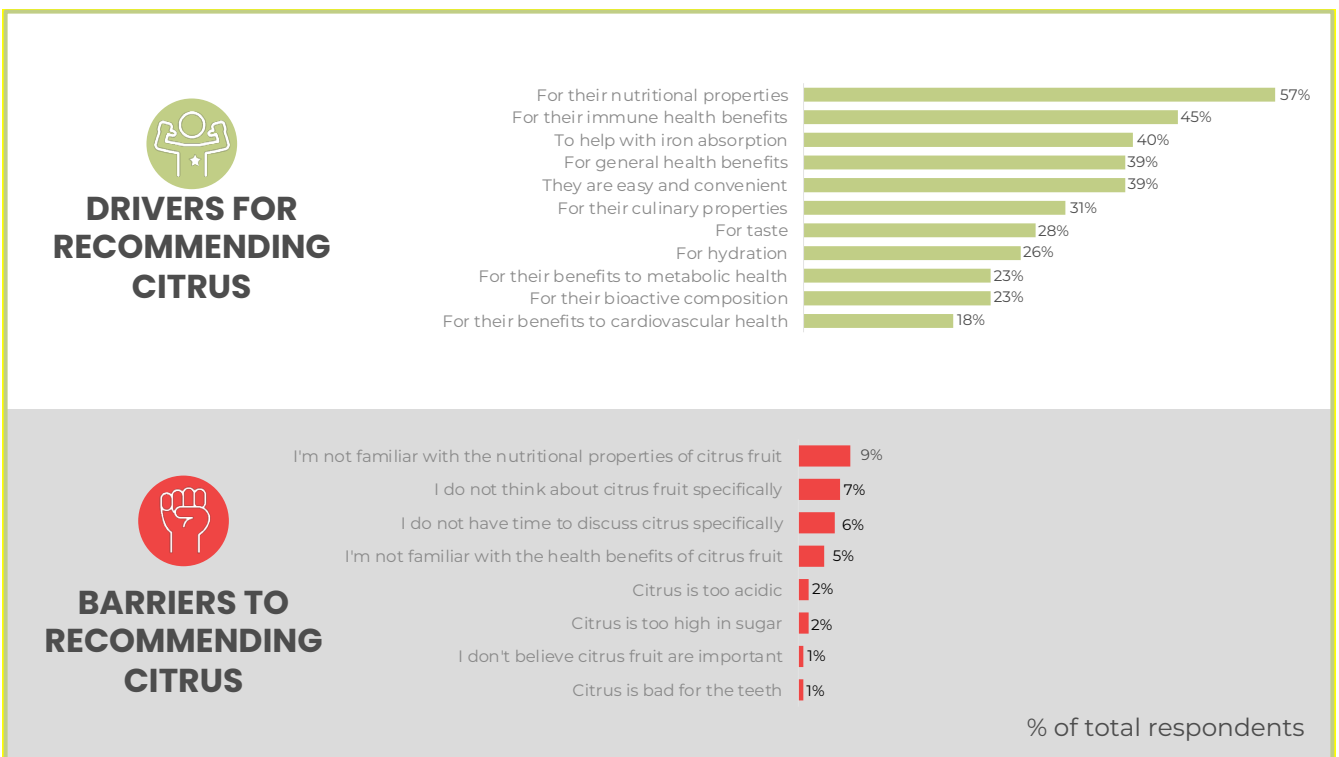


FIGURE 7: Drivers and barriers to HP Citrus fruit recommendation

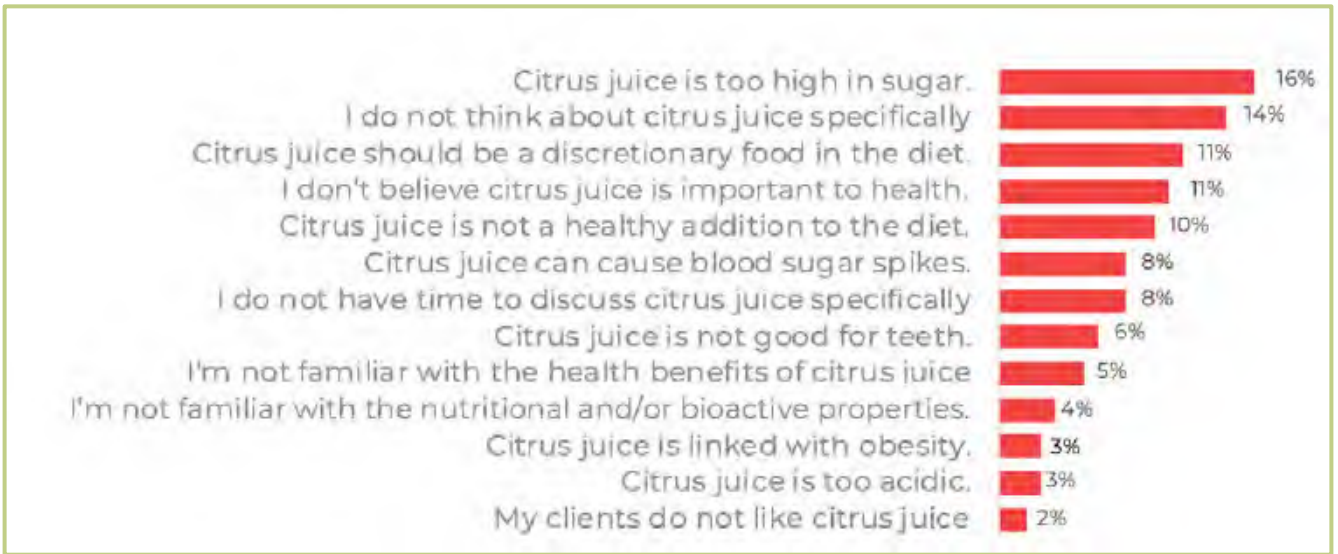


FIGURE 8: Barriers to HP Citrus Juice recommendation

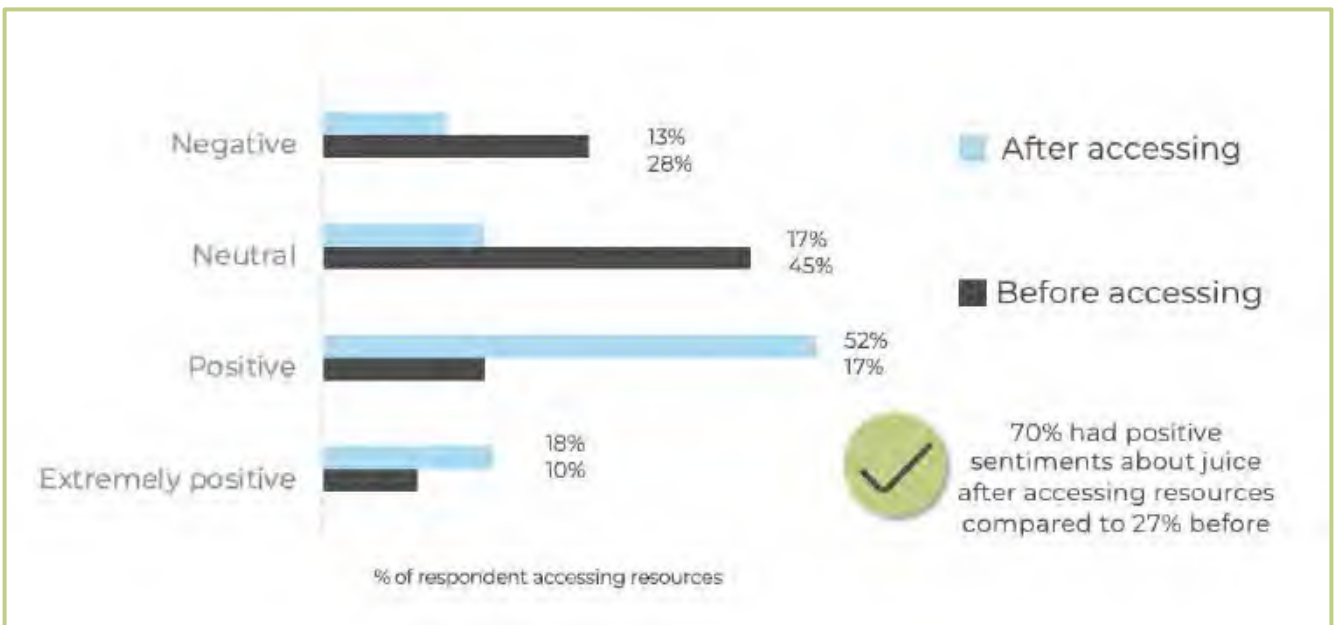


FIGURE 9: Health professionals impacted by project (accessed resources) self-reported sentiment towards citrus juice before and after the project.



FIGURE 10: Project resources usage and perception for project.

In summary, there was a significant increase (10 percentage points) in HP who reported they were not only familiar but could specify citrus nutrition benefits compared to baseline. HP knowledge regarding the key project education messages all increased, supporting that the project resources were effective. Across the board, there were 18-52 percentage point increases in the number of respondents' identifying the key nutrition and health benefits compared to baseline.

While 23% of respondents in the sentiment survey reported that they had accessed the hub compared to the target of 50%, this and the initial baseline survey were independent cross-sectional surveys, involving different, though overlapping, audiences. This difference might account for variations in database access, as new or different respondents captured in the project-end survey might not have been as engaged or informed about the database. This finite project of 12 months of activation however exceeded its intended database recruitment more than doubling the the project end target with and additional 804 subscribers added (KPI: +300) to achieve a solid total 1197 subscribers at project end.

Accessing resources & education correlates well with increased knowledge, confidence and recommendation. The resources played a pivotal role in enhancing HP confidence and recommendation, with two thirds (68%) of those accessing the resources 'quite' or 'very confident' to discuss the nutrition benefits of citrus compared to just over a third (37%) of those not having accessed. Those accessing resources were 1.2 times more likely to recommend citrus (86%) compared to those who had not (72%), and 2 times more likely to recommend 100% citrus juice (87% vs 42%). HP were also more likely to feel confident in correcting misinformation on juice if they had accessed the resources. One in four who had not accessed resources felt no confidence at all (23%) while none of those who accessed the resources felt they had no confidence at all. Moreover, they were nearly twice as likely to feel 'very' or 'quite' confident in correcting misinformation (41%) versus if they had not accessed resources (23%). Overall the project had a significant impact in changing sentiment on views on 100% citrus juice, with only a third (27%) who were impacted by the project reporting being positive toward juice prior to the project increasing to over 70% post-project.

All educational webinars were rated highly for information, usefulness and engagement, and achieved 6+ hours of valuable face-to-face engagement about the science of 100% citrus juice with members of the dietetic community at their annual professional conference. The webinar, along with the digital outreach served as a valuable strategy to drive database recruitment to disseminate further resources. Leveraging the digital format offers the benefit of securing an evergreen resource that can be leveraged with future audience acquisitions.

Outputs

Output	Description	Detail
IQ3 [®] Strategy workshop with stakeholders	FOODiQ proprietary strategic planning process to develop collaborative robust strategic plan for project. Target audience: Hort innovation, Industry stakeholders	Collaborative workshop undertaken 9 th December 2022 and final strategic plan presented 24 th February 2023 (Appendix 1).
Audience Sentiment Research – Baseline	Baseline findings HP awareness and knowledge in Australian citrus and 100% citrus juice nutrition and health benefits. Baseline findings used to help set M&E targets and direct project strategy. Target audience: Hort Innovation	Date conducted: October 2022 Survey responses: 393 (KPI: >200) Report (Appendix 2) submitted to Hort Innovation on 23 rd December 2022.
Audience Sentiment Research – Project end	End of project findings HP awareness and knowledge in Australian citrus and 100% citrus juice benefits, usage of resources and recommendation for project evaluation. Target audience: Hort Innovation	Date conducted: August 2024 Survey responses: 227 (KPI:>200) Report (Appendix 3) presented at PRG 4 and submitted to Hort Innovation as part of this final report.
Citrus Australia Nutrition & Health Webpage	Webpage serving as educational platform for citrus nutrition and health messages and the digital repository of the project resources on the Citrus Australia website for HPs. Target audience: Health Professionals	The Citrus Australia Citrus & Health Webpage was developed and went live 9 th June 2023. Two hubs (Citrus and Juice) were also developed on the FOODiQ health professional hub.
Factsheets	Four fact sheets (Appendix 4); 3 x HP evidenced based summaries and 1 x consumer facing on citrus and health were developed. The HP factsheets each summarized the research on citrus and immunity , heart health and brain health . Target audience: Health professionals	Available on the Citrus Australia and FOODiQ Citrus hubs and sent out via the HP database, distributed to attendees at webinars and DA Conference, and communicated in HP channel communication and social media activation.
FOODiQ HP Citrus Webinar	1-hour professional development webinar. Target audience: HP	Webinar was held on 21st November 2023 See Appendix 5 for evaluation. 381 registrations and 102 attended live. 317 views post event to date 100% rated webinar ‘excellent’ or ‘very good’ overall (KPI >90%). 100% found event ‘extremely informative’ or ‘very informative’

		<p>97% found event engaging</p> <p>100% found information presented useful (KPI>90%)</p>
FOODiQ HP Juice Webinar	<p>1.5-hour professional development webinar.</p> <p>Target audience: HP</p>	<p>Webinar was held on 4th June 2024</p> <p>See Appendix 6 for evaluation.</p> <p>368 registrations and 105 attended live.</p> <p>360 views post event to date</p> <p>89% rated webinar ‘excellent’ or ‘very good’ overall (KPI >90%).</p> <p>100% found event ‘extremely informative’ or ‘very informative’</p> <p>97% found event engaging</p> <p>94% found information presented useful (KPI>90%)</p> <p>100% reported they learnt something new</p>
AUSActive Fitness Professional Juice Webinar	<p>1-hour professional development webinar.</p> <p>Target audience: HP</p>	<p>Webinar was held on 4th June 2024</p> <p>See Appendix 7 for evaluation.</p> <p>135 registrations and 75 attended live.</p> <p>67 views post event to date</p> <p>89% rated webinar ‘excellent’ or ‘very good’ overall (KPI >90%).</p> <p>100% found event ‘extremely informative’ or ‘very informative’</p> <p>98% found event engaging</p> <p>95% found information presented useful (KPI>90%)</p> <p>100% reported they learnt something new</p>
Videos	<p>3 x 1 minute videos communicating juice messages; key findings of the umbrella review publication; myth-busting juice and the making of 100% citrus juice.</p> <p>Target audience: HP</p>	<p>All three are available on the Citrus Australia, FOODiQ Citrus Hub and YouTube channel.</p> <p>The videos sent out via the HP database and communicated in social media activation.</p>
Infographics	<p>Two infographics (Appendix 8) communicating key messages on citrus fruit and 100% citrus juice.</p> <p>Target audience: HP</p>	<p>Both are available on the Citrus Australia, FOODiQ Citrus Hub and were sent out via the HP database, distributed to attendees at webinars and DA Conference, and communicated in HP channel communication and social tiles utilised in social media activation.</p>
Recipe book	<p>Recipe book (Appendix 9) was developed as resource to provide to clients to inspire clients with culinary nutrition.</p>	<p>Recipe book available on the Citrus Australia, FOODiQ Citrus Hub and sent out via the HP database.</p>

	Target audience: HP	
Oral presentation CT21004 Juice umbrella review at 2 x conferences	Two opportunities were gained to orally present the comprehensive umbrella review of evidence for 100% juice and health. Target audience: HP	Presentation given at DA conference Monday 24 th July 2023 (Appendix 10) and Nutrition Society of Australia Conference December x 2023 (Appendix 11).
Dietitian Australia Conference 2024 Trade display	Australian Citrus exhibition stand at the 2024 Dietitians Conference , Brisbane, where information and resources on 100 per cent citrus juice was provided to delegates. Target audience: HP	FOODiQ Global staff on behalf of Hort Innovation exhibited Australian Citrus at the conference 18-20 th August 2024. An engaging exhibition booth was created with citrus juice sampling, resources and education on nutrition and health benefits of citrus and its juices was provide to delegates. See Appendix 12 .
Digital Activation Campaign	Communications outreach campaign targeted to HP to drive reach for the awareness of the resources, utilising social media, channel advertising and KOL activation. Target audience: HP	Two x paid social media campaign took place February 2024 (4week) and July/August 2024 (6 week) along with advertisement to Dietitian Connection (DC) membership, Australian Practice Nurse Association (APNA) , Australian Natural Therapist Association (ANTA) and influencer campaign. See Appendix 13 for evaluation. Total social reach phase 1: 25,745 CTR: 3.3% Total social reach phase 2: 60,852 CTR 2.8% Total reach emails: 121,046 (>80,000) HP Channel open rate: 29-49% (KPI: 25%) DC Citrus CTR %: 2% (KPI: 2%); Juice CTR 10.2% (KPI: 2%) ANTA Juice CTR%: 10.8% (KPI: 2%) APNA Citrus CTR%: 1.9% (KPI: 2%) Juice CTR 4.2% (KPI: 2%) AUSActive Juice CTR%: 2.3% (KPI: 2%) KOL reach: followers 154, 960
Electronic Direct Mail (EDM)	An electronic direct email sent to the citrus HP database ongoing regular basis. Target audience: HP	10 x EDMs (Appendix 14) were sent to the HP database throughout the project. The EDMs served to keep citrus top of mind with HP, communicate nutrition and health benefits of citrus and myth-bust juice. 20 th January 2023, 30 th June 2023, 22 nd July 2023, 29 th September 2023, 8 th November 2023, 9 th November 2023, 29 th May 2024, 7 th June 204, 6 th August 2024, 23 rd August 2024
Health Professional database	A final database built during the project to enable an ongoing conversation with HP. Target audience: HP	At project end the HP database (Appendix 15 sent separately) had 1197 subscribers which was an additional 804 subscribers and 204% increase on baseline (KPI: +300 from baseline).

Project Reference Group (PRG) Meetings	6-monthly meeting with appointed project stakeholders/advisors to inform and consult on project. Target audience: HP, Industry, Hort Innovation	4 x Meetings (Appendix 16) were held where project deliverable outcomes and learnings discussed and consultation for future plans discussed and aligned. 7 th December 2022, 11 th July 2023, 11 th January 2024, 10 th September 2024.
Citrus Industry News	Project update story published in Citrus industry news communicated to growers. Target audience: Industry	2 x articles (Appendix 17) were prepared. 20 th July 2023, 9 th September 2024
Growers Presentations	Three presentations on the on project were delivered to growers at their annual conference in 2022, 2023 and 2024 to update and educate. Target audience: Industry	Dr Flavia Fayet-Moore from FOODiQ Global attended and presented to growers in Mildura on 8 th March 2023 (Appendix 18). Dr Emma Beckett from FOODiQ Global attended and presented to growers at Citrus Growers Conference in Griffith on 19 th October 2023 (Appendix 19) and at The Australian Citrus Congress Sunshine Coast on 5-7 March 2024 (Appendix 20).
Citrus Australia Podcast	The current and related project CT21004 status were communicated to growers via the Citrus Australia <i>The Full Bottle</i> podcast series. Target audience: Industry	Tim Cassettari from FOODiQ Global presented in episode 23 on 28 th April 2024.

Outcomes

Table 4. Outcome summary

Outcome	Alignment to fund outcome, strategy and KPI	Description	Evidence
A solid database was established. The HP database increased 204% from 393 subscribers at baseline to achieve 804 additional subscribers at project end, to achieve a total of 1197 subscribers on the database.	KPI: ≥300 sign ups baseline ≥300 new names added to HCP database from baseline to project end	The HP database acquisition commenced via the baseline audience sentiment survey recruitment. The database has grown throughout the project via targeted strategies via webinars, conference and the digital outreach campaign. The database is a key and central strategy to gain direct line communication with the target audience to a maintain cost effective and ongoing connection that ensures citrus remains top of mind to secure recommendation and continue to support long term industry growth.	Database management
A robust strategic plan was developed collaboratively with key stakeholders on time.	KPI: Strategic workshop undertaken by due date.	RFPs for projects are written without a two-way dialogue which has the potential for misalignment or more importantly missed opportunities. Working collaboratively with key stakeholders as was undertaken in this project helped to ensure quality outcomes and maximise return on investment. As a result of the strategic process, original project plan was modified and a variation submitted and approved for the updated plan,	Appendix 1
A clear understanding for HP knowledge and attitudes to citrus and juice were obtained with 364 responses for the baseline ASR and 227 responses obtained for the project end ASR.	KPI: ≥200 valid responses for each Audience Sentiment Research	A cross-sectional audience sentiment survey was undertaken at baseline to provide insights to inform and refine project strategy and provide benchmark target. The survey was repeated at project end to provide insight in impact of the project on addressing key outcomes.	Appendix 2
An engaging HP citrus and health webpage developed on the Citrus Australia website in the first year of project (9 th June 2023) and maintained	KPI: HCP dedicated webpage created for Citrus Australia in year 1 and maintained	The thirteen resources; umbrella review publication, 4 x factsheets, 2 x infographics, 1 x recipe booklet, 3 x webinar recordings, and 3 x videos were all uploaded onto the Citrus Australia Citrus and Health webpage	Citrus & Health HP

throughout the project	throughout the remainder of the project Resources made available to HCPs on the Citrus Australia website	as well as the FOODiQ citrus Hub.	
Effective sought after resources developed. 23% of HP aware of the project resources and hub with 79% utilising or intending to utilise the resources. Nearly all (97%) found them useful with one third wanting more. Common feedback included they were engaging, simple, concise and credible.	KPI: 50% HCPs aware of resource availability on citrus HCP dedicated webpage ≥50% HCPs utilising or intending to utilise resources ≥80% HCPs who use resources reporting that they find them useful	The Citrus & Health Hub is the repository for all project resources which aim to increase knowledge and understanding on citrus and its juices. The citrus hub was continuously communicated via direct EDM to the owned database every 2-6 months, at all educational events and via digital outreach campaign. The evaluation research supports that when awareness is engaged and knowledge increases, confidence and intention for recommendation increases. Increasing HP knowledge and awareness of hub is key and opportunity to further drive this.	Audience Sentiment Survey
Industry was regularly involved and updated on project status throughout.	KPI: Updates provided to Citrus Communication project on current progress and what is to come.	Project status was updated to relevant key stakeholders via PRG meetings and directly to growers via attendance at annual conferences, and via the industry communication channels; podcast and citrus news.	Milestone reports
HP awareness increased. 97% of HP utilizing resources rated themselves familiar with citrus nutrition benefits compared to 90% at baseline. 65% rated themselves as also able to specify which was an 18% increase from baseline (55%).	KPI: Increase HP awareness of nutrition & health benefits of citrus and its juices.	HP familiarity with the nutrition benefits was driven through the developed resources which were disseminated via channel and social communications, and educational events. Increasing familiarity is key to driving knowledge and recommendation.	Audience Sentiment Survey
HP knowledge of citrus nutrition and health benefits increased. Across the board, there were 18-52 percentage point increases in the number of respondents' identifying the	KPI: Increase HP who can accurately identify the nutrition & health benefits of citrus	It is known that key barrier to recommendation is not being familiar with nutrition and health benefits and that these attributes are a key attributes to recommendation.	Audience Sentiment Survey

<p>key nutrition and health benefits compared to baseline.</p>		<p>The specific project resources and educational events were designed to increase understanding and knowledge of citrus nutrition and health benefits.</p>	
<p>HP confidence in discussing the health benefits of citrus increased. Confidence nearly doubled compared to baseline with two thirds (68%) of respondents who had accessed resources 'quite' or 'very confident' at project end versus just over one third (37%) at baseline.</p>	<p>KPI: Increase in HCPs who are 'confident' or 'extremely confident' in discussing the health benefits of citrus</p>	<p>Confidence in being able to discuss benefits is linked with knowledge in supporting HP likelihood of recommending citrus to clients.</p> <p>The project aimed to always frame communication and education messages in line with fulfilling HP desire to keep up to date and provide them with simple, concise and credible resources that made this easy and motivating to seek out.</p>	
<p>HP confidence in correcting misinformation around citrus juice increased. HP were nearly twice as likely to feel 'very' or 'quite' confident in correcting misinformation if they had been impacted by the project (had accessed resources) versus if they had not (41% vs 23%).</p>	<p>KPI: Increase in HCPs who are 'confident' or 'extremely confident' in correcting misinformation</p>	<p>Misinformation abounds about juice with overall negative sentiment and recommendations to avoid. While HP may feel some positivity towards juice, having the evidence-based information to be able to correct misinformation is vital to change societal sentiment. Positive sentiment to juice results from increasing HP awareness and knowledge of the nutrition and health benefits of 100% juice.</p> <p>This was the main strategy for the project which involved development of the highest level of science to credibly discuss the balance of evidence for health effects of juice, translate this into easy to digest resources and communicate and disseminated via a comprehensive communication plan.</p> <p>HP fulfil an important role in consumer decision-making and purchasing, providing trusted information in an increasingly confusing and overloaded information ecosystem. While less tangible and indirect, they play a pivotal part long term in maintaining and further fueling demand and consumption.</p>	<p>Audience Sentiment Survey</p>

Monitoring and evaluation

Table 5. Key Evaluation Questions

Key Evaluation Question	Project performance	Continuous improvement opportunities
<p>To what extent has the project increased HP awareness, knowledge, confidence and proficiency in talking about the nutrition and health benefits of citrus and their juices and correcting misinformation?</p>	<p>The project has had a significant positive impact on increasing HP awareness, knowledge and confidence in talking about citrus and juices' nutrition and health benefits and correcting misinformation.</p> <p>Sentiment research indicates that the proportion of HP aware of benefits and able to specify these increased by ten percentage points (baseline Vs project end). The proportion of HP able to correctly identify the nutrition and health benefits increased by 18-52 percentage points from baseline and significantly higher than those who had not accessed the resources. See Appendix 3 for further detail.</p> <p>As a result, there was nearly a doubling in the proportion of HP who perceived themselves to be 'very' or 'quite' confident (68% vs 37%) in discussing the benefits and correcting misinformation (41% vs 23%).</p> <p>Our project has profoundly shifted HP sentiment for 100% citrus juice, transforming it from predominantly negative or neutral to overwhelmingly positive. Before the initiative, only 27% of those impacted by the project viewed 100% juice positively. However, following the project, this figure soared to over 70%. Additionally, the proportion of those with negative sentiment dropped by a factor of three, highlighting a remarkable turnaround in attitudes.</p>	<ul style="list-style-type: none"> • While confidence in correcting misinformation significantly increased, just over half (58%) in those impacted by the project reported a lower confidence (slightly or somewhat confident). This underscores the ongoing need for continued communication and education to further elevate confidence levels. • In just 18 months, including only 6 months of focused "juice" communications, the project has achieved substantial impact. Evaluation results support that those who have been impacted by the project have experienced improved understanding and positive shifts in attitudes. However, the project has only reached a subset of the HP community so far. Ongoing and consistent communication will be crucial in expanding this reach and reinforcing the momentum needed for broader impact.
<p>To drive demand of Australian citrus, to what extent</p> <p>- did HCPs find the educational events informative?</p> <p>- did HCPs find the information and resources provided throughout the</p>	<p>The educational events have consistently been rated by HP as engaging, useful and informative with all exceeding KPI >90%. Unprompted survey feedback was extremely complimentary of the format, content and credibility. For all three webinars 100% of participants rated the webinar as</p>	<ul style="list-style-type: none"> • Unsolicited feedback consistently throughout the project as well as in the final sentiment survey has revolved around questions on practical recommendations for which type of juice, how to select, how much. There is opportunity for dedicated resources to

<p>project useful?</p>	<p>informative.</p> <p>The resources were deemed useful by nearly all (97%) who had accessed them, with a third (34)% saying they would like more. Some of the anonymous open-ended feedback in the final project ASR include:</p> <p>“I find it to be very informative and helpful, as well as educational.”</p> <p>“Simple, Clear and precise, well researched, scientific & evidence based.”</p> <p>“I find it to be very informative and helpful, as well as educational.”</p> <p>“Great information and great design.”</p> <p>“Well presented, engaging, provides a concise way to discuss with clients.”</p>	<p>communicate this.</p>
<p>To what extent have regular project updates been provided through linkage with the industry?</p>	<p>The project team has provided regular updates to key industry stakeholders informally via email and formally via 4 PRG meetings, 2 news articles for the grower’s magazine and attendance at 3 grower conferences.</p>	<ul style="list-style-type: none"> • There is an opportunity to develop a comprehensive Citrus Nutrition and Health Strategic Blueprint that encompasses all stakeholders—including growers, retailers, consumers, and government entities. This strategic framework would enhance impact and efficiency by aligning strategies, outputs, and initiatives across the board.
<p>To what extent did the planned HP communication and education activations meet target engagement levels?</p> <p>To what extent did HCPs find the educational events useful?</p> <p>To what extent were HCPs aware of educational resources, using or intending to use them and consider useful?</p>	<p>Educational events have consistently received high engagement ratings from HP, with webinars surpassing KPIs and achieving scores between 97% and 98%.</p> <p>Unprompted survey feedback highlights several factors contributing to these high ratings: the introduction of new, relevant information, innovative presentation methods, visuals interesting, slides simple, interactive with ability to chat and comment, engaging and enjoyable quizzes, authoritative and captivating speakers, great hosting, well-referenced and clearly organized content, and practical, clinically useful insights.</p> <p>HP consistently rated the webinars as highly useful, with scores ranging from 94% to 100%. Key factors</p>	<ul style="list-style-type: none"> • While there was very little feedback for improvement on webinars, some insights from only a few include while love the quizzes, keep them shorter to not lose momentum. • There remains a significant opportunity to enhance awareness of the project messages and resources. There is still a need for increased outreach and targeted communication efforts to ensure that a broader segment of HP is informed. By driving greater awareness, we can further increase engagement and support, ultimately maximizing the impact and benefit of these valuable resources and citrus consumption.

	<p>driving these ratings included the presentation of new, relevant information and its practical, clinical applications. Participants appreciated how the content was made accessible and actionable, simplifying complex concepts and making them more achievable.</p> <p>In the sentiment research, a cross-sectional survey of HP, revealed that around one in four (23%) of respondents were aware of the resources. Of these, 79% were using or intending to use, and nearly all deemed useful (97%), with a third (34)% saying they would like more.</p>	
<p>Have project outputs been delivered within timelines, to budget and quality?</p>	<p>All project outputs have been delivered within the required timelines within budget and to high quality as exemplified by feedback at events and from PRG members.</p>	<ul style="list-style-type: none"> • Going forward it is recommended that greater proportion of budget is allocated to support awareness of the hub and resources via digital outreach. • Extended timelines for the activation period would increase ROI on the initial resource creation. • Opportunities to re-activate the existing resources while they remain in date should be sought

Recommendations

In Summary

The two-year project focused on HP education has successfully concluded, delivering notable results. In only 12 months of actual targeted education and communication, the project effectively enhanced HP awareness and knowledge about the nutritional benefits of citrus and its juices. It also increased confidence in discussing these benefits and correcting misinformation. HPs impacted by the project were 1.2 times more likely to recommend citrus fruit and twice as likely to endorse citrus juices compared to those not involved. The project made significant strides in shifting perceptions of citrus juice from predominantly negative (28%) or neutral (45%) to overwhelmingly positive (70%). Given HPs' critical role in shaping the nutrition and health landscape amid complex and conflicting information, this project highlights the value of increasing awareness, knowledge, and confidence in citrus and its juices as a strategy for driving industry growth.

Challenges and Opportunities

However, without sustained, consistent education and communication, these gains may erode. There remains a substantial opportunity to engage a broader and more diverse segment of health professionals. Furthermore, aligning nutrition and health initiatives across key stakeholders—including government bodies, consumers, retailers, industry and health professionals—presents an opportunity to achieve greater efficiency and impact.

Looking Ahead

Two primary challenges need to be addressed:

Citrus Fruit Perception: Citrus fruit is often seen as familiar and unexciting. While the current campaign has begun to shift this perception by highlighting that there is "more to citrus than vitamin C," further refinement is necessary to enhance this message and better differentiate citrus fruit.

100% Citrus Juice Bias: Deep-rooted negative biases towards 100% citrus juice are challenging to overcome. Although the project has made notable progress, achieving widespread acceptance will require continued strategic efforts. The process of changing entrenched attitudes can be lengthy, as demonstrated by the 40-year evolution of perceptions regarding eggs, which shifted from a heart health risk to a recognized component of a balanced diet.

Strategic Recommendations

To build on the project's successes and address these challenges, we recommend developing a comprehensive Citrus Nutrition and Health Strategic Blueprint, with a 10-year horizon. By establishing this long-term framework, decision-making regarding future funded projects, including what they should be and ensuring they are strategically aligned and synergistic, can be enhanced. This blueprint should include:

- **Strategic Pillars and Messaging Pipeline:** Clearly outline strategic pillars, target audiences, and a key messaging pipeline across different time horizons to maximize impact.
- **Separate Plans for Citrus Fruit and Juice:** Develop distinct strategies for citrus fruit and citrus juice, ensuring alignment and synergy.
- **Focus on Key Elements:** Determine whether to emphasize all citrus varieties or spotlight a specific 'hero' variety, such as orange, especially for juice.
- **Expand Focus:** Include additional health professionals, such as general practitioners, and integrate strategies for engaging other stakeholders, including retailers, consumers, industry and advocacy groups.
- **Maintain Credibility and Thought Leadership:** Continue to build credibility through well-researched, authoritative content and strategic partnerships.

Detailed Recommendations

Sustain Engagement with a Digital Presence

- **Maintain Visibility:** Keep citrus top of mind through a vibrant and consistent digital hub.
- **Foster Connection:** Engage users with compelling, ongoing content.

Create a Signature Citrus Message

- **Build a Messaging Pipeline:** Develop a long-term, impactful messaging strategy.
- **Own a Unique Territory:** Craft a powerful message around a standout benefit (e.g., brain health, unique bioactives).
- **Enhance the Narrative:** Expand on existing efforts by integrating food science, culinary nutrition, and sustainability.

Drive Juice Acceptance

- Long-Term Messaging: Continue to promote and refine the message.
- Practical Recommendations: Develop guidance on juice consumption (type, serving size, frequency).
- Educate on Processing: Provide information on juice processing and nutrient impact.

Expand Influence

- Broaden Reach: Extend communications to general practitioners and engage consumers through innovative campaigns.
- Build Partnerships: Collaborate with influencers and experts to amplify the message.

Invest in Scientific Insights

- Nutrition Surveys: Assess the contribution of citrus fruits and juices to bioactive intake.
- Health Data: Analyse associations between juice and total fruit intake with diet quality measures.
- Translate Science: Research effective ways to communicate juice science for public health benefits.

Champion Advocacy and Guidelines

- Health Star Rating / Free Sugars: Engage in discussions around health ratings and sugar guidelines.
- Dietary Guidelines: Advocate for the inclusion of citrus in dietary recommendations.
- Juice: Support evidence-based guidelines on juice consumption.

Refereed scientific publications

Nil

References

Nil

Intellectual property

No project IP or commercialisation to report

Appendices

Appendix 1 – FOODiQ Global iQ³ Citrus Strategic Plan

Appendix 2 – Audience Sentiment Research (Baseline)

Appendix 3 – Audience Sentiment Research (Project end)

Appendix 4 – Factsheets

Appendix 5 – FOODiQ Citrus Webinar presentation evaluation

Appendix 6 – FOODiQ Juice Webinar presentation evaluation

Appendix 7 – AUSActive Juice Webinar presentation evaluation

Appendix 8 – Infographics

Appendix 9 – Savouring Citrus Recipe booklet

Appendix 10 – Dietitian Australia 2023 Conference presentation

Appendix 11 – Nutrition Society of Australia 2023 Conference presentation

Appendix 12 – Dietitian Australia 2024 Evaluation

Appendix 13 – Digital Activation Campaign Evaluation

Appendix 14 – EDMs

Appendix 15 – HCP Database (confidential sent separately)

Appendix 16 – PRG Meetings

Appendix 17 – Citrus News

Appendix 18 – Growers Conference Mildura 2023 Presentation

Appendix 19 – Growers Conference Griffith 2023 Presentation

Appendix 20 – Growers Conference Sunshine Coast 2024 Presentation

APPENDIX 1

NUTRITIONiQ™

CT21006: Citrus HCP

February 2023



Background:

Hort Innovation tendered a 2-year project for the Citrus industry, to educate HCP on nutrition & health benefits of citrus.



Its aim is to position citrus as an important component of a healthy diet and showcase their unique value proposition in contributing to diets, ultimately influencing healthcare professional recommendation and supporting increased citrus consumption.



The opportunity:

How to get healthcare professionals to recommend and support consumption of citrus fruit and its juices?

Two separate communication objectives identified

	1. Citrus Fruits 		2. Citrus Juices 	
	FROM	TO	FROM	TO
THINK	Citrus = vit C = not important	Citrus = vit C + flavanones = Therapeutic solution = Citrus is medicine	Full of sugar, low in fibre	Full of goodness = beneficial for health
FEEL	Neutral (just another fruit)	Positive (superior therapeutic properties)	Negative – Neutral (guilty about its nutrition)	Neutral – Positive (reassured in its nutrition)
DO	Not recommending	Top of mind recommendation to address specific health concerns	Recommend to avoid	Recommend as sometimes to everyday (core) food

* Recommend that project outcomes are refined to reflect these differences.



Messaging: The 'What'

The problem

How to get healthcare professionals to recommend and support consumption of citrus fruits and its juices?

Objectives

1. Awareness & identification of citrus fruits nutrition & health benefits.
2. Increasing confidence in discussing health benefits of citrus fruit.

1. Awareness & identification of citrus juice nutrition & health benefits
2. Increase confidence in correcting misinformation on citrus juice.

Primary messaging

1. Citrus as Medicine (Citrus fruit)

- “More to Cee in Citrus”
- Outstanding matrix of nutrients & bioactives
- Bioactive superfood, highest in flavanones
- Supports immunity, CVD, brain (gut) health
 - Leverage vit C credentials
 - Make citrus top of mind again
 - Citrus types

2. Juicy Myths (Citrus juices)

- “More to See than Sugar”
- Umbrella review science
- Leverage the goodness of citrus fruits
- Bioactive profile & mechanisms
 - Myth-busting
 - Citrus juice types

Secondary messaging

3. Engage & inspire with culinary cues, practical tips & refreshing recipes

4. Leverage sustainability facts: Nature's perfect package



Execution: The 'How'



Make HCP group specific

- Different HCPs have different needs and knowledge base
- Tailor key message to the different HCP audiences



Develop range of collateral types

- Range of preferences for educational resources
- Employ brochures, infographics, video, and webinars



Manage juicy myths messaging risks

- Juice message risk of backlash
- Citrus messaging to be first
- Leverage umbrella review
- Develop coalition of supporters - Communicate to academic and KOL communities first

How to get healthcare professionals to recommend and support consumption of citrus fruit and it's juices?



HCP audience segmentation: The 'WHO'

	PROS	CONS	ASSESSMENT	RECOMMENDATION
Dietitians Registered nutritionists	<ul style="list-style-type: none"> Trusted experts in nutrition. Influencers of wider HCP landscape, including public health policy (very relevant for juice). 	<ul style="list-style-type: none"> Moderate - Low reach consumer. Focused on nutrients and little knowledge of bioactives. 	<ul style="list-style-type: none"> Key group to develop as advocates to ensure successful project outcomes and interested in how food can support their client's health. 	<ul style="list-style-type: none"> Primary group to target and develop as advocates. Target for both citrus fruit & juice campaigns with multiple and repeated touchpoints
GPs	<ul style="list-style-type: none"> High trust and reach Neutral-positive to juice 	<ul style="list-style-type: none"> Very little time for nutrition & can be hard to reach Current science not strong enough to be solution to their problems 	<ul style="list-style-type: none"> Unlikely to see significant shift in recommendation behaviour – lower ROI 	<ul style="list-style-type: none"> Do not target
Practice Nurses	<ul style="list-style-type: none"> High trust and reach More time & discuss nutrition Easier to reach than GPs 	<ul style="list-style-type: none"> Low nutrition knowledge, Group most likely to be negative to juice. 	<ul style="list-style-type: none"> High reach and trusted consumer influencer that is receptive to nutrition education. Providing health promotion advice. 	<ul style="list-style-type: none"> Primary group to target Target for both citrus fruit & juice campaigns with simpler messaging
Naturopaths Nutritionists (non-degree qualified)	<ul style="list-style-type: none"> High trust and primary provider for 5% population Key advocates as food as medicine and Juice not significant issue 	<ul style="list-style-type: none"> Poor food composition knowledge – lack of awareness citrus good source C and not making food as medicine link with citrus. 	<ul style="list-style-type: none"> Targeting will ensure coverage of all primary providers to consumers. 	<ul style="list-style-type: none"> Secondary group to target. Target for Citrus fruit only
Personal trainers	<ul style="list-style-type: none"> High reach and trust 	<ul style="list-style-type: none"> Focused only on weight management/sport where citrus has little credibility and likely will not solve their problems. Negative perceptions juice and likely to be key detractors to consumers on juice 	<ul style="list-style-type: none"> High reach and trusted consumer influencer. Most likely not talking fruit but will be actively recommending avoidance juice for weight. 	<ul style="list-style-type: none"> Secondary group to target Target for Citrus juice only
Key HCP influencers	<ul style="list-style-type: none"> High trust and reach. Key influencers younger demographic group and HCP community. Key to building coalition of supporters to drown out detractors 	<ul style="list-style-type: none"> Farm tours and related activations expensive to engage 	<ul style="list-style-type: none"> ROI not justified to actively target with farm tour but one-on-one KOL engagement more viable. This however will be already taking place concurrently as part of ABCL juice project 	<ul style="list-style-type: none"> Target via personalised invites to 'Citrus as medicine' webinar and follow up with social pack. Link into ABCL project KOL engagement on juice.



Audience & Timings

Campaign Focus

Citrus as Medicine

Juicy Myths

Unique Audience Segments

1. Nutrition & Dietetics Community

2. Medical Profession

3. Holistic Wellness

1. Nutrition & Dietetics Community

2. Medical Profession

4. Fitness Industry

Audience subset – Key Area of Practice

Dietitian influencers & in Private Practice, Academia & Food Comms

Practice Nurses

Naturopaths
Nutritionists

Dietitians in Private Practice, Academia & Food Comms

Practice Nurses

Personal Trainers

Timings

March - December 2023

November 2023 - July 2024



Activation on a page: Citrus as Medicine

Phase 1: March – December 2023

TYPE	HOW (ACTIVATION PLAN)	WHO (TARGET AUDIENCE)	ACTIVATION CHANNEL	WHEN (TIMING)
Resources	Recipes + Fun Facts + Sustainability key messages	All	Integrated within existing resources	April 2023 – to feed into other resources
	HCP fact sheets x 3 – CVD, Immunity, Gut	Dietitians Naturopaths	Digital outreach campaign (social media, dedicated HCP channels)	Immunity –1 June 2023 (Winter) Brain (Gut) – July 22nd 2023 (World Brain Day) CVD – September 2023 (World Heart Day)
	Client facing fact sheet x 1 – Citrus as Medicine	Practice Nurses Dietitians Naturopaths	Digital outreach campaign (social media, dedicated HCP channels)	October 2023
	Infographic brochure – Citrus as Medicine	Dietitians Naturopaths Practice Nurses	Digital outreach campaign (social media, dedicated HCP channels) Nutrition Influencers	October 2023
	Social media tiles & video reel	All	Digital outreach campaign (social media, dedicated HCP channels) NRAUS Nutrition Influencers	October 2023
Webinar	NRAUS hosted webinar – Citrus as Medicine	Dietitians Naturopaths	NRAUS	November 2023
		Practice Nurses	Digital outreach campaign (social media, dedicated HCP channels)	
Ongoing	EDM - Resources	All	Database	Ongoing
	Website content creation	All	Database	May 2023 Ongoing



Activation on a page: Juicy Myths

Phase 2: November 2023 – July 2024

TYPE	HOW (ACTIVATION PLAN)	WHO (TARGET AUDIENCE)	ACTIVATION CHANNEL	WHEN (TIMING)
Resources	Infographic brochure – Juicy Myths	Dietitians Practice nurses Personal trainers	Digital outreach campaign (social media, dedicated HCP channels)	February 2024
	Umbrella review summary – video/animation	Dietitians Practice nurses Personal trainers	Digital outreach campaign (social media, dedicated HCP channels)	February 2024
	Social media tiles	All	NRAUS HCP Influencers	February 2024
Webinars	NRAUS hosted webinar – Juicy Myths	Dietitians Practice Nurses	NRAUS Digital outreach campaign (social media, dedicated HCP channels)	March 2024
	AUSActive hosted Juicy Myths webinar	Personal trainers	AUSActive Digital outreach campaign (social media, dedicated HCP channels)	April 2024
Conferences	NSA Conference presentation – Umbrella review	Academia	NSA Conference	TBC (~November 2023)
	DA Conference presentation – Umbrella review DA Conference booth – Juice bar Q&A	Dietitians	DA Conference	July 2023 TBC (~July 2024)
Ongoing	EDM - Resources - Umbrella review	All	Database	Ongoing
	Website content creation	All	Database	Ongoing



Key deliverables and inter-connections

Educational events:

Conferences & Webinars to Seed juice Science to Academia & Educate clinicians on benefits citrus & its juices



Dietitian Australia Conference
July 2023 Umbrella review Abstract
2024: Juice focus trade display



Webinar Nov 2023 Dietitians, Naturopaths, Practice Nurses



Nutrition Society Australia Conference
2024: Present Juice SLR



Webinar March & April 2024: Dietitians, Practice Nurses & Fitness professionals

Drive attendees to hub & database

Web-page:

Citrus Digital Hub – Nutrition & Health Section as central information repository



Resources:

- 2 x **Infographics** – Citrus as medicine, Juicy myths
- 3 x **HCP Factsheets**: Immunity, CVD, Gut health
- 1 x **Consumer Factsheet**: Citrus as medicine
- **Video** (2min) – Juice scientific review
- **Webinar recordings**: Citrus as Medicine, Juicy Myths
- **Social media pack** Static tiles, recipe stop motion reel

4+ x **EDMs** to owned Citrus HCP database

Educate, disseminate resources, drive to citrus hub



Build Database of subscribers



Digital Outreach Campaign to drive awareness hub/resources/ events & database acquisition



HCP Influencers

Personalised outreach to NRAUS Tier 1 KOLs with invite to 'Citrus Medicine' Webinar & follow up with Citrus social media & infographic kit

[Link up with ABCL juice KOL engagement project]



Thank you



@nutritionresearchaus



nr_au



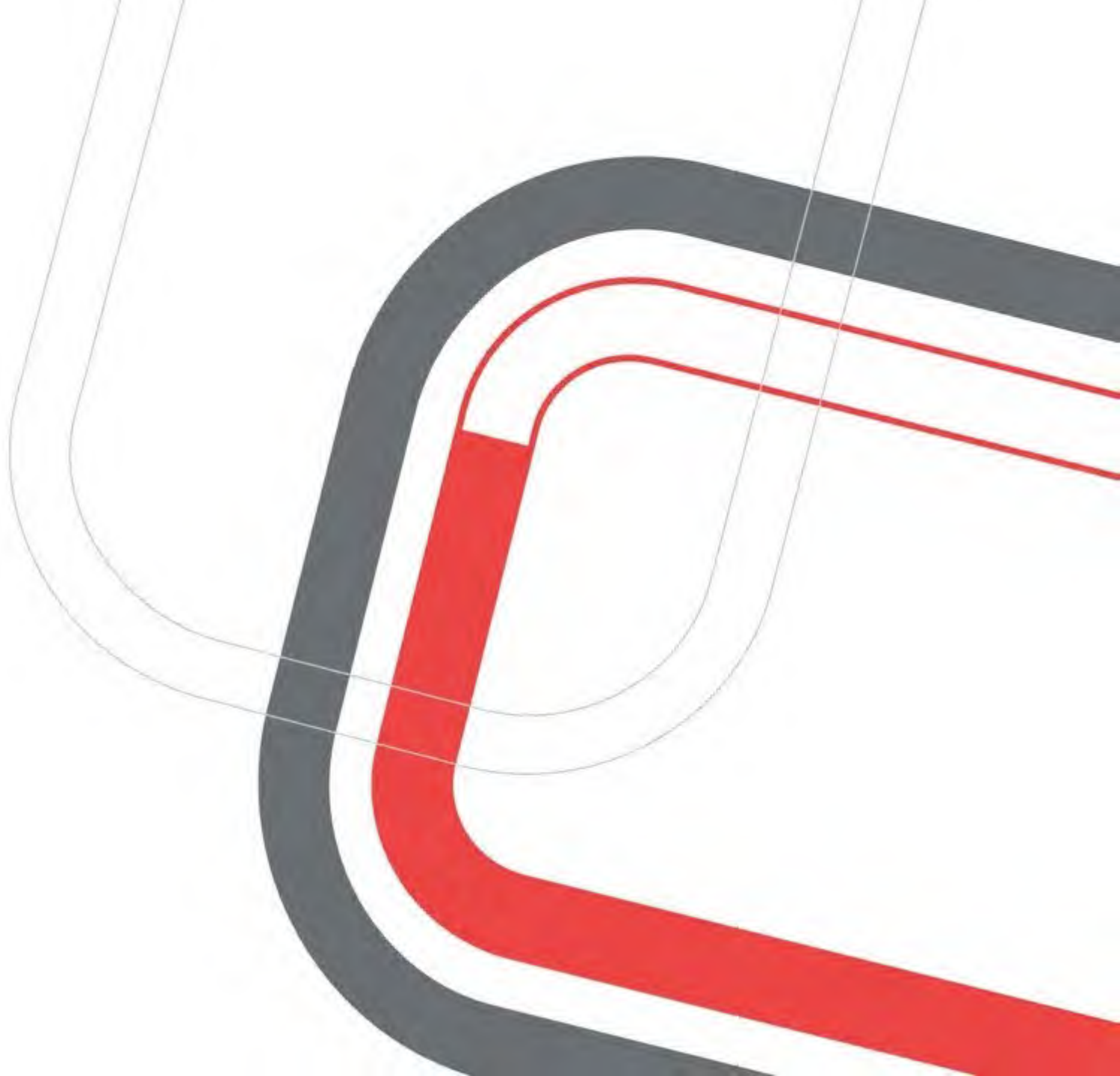
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APPENDIX 2

Citrus Market Research: Baseline Report

Prepared for Hort Innovation

December 2022



□ ackground

Project code: CT21006

Project name: Citrus Industry Health & Nutrition Education Program

Project leader: Dr Flavia Fayet-Moore

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Contents

- **Objectives & Outcomes**
- **Methods**
- **Results**
 - Audience demographics
 - HCP familiarity with the nutritional properties, and health effects of citrus fruits
 - HCP familiarity with the nutritional properties, and health effects of 100% citrus juice
 - Other considerations
- **Learnings & Recommendations**
- **Limitations**
- **Conclusions**





Objectives □ Outcomes

Objectives



1. Obtain baseline data on perceptions and attitudes to be used as a benchmark for project evaluation at project end as part of monitoring & evaluation plan.



2. Gain market insights to help tailor key message development and adjust the communication plan.

This report describes the findings from the baseline market research survey among health care professionals (HCPs). It is the first of two market research reports, with the second due to be conducted at the conclusion of the 2-year project, around February 2024.

Outcomes

The 2-year project has the following outcomes:



Health care professionals to have an increased **awareness, knowledge, and confidence** discussing the **health and nutrition benefits** of Australian citrus including oranges, mandarins, lemons, limes, and grapefruit



Health care professionals to have **access and used developed resources to educate clients** on the health benefits of Australian citrus (including oranges, mandarins, lemons, limes, and grapefruit)



Health care professionals are **aware of the health benefits of citrus juice** and are **confident correcting misinformation** regarding citrus juice.



Methods



Approach

Four separate static social tiles were created, which allowed us to test and refine the recruitment strategy.

A digital recruitment campaign was run to recruit a minimum of 200 health care professionals:

- over 6 weeks (September 26th to November 4th, 2022)
- across paid social media channels – Facebook.
- complemented with organic strategies (e.g., sharing via NRAUS employee social media accounts (Facebook, LinkedIn to professional networks).
- promoted with the chance to win 1 of 5 \$100 Visa gift cards.

To be eligible, participants had to reside in Australia, and either be a health care professional or studying to become one.



Open assets

Social Media	Spend	Impressions	Clicks	Cost per click
Facebook	\$ 225.37	23,811	126	\$1.79
Total	\$ 225.37	23,811	126	\$1.79
A further 638 clicks were achieved through organic, non-paid strategies.				
LinkedIn	\$ 0	261	12	
Other (organic Facebook, Twitter, shares)	\$ 0	-	626	





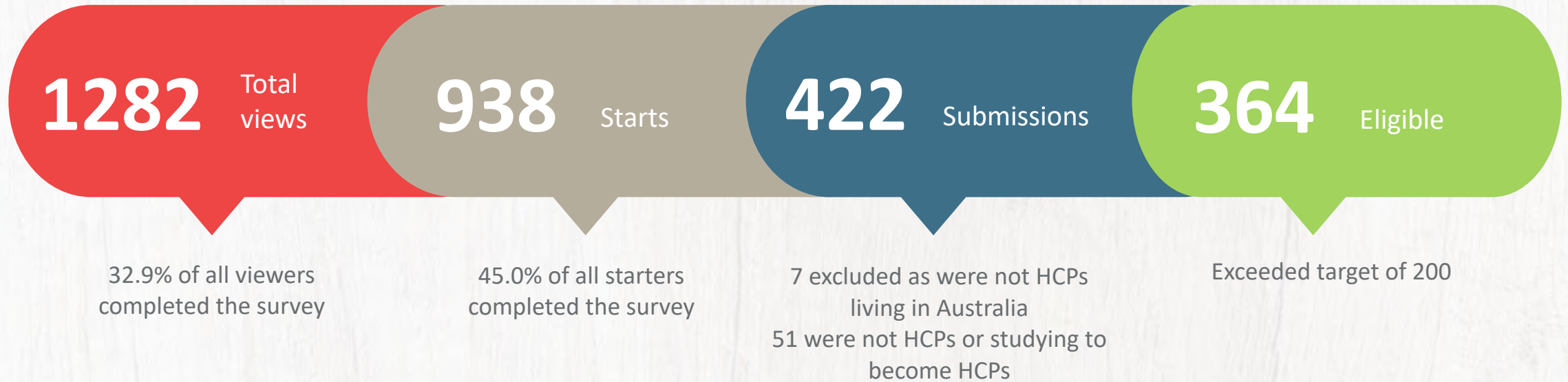
□ results

Audience demographics

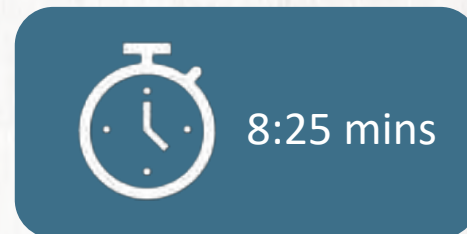


Survey stats

Participant flow:



Average time to complete:



Note: The increased time for completion compared with previous surveys results from the time respondents spent responding to question XX: Why do you consider citrus juice to be discretionary/core?

Audience Segmentation



Age: 85% were 25-44

- 50% 25-34yrs
- 35% 35-44yrs
- 8% 45-54yrs
- 4% 55+yrs
- 3% 24yrs or younger

* 1 participant chose not to disclose



Sex: 55% female

- 55% Female
- 43% Male
- 1% Other/non binary

* 3 participants chose not to disclose



State: QLD most popular

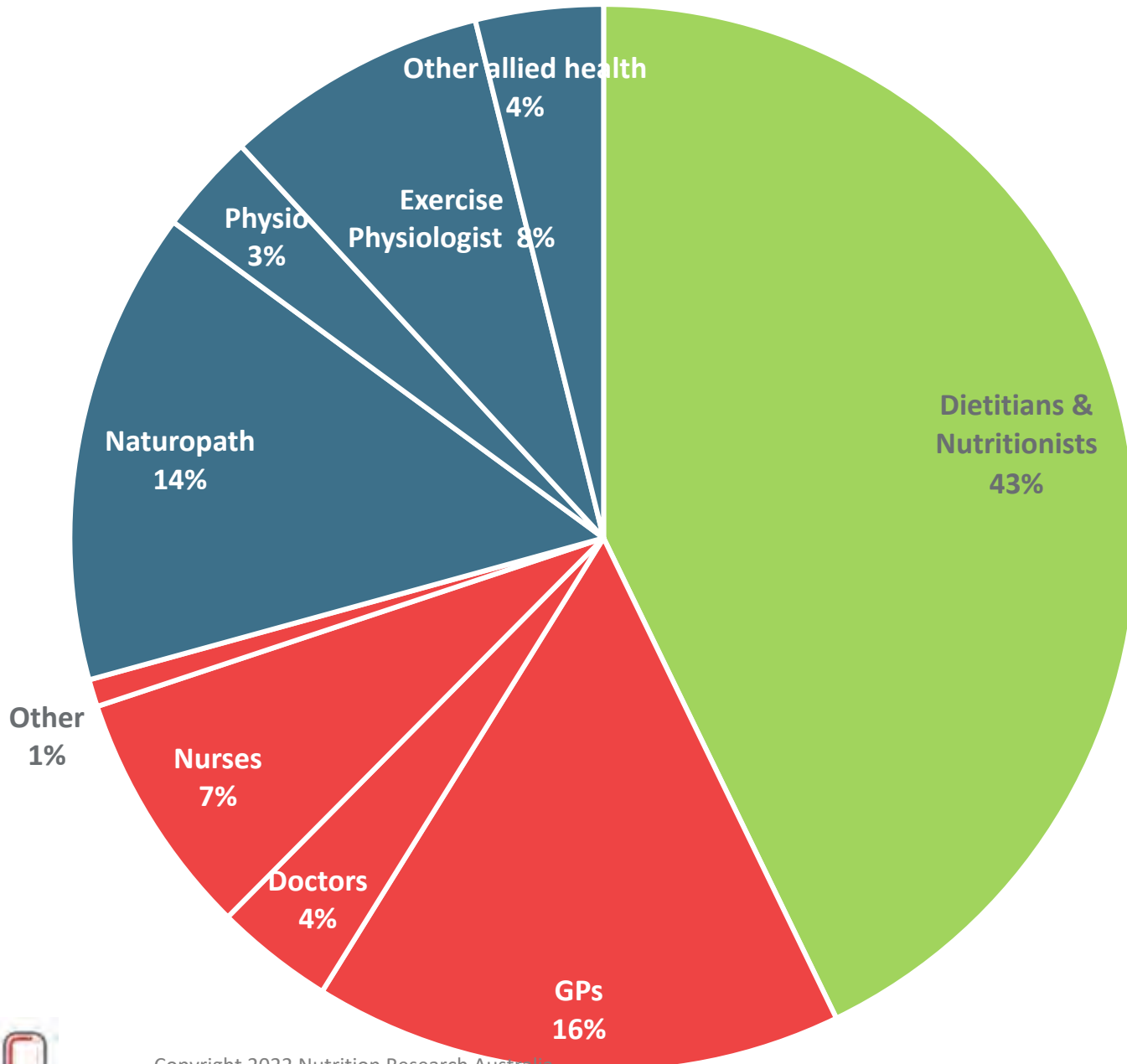
- 22% QLD
- 18% NSW
- 18% VIC
- 17% WA
- 15% SA
- 10% ACT, NT, TAS



Students: 1 in 4

- 73% HCPs
- 27% studying

There was a fairly even spread across sectors, with two-thirds (66%) working in clinical, private practice, or public health



Setting of current practice:

- 34% in clinical
- 18% in public health
- 14% in private practice
- 14% in education/tertiary
- 10% in research
- 6% management or other
- 3% currently studying



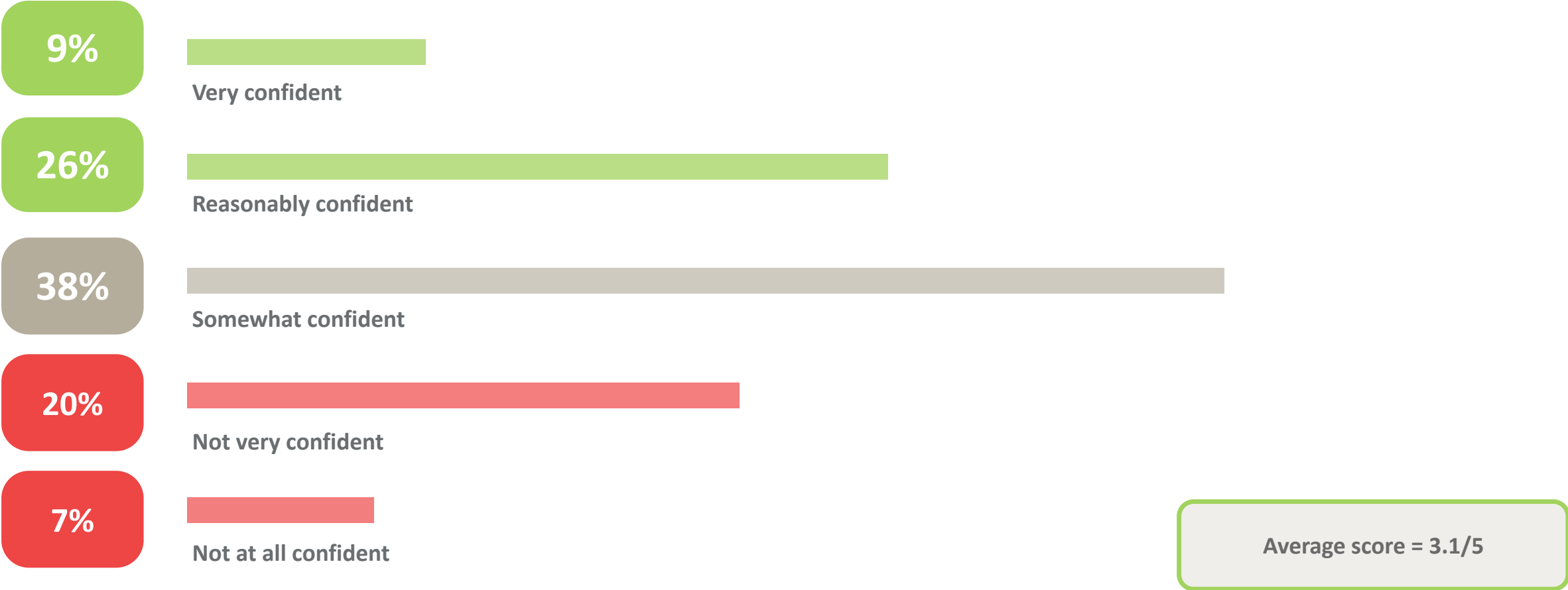


□ results

HCP familiarity with the nutritional properties, and health effects of citrus fruits

The majority (73%) of respondents feel at least somewhat confident in discussing the nutrition and health benefits of Australian citrus fruit with one third rating themselves very or reasonably confident.

Q. On a scale between 1 and 5, where 1 is 'not confident at all', and 5 is 'very confident', how confident do you feel in discussing the nutrition and health benefits of Australian citrus fruits?



Confidence levels were similar across all professions, with nutritionists and physiotherapists feeling the most confident.

Q. On a scale between 1 and 5, where 1 is 'not confident at all', and 5 is 'very confident', how confident do you feel in discussing the nutrition and health benefits of Australia citrus fruit? (by profession)

Profession	n	Mean	SD
Dietitians	97	3.1	0.9
Nutritionists	58	3.4	1.0
Physiotherapist	11	3.4	1.6
General Practitioner	58	3.2	0.8
Nurse	27	3.1	1.1
Other allied health	3	3.0	0.0
Other	2	3.0	0.0
Naturopath	52	2.8	1.3
Exercise physiologist	29	2.8	0.9
Medical doctor other than GP	13	2.8	0.9

SD = standard deviation



Over half (68%) of all HCPs felt familiar with the specific nutritional properties of Australian citrus fruit

Q. How familiar are you with the different **nutritional properties** (nutrient content and bioactive components) of Australian citrus fruit?

2%



Academic knowledge and actively seek more information

12%



Very familiar as I have attended events/seminars/read resources

43%



Familiar and can specify them

37%



Familiar with some aspects but cannot specify them

5%

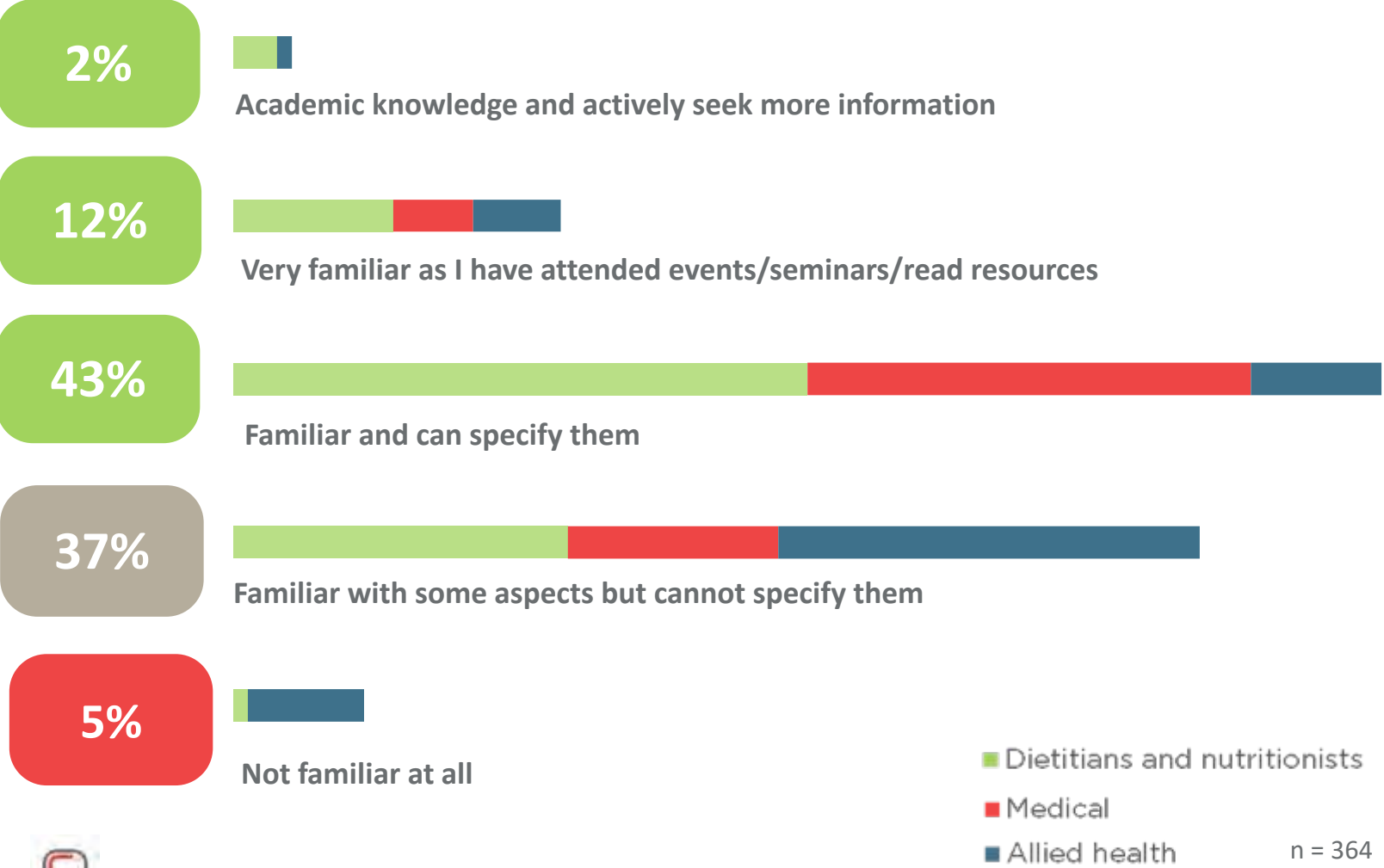


Not familiar at all



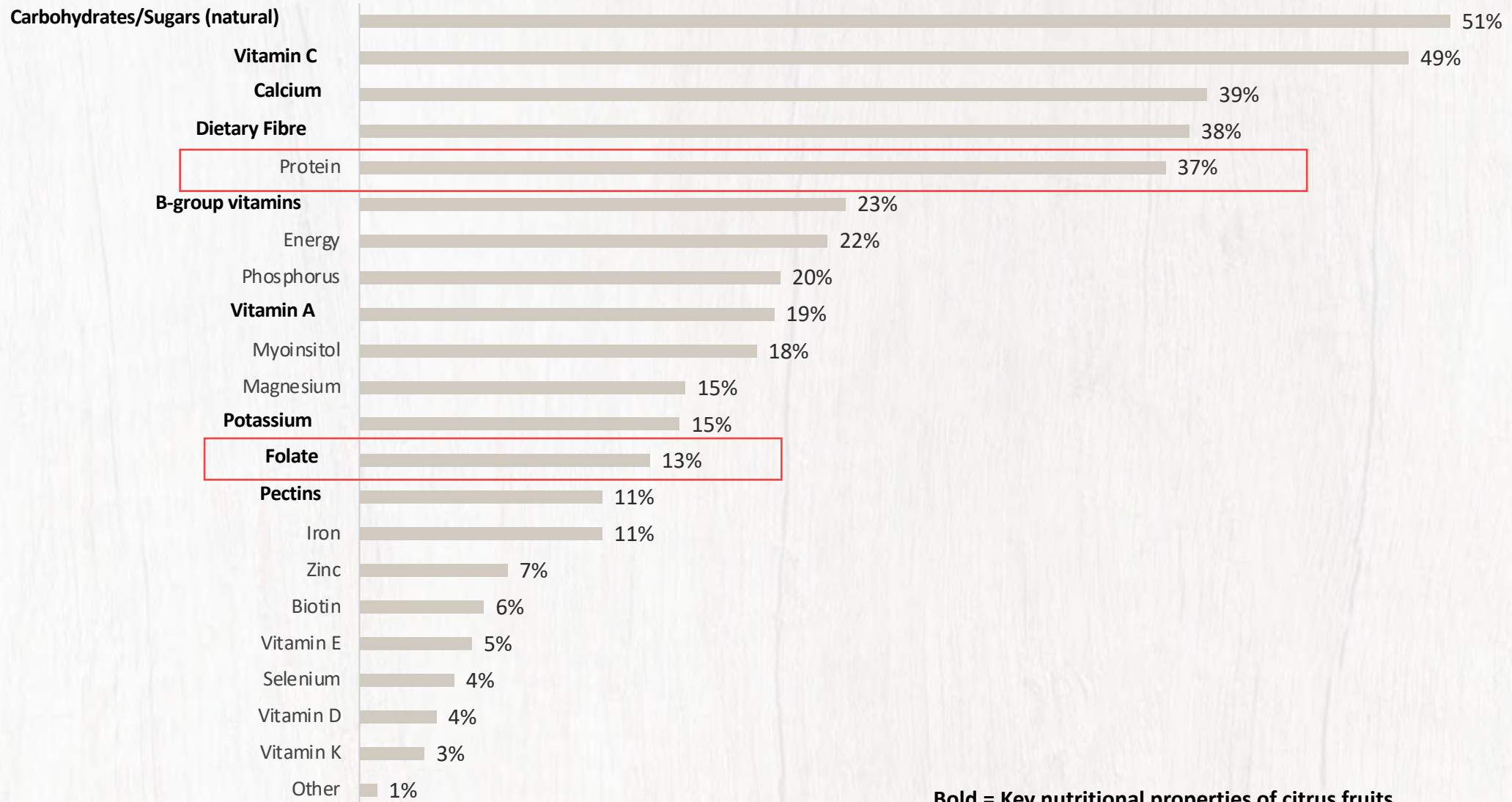
The majority (57%) of HCPs felt familiar with the different nutritional properties of Australian fruit, with a similar spread across professions.

Q. How familiar are you with the different nutritional properties (nutrient content and bioactive components) of Australian citrus fruit?



Half of respondents were able to correctly identify some of the common nutritional properties of citrus fruit, but many missed key nutrients (such as folate) or identified incorrectly (such as protein), indicating an overall lack of knowledge.

Q. In your opinion, what are the key nutritional properties of Australian citrus fruit?

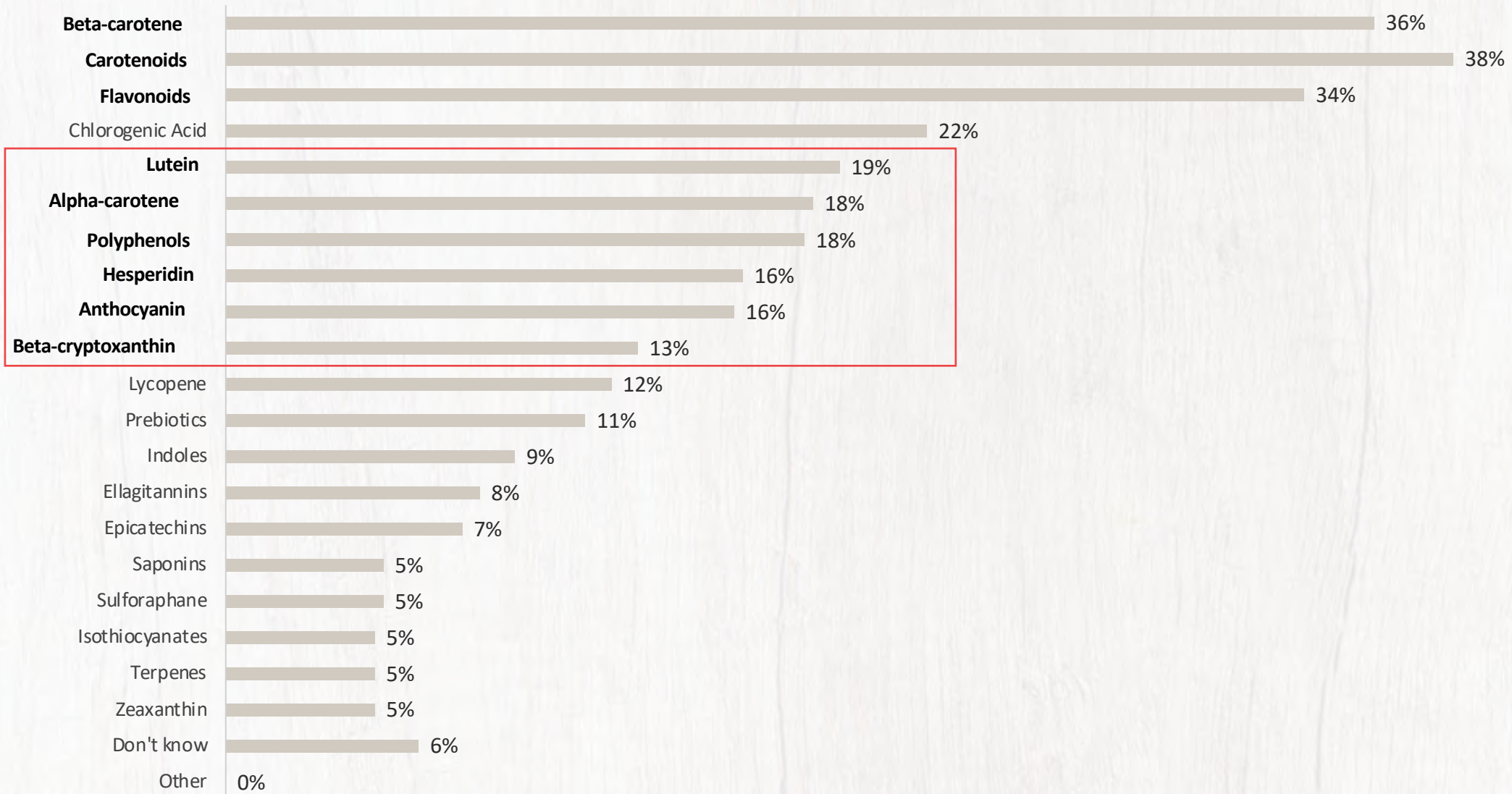


Bold = Key nutritional properties of citrus fruits.



Only one third recognized the well-known bioactive groups of carotenoids and flavonoids and less than 20% were familiar with individual bioactives found in citrus fruit.

Q. In your opinion, what are the key bioactives of Australian citrus fruit?



Bold = Key bioactives provided by citrus fruit.



The majority of respondents (83%) feel somewhat familiar with the health benefits of citrus, but only half of those felt confident in specifying them.

Q. How familiar are you with the different **health benefits** of Australian citrus fruit?

1%



Academic knowledge and actively seek more information

14%



Very familiar as I have attended events/seminars/read resources

43%



Familiar and can specify them

40%



Familiar with some aspects but cannot specify them

2%

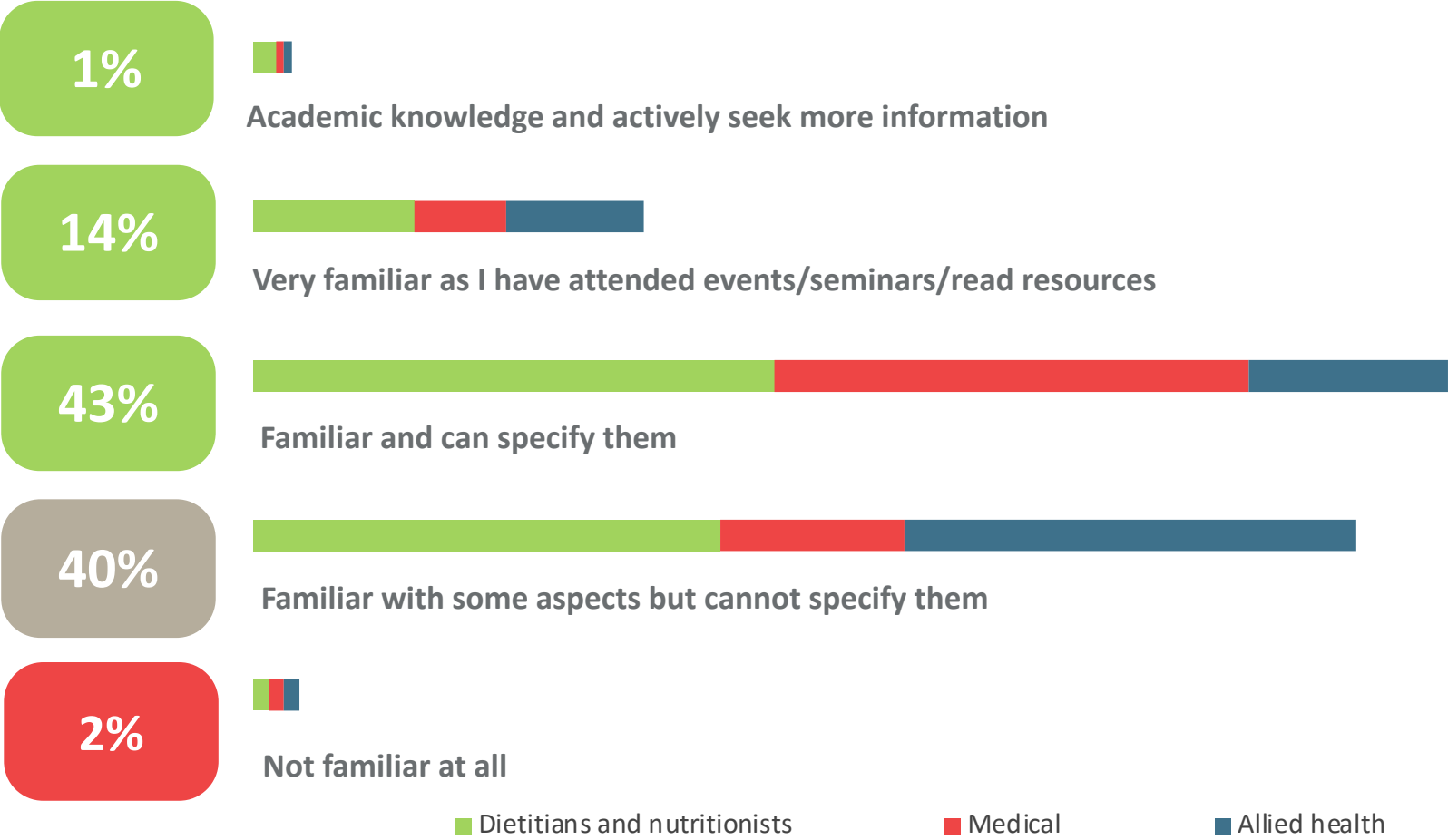


Not familiar at all



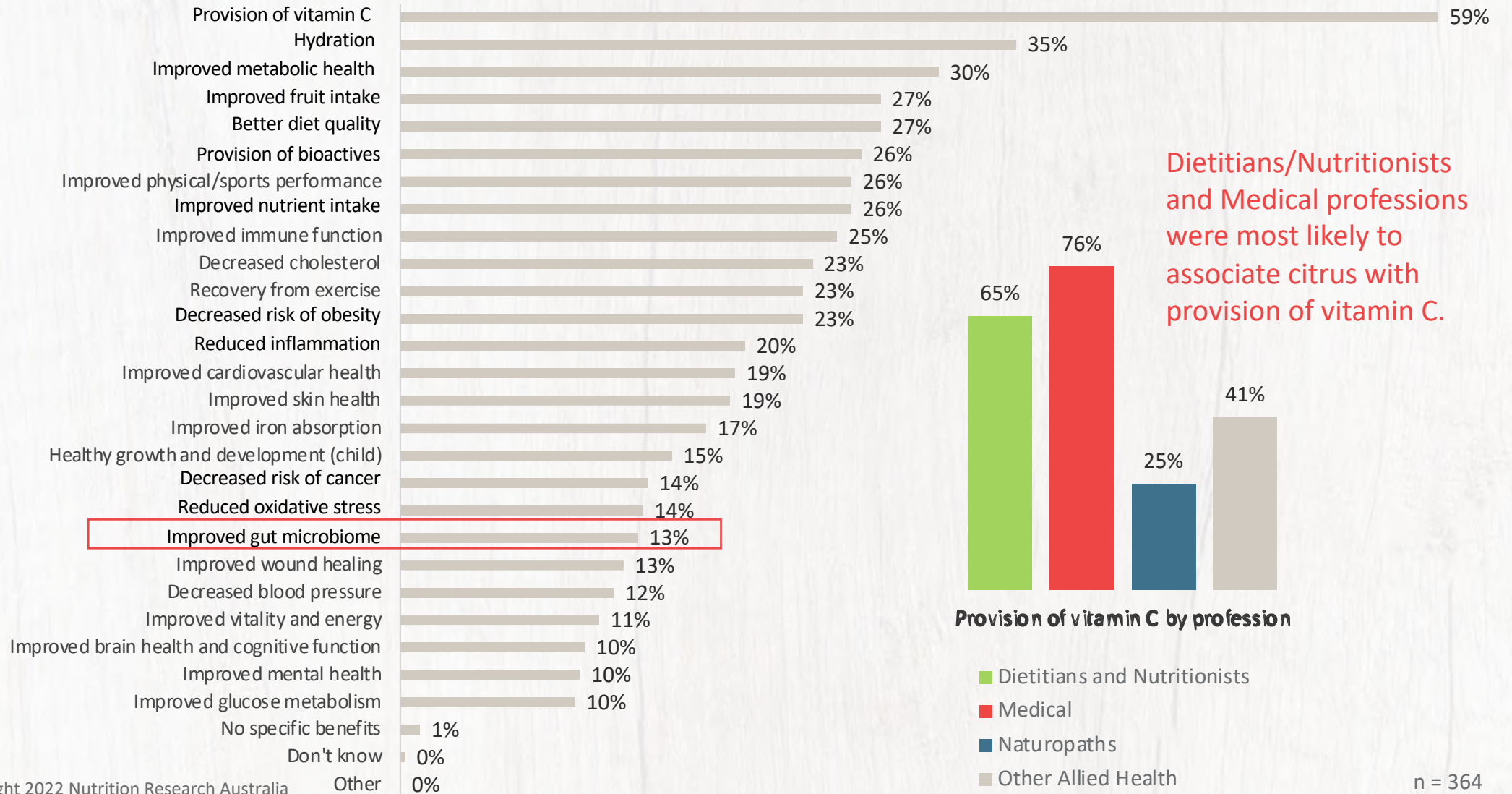
Most HCPs (58%) were familiar with the specific health benefits of citrus fruit, with consistency across all professions.

Q. How familiar are you with the different **health benefits** of Australian citrus fruit?
(By profession)



The most widely recognized benefit of citrus in the diet was for vitamin C (for key HCP groups in particular), followed by hydration and improved metabolic health; knowledge of other key health benefits, particularly gut health, was lacking.

Q. In your opinion, what are the benefits of Australian citrus fruit in the diet?



While the majority (71%) of respondents feel at least somewhat confident in discussing the nutrition and health benefits of Australian citrus, only 25% have a high level of confidence.

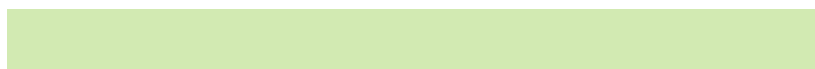
Q. On a scale between 1 and 5, where 1 is 'not confident at all', and 5 is 'very confident', how confident do you feel in correcting misinformation about the nutrition and health benefits of Australian citrus fruits?



The majority (83%) of respondents were either unaware of resources or do not use them.

Q. Which statement best describes your opinion of the resources available to healthcare professionals on Australian citrus fruit?

28%



I have resources and I intend to use them

46%



I have seen resources but am not really interested in them

26%



I don't know of any resources



For those who use resources on Australian Citrus, farmers are a respected source of knowledge across all health professions.

Q. Please briefly describe where you obtain the Australian citrus resources you use.



Dietitians & Nutritionists

Unspecified Australian content (n=4)
Farmers (n=2)
Australian Citrus (n=2)
My own research (n=2)
Friends (n=2)
CSIRO (n=1)
Medical Practitioners (n=1)
Fruit store (n=1)
Specialised course (n=1)
Unsure (n=1)



Naturopaths & Allied Health

Unspecified Australian content (n=4)
Australian Citrus (n=2)
Farmers (n=4)
Self-experimenting with fruit (n=1)
Internet (n=1)
Amazon (n=1)



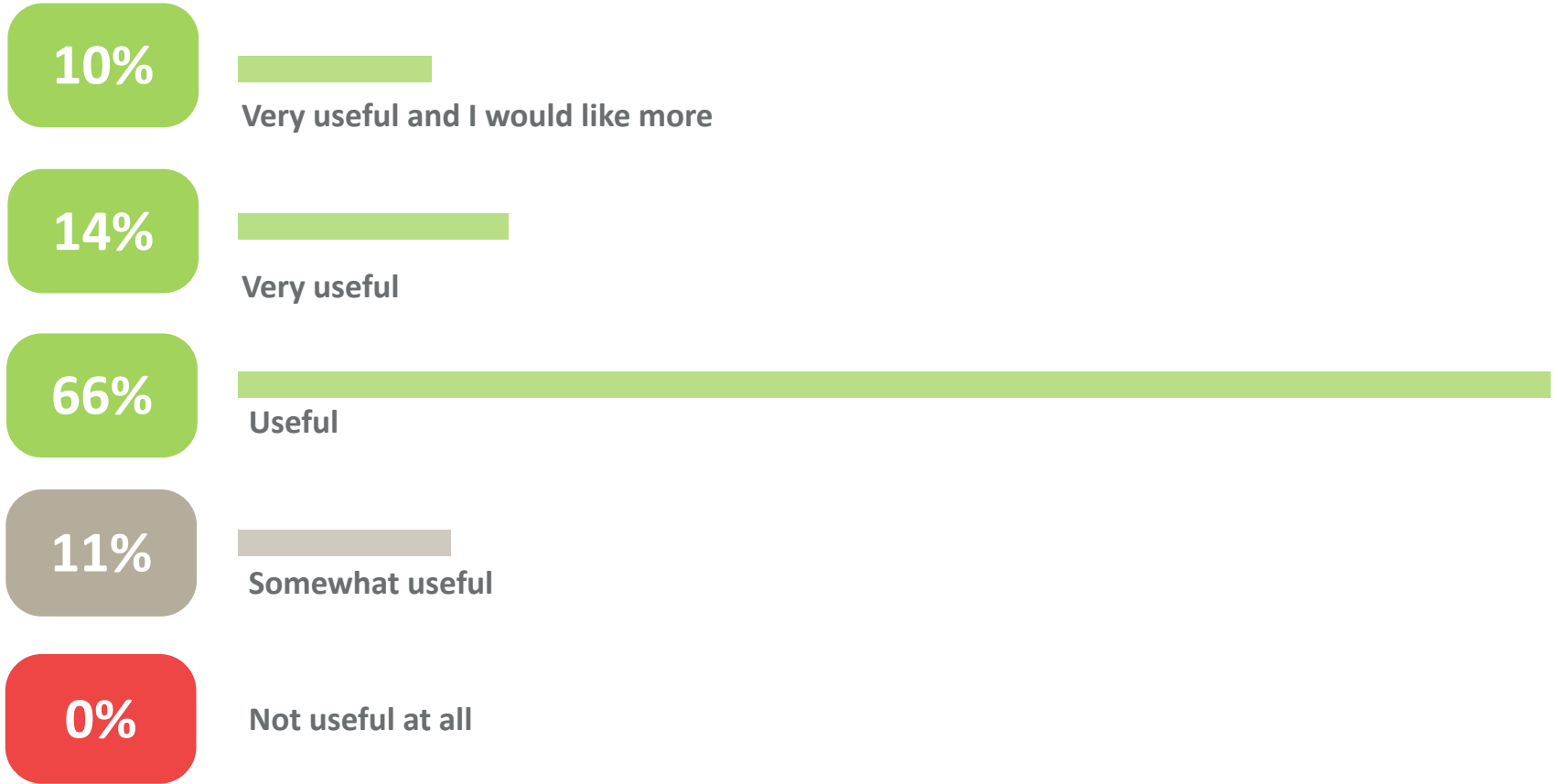
Medical

Unspecified Australian content (n=27)
Australian Citrus (n=2)
Farmers (n=3)
Unsure (n=1)
Internet (n=4)



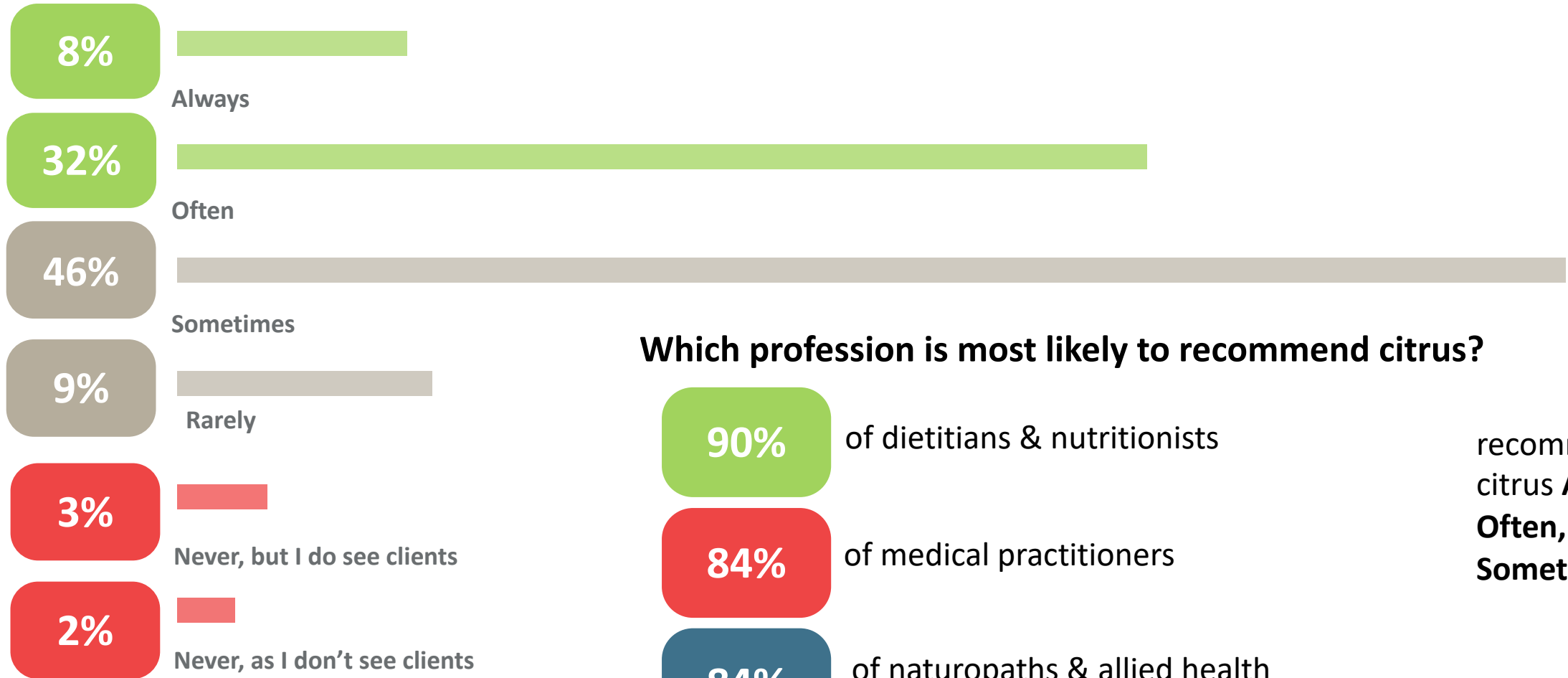
The majority (89%) of respondents who use or are aware of available resources report finding them useful. The professions that would like more resources included dietitians, GPs, naturopaths and nutritionists.

Q. Which statement best describes your opinion on the usefulness of Australian citrus resources available to healthcare professionals?

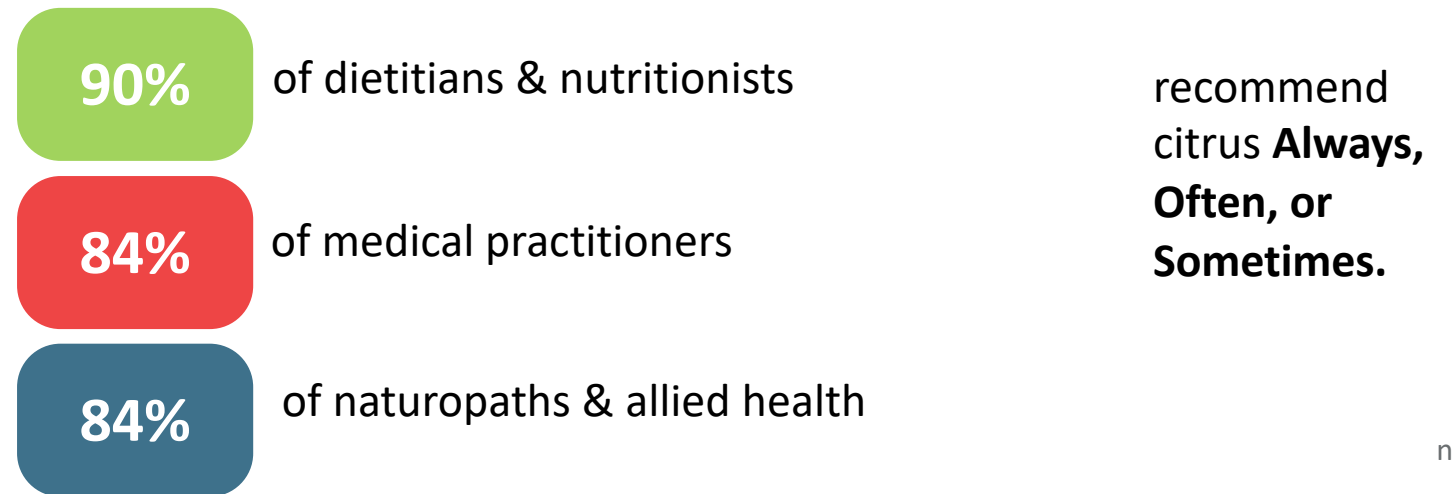


Citrus fruits are frequently recommended to clients, with 40% of respondents recommending them often or always. Dietitians were most likely to regularly recommend citrus, but a high proportion of medical practitioners and allied health also recommended citrus at least semi-regularly.

Q. Which statement best describes how often you specifically recommend citrus fruit to your clients or patients?



Which profession is most likely to recommend citrus?

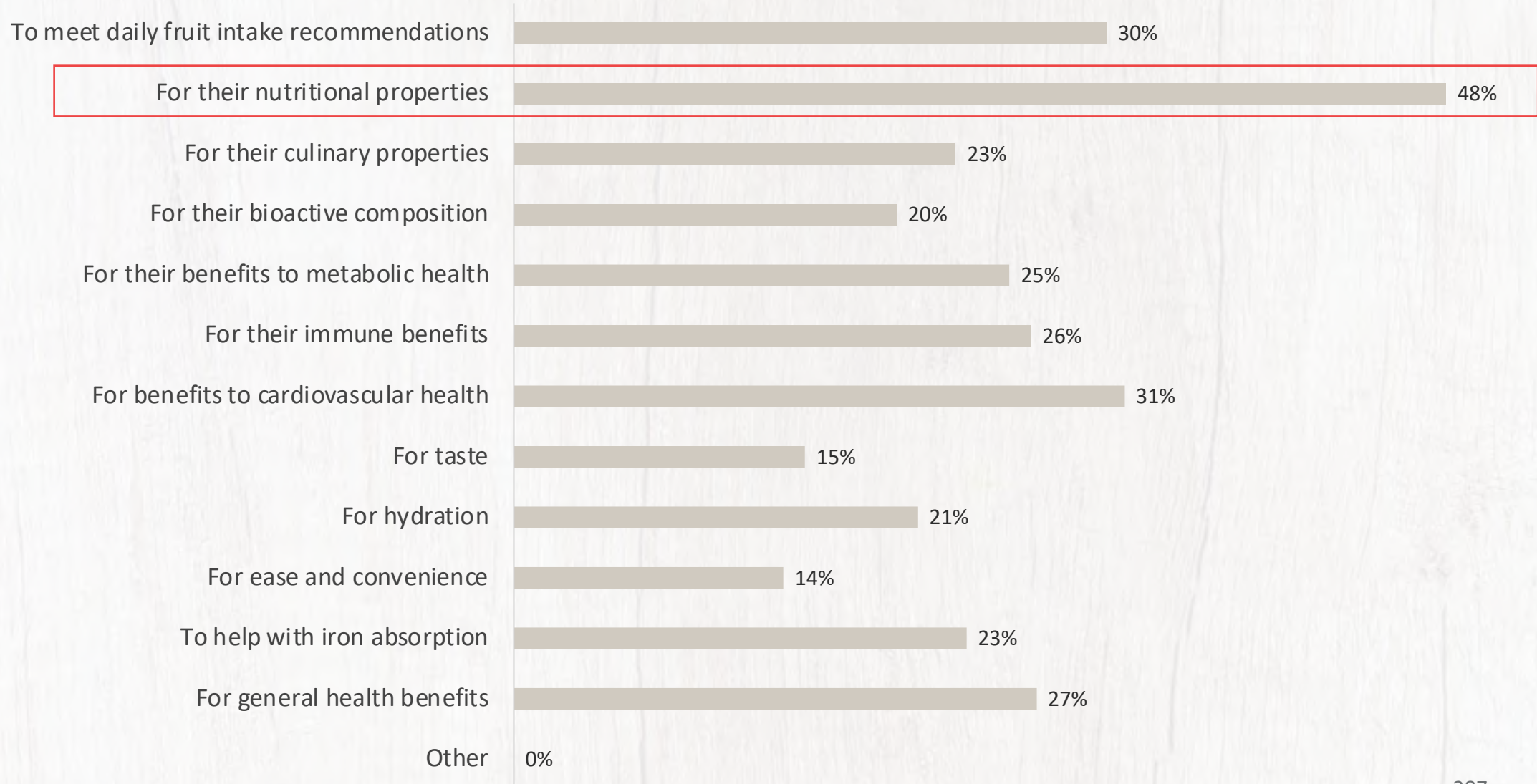


n = 364



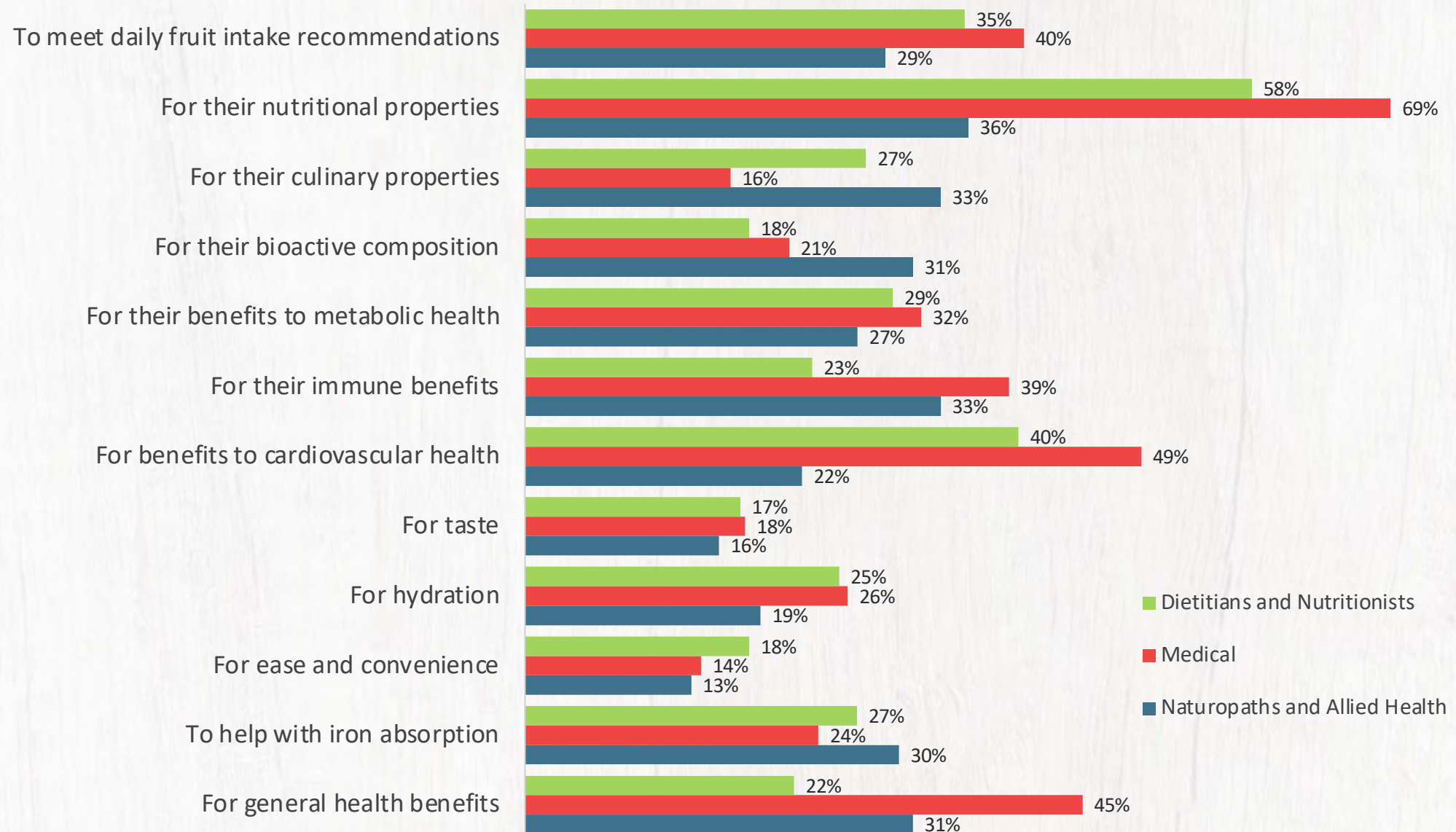
The nutritional properties of citrus fruit were the stand-out when it comes to reasons for their recommendation, followed by cardiovascular benefits and fruit intake; the health benefits provided by citrus are not well understood.

Q. Help us to understand why you recommend citrus to your clients. Tick all that apply.



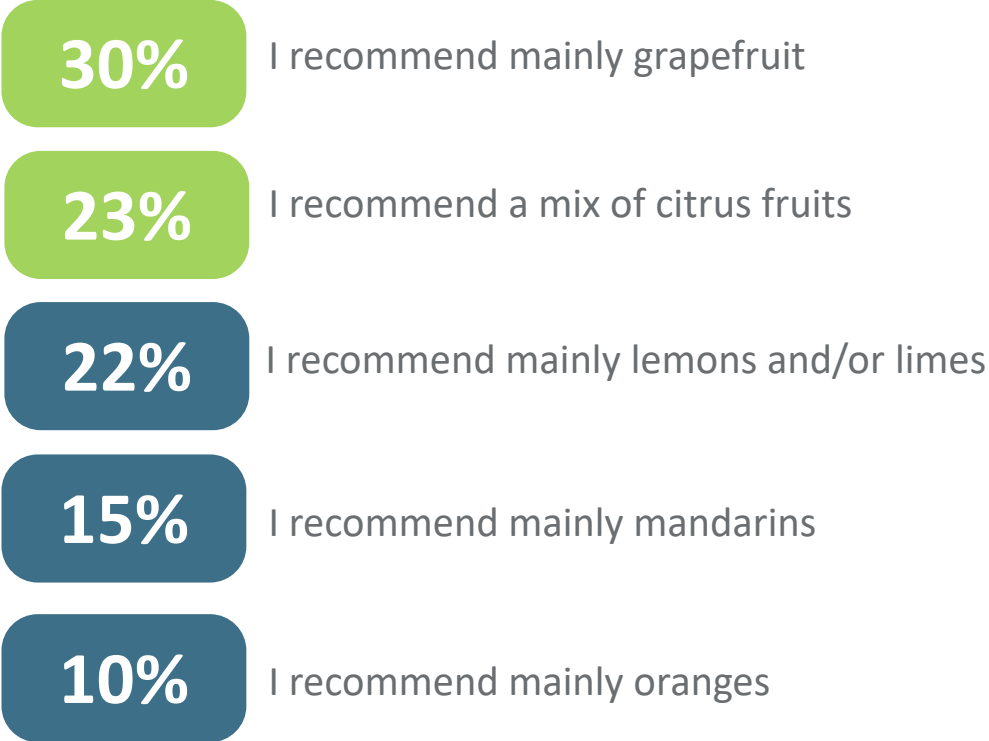
Medical professionals were far more likely to recommend citrus for its health benefits.

Q. Help us to understand why you recommend citrus to your clients. Tick all that apply (by profession).

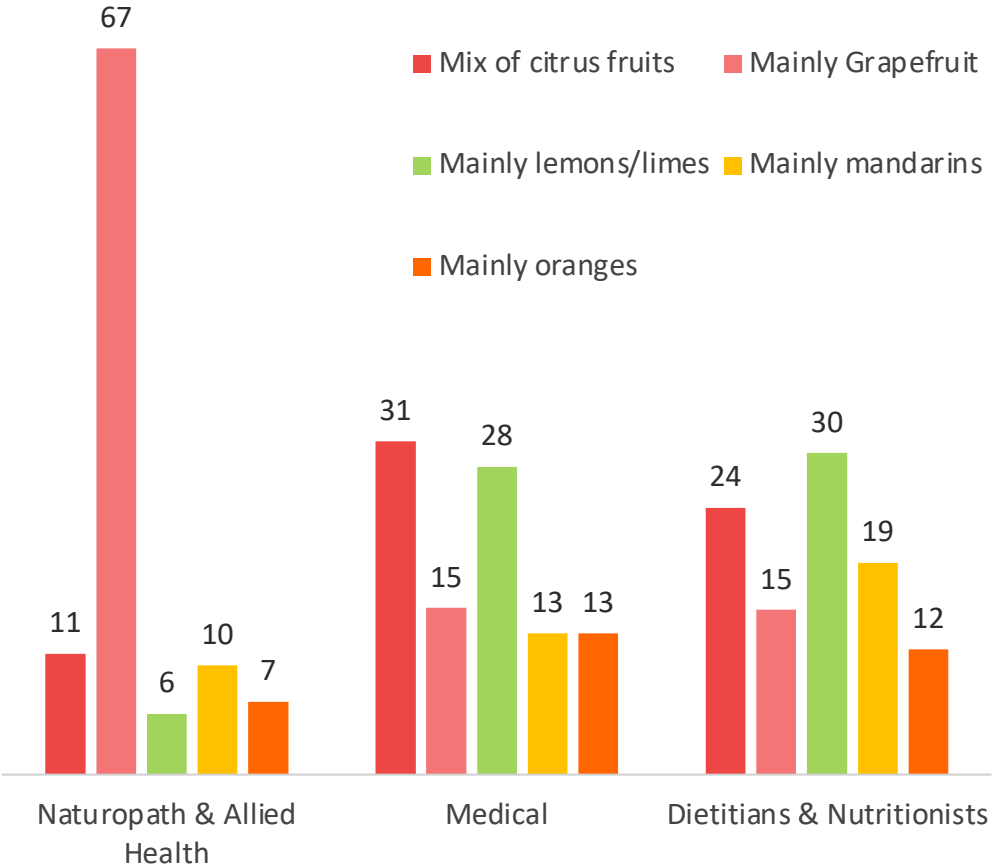


Grapefruit and lemons/limes were most likely to be recommended by HCPs to their clients, while oranges and mandarins were recommended less than 20% of the time. Naturopaths and allied health were far more likely to recommend grapefruit, whereas both medical professionals and dietitians & nutritionists most likely to recommend a mix, or recommend lemons and limes.

Q. Which statement best describes your recommendation of citrus?

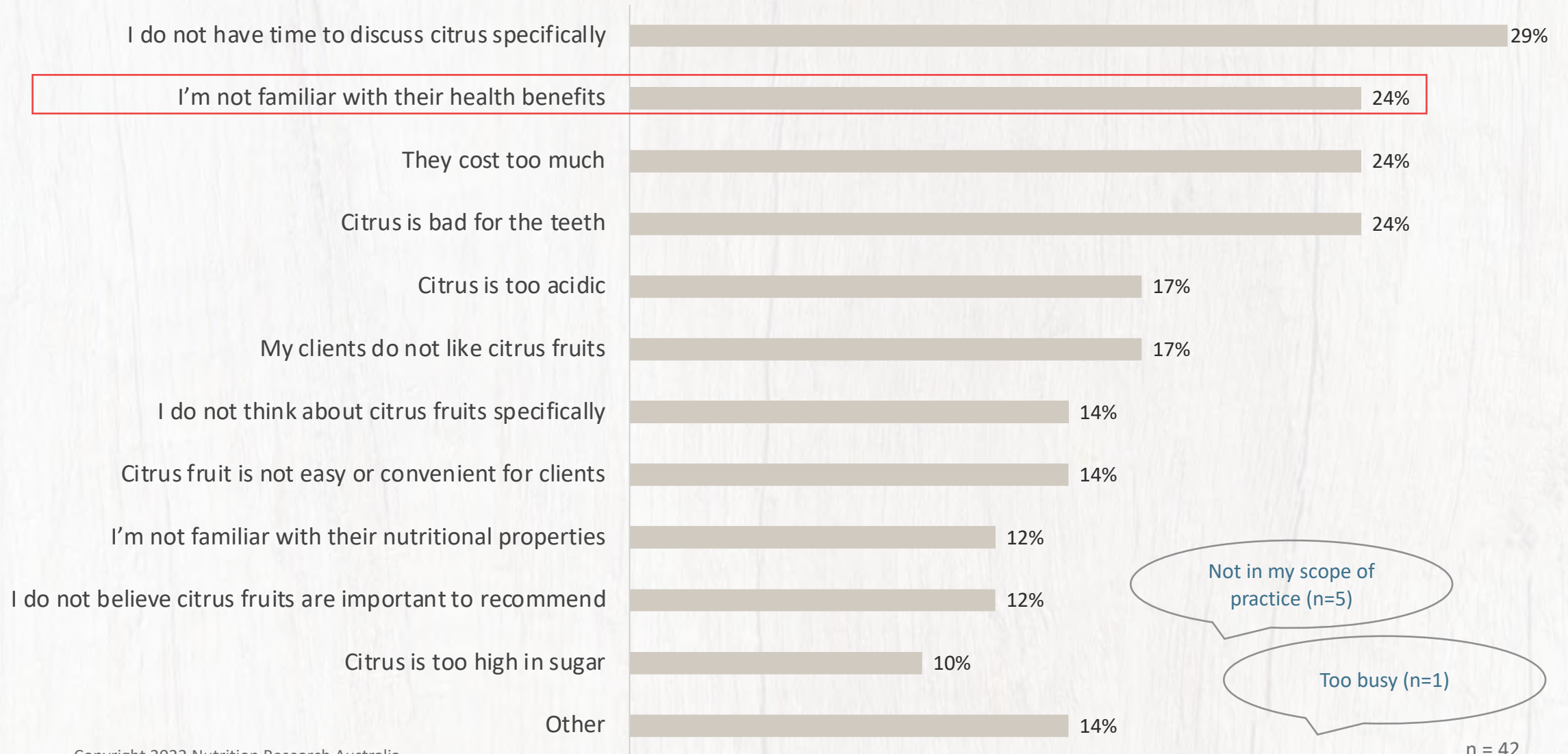


Recommendations by profession



The most common reasons citrus fruit was not recommended by HCPs were unfamiliarity with health benefits, or being bad for the teeth, in addition to not having the time, indicating a lack of awareness for citrus fruit.

Q. Help us to understand why you do **not** regularly recommend citrus fruit to your clients.



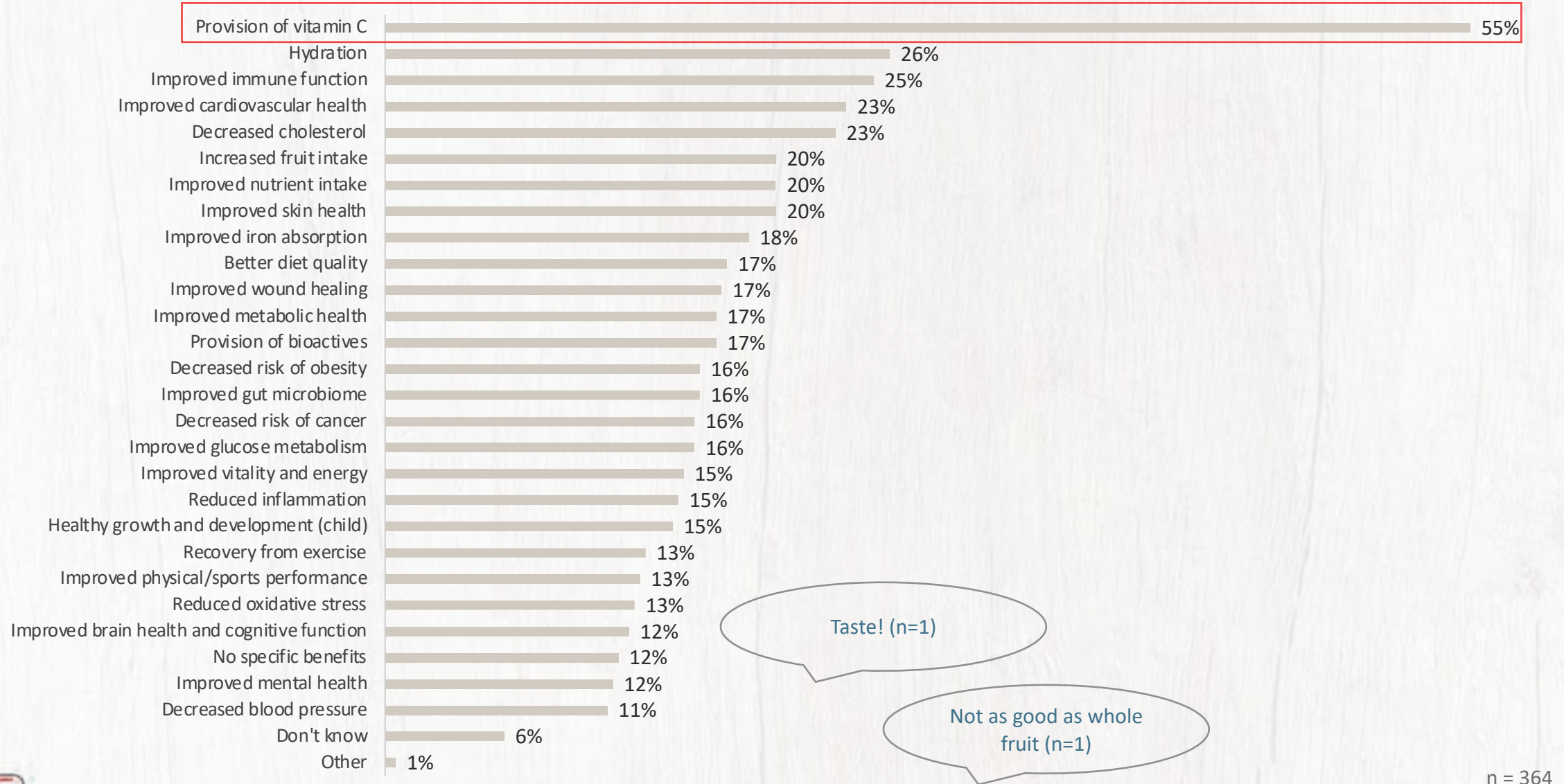


□ Results: Citrus Juice

HCP familiarity with the nutritional properties, and health effects of 100% citrus juice.

The most widely recognized benefit of citrus juice in the diet was for vitamin C; less than one third of respondents were aware of the many other benefits provided by citrus juice.

Q. In your opinion, what are the benefits of Australian 100% citrus juice in the diet?

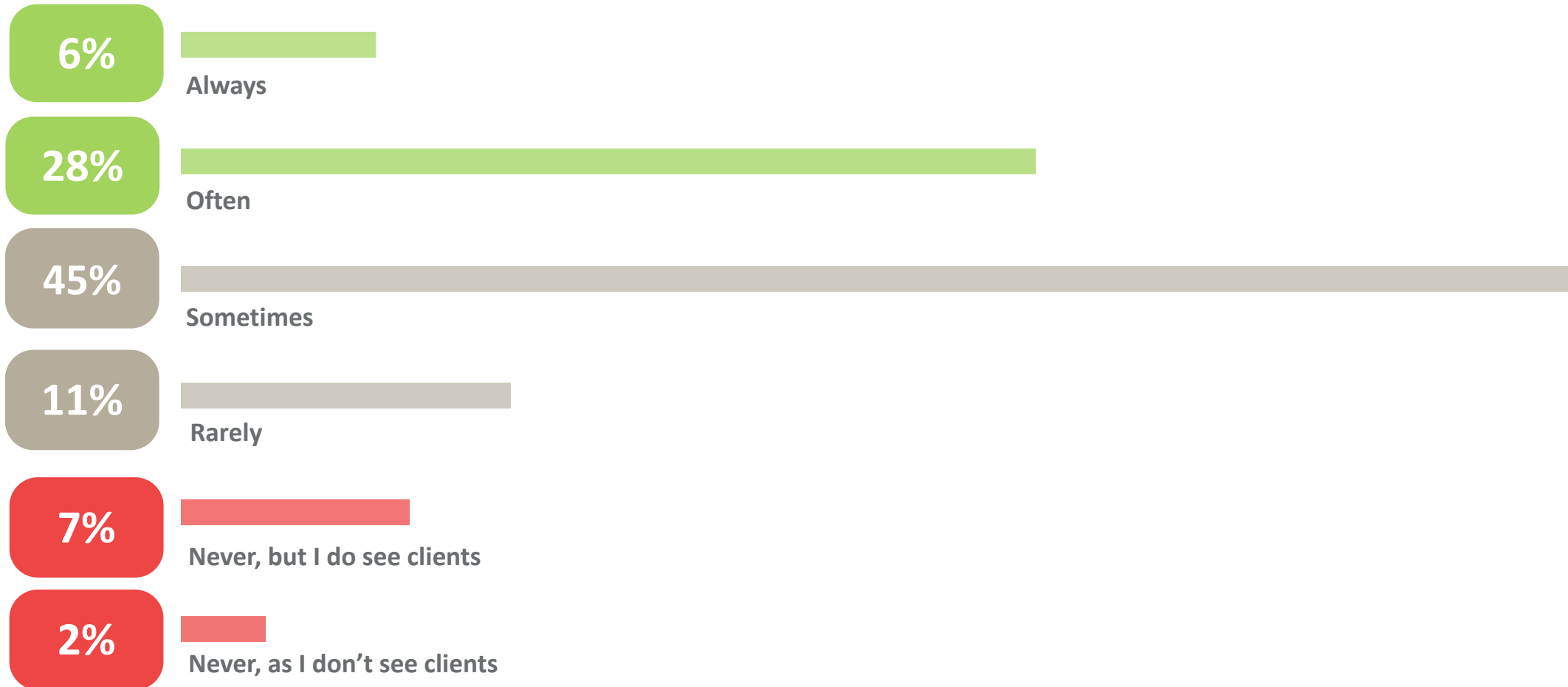


n = 364



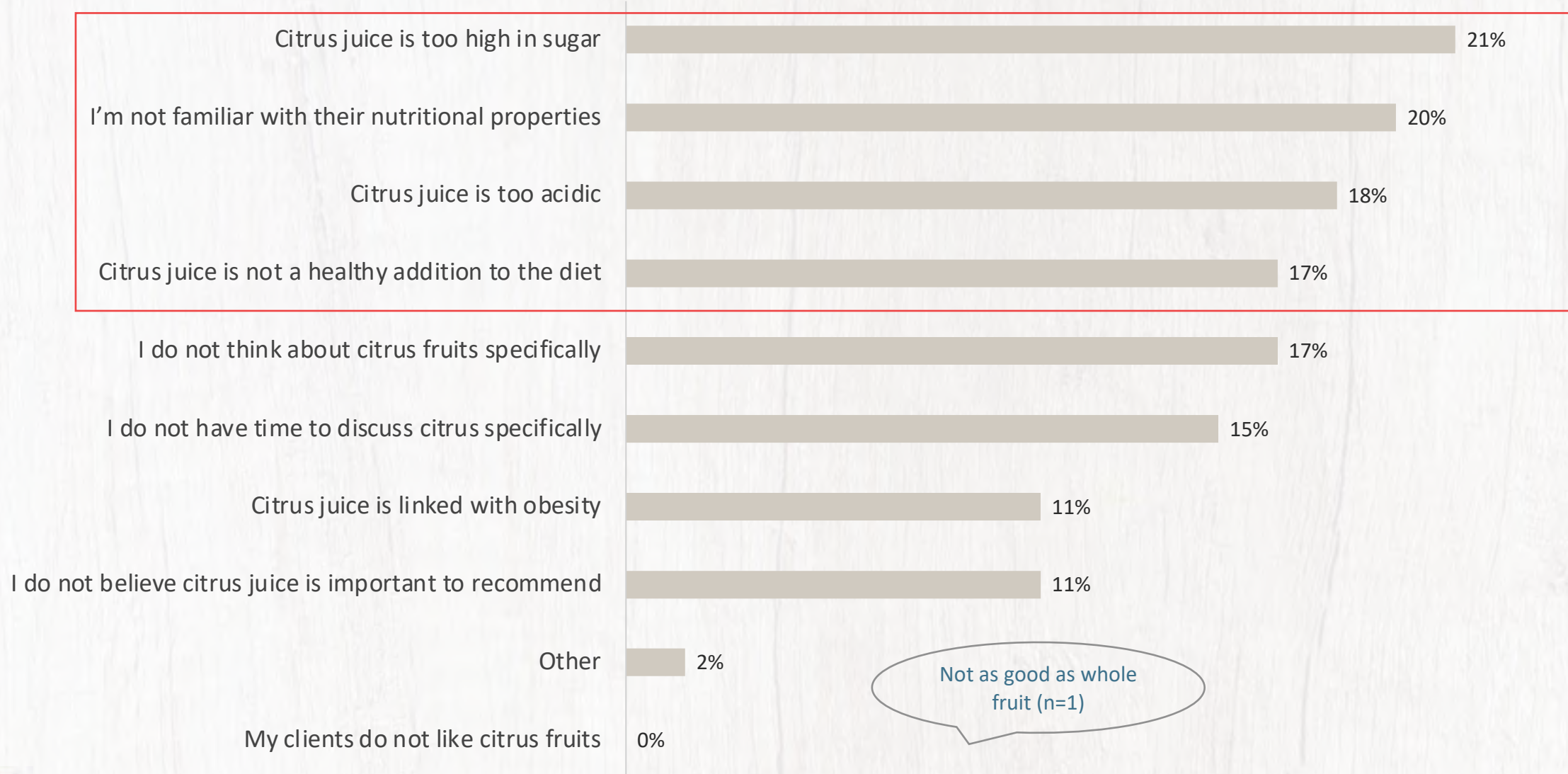
The recommendation of citrus juice is made “sometimes” most regularly (45%), indicating an opportunity to increase the frequency of citrus juice recommendations.

Q. Which statement best describes how often you specifically recommend 100% citrus **juice** to your clients?



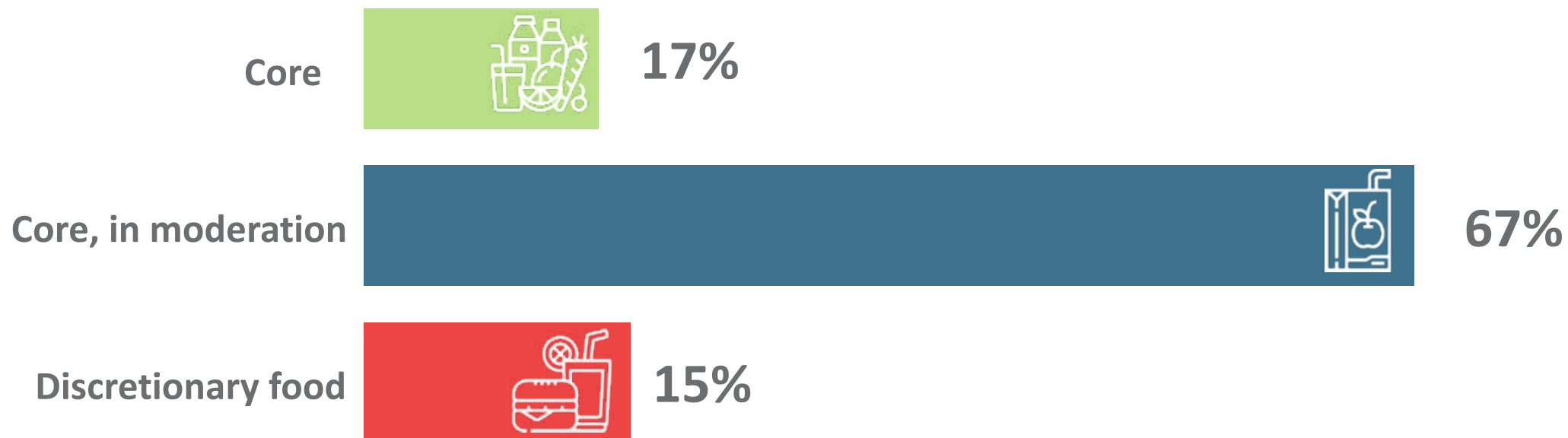
The main barriers to recommending 100% citrus juice to clients were a lack of knowledge and the perceived adverse health effects i.e., sugar content, acidity levels, or just not a healthy addition to the diet. Driving obesity was not common perception

Q. Help us to understand why you do **not** regularly recommend 100% citrus **juice** to your clients.



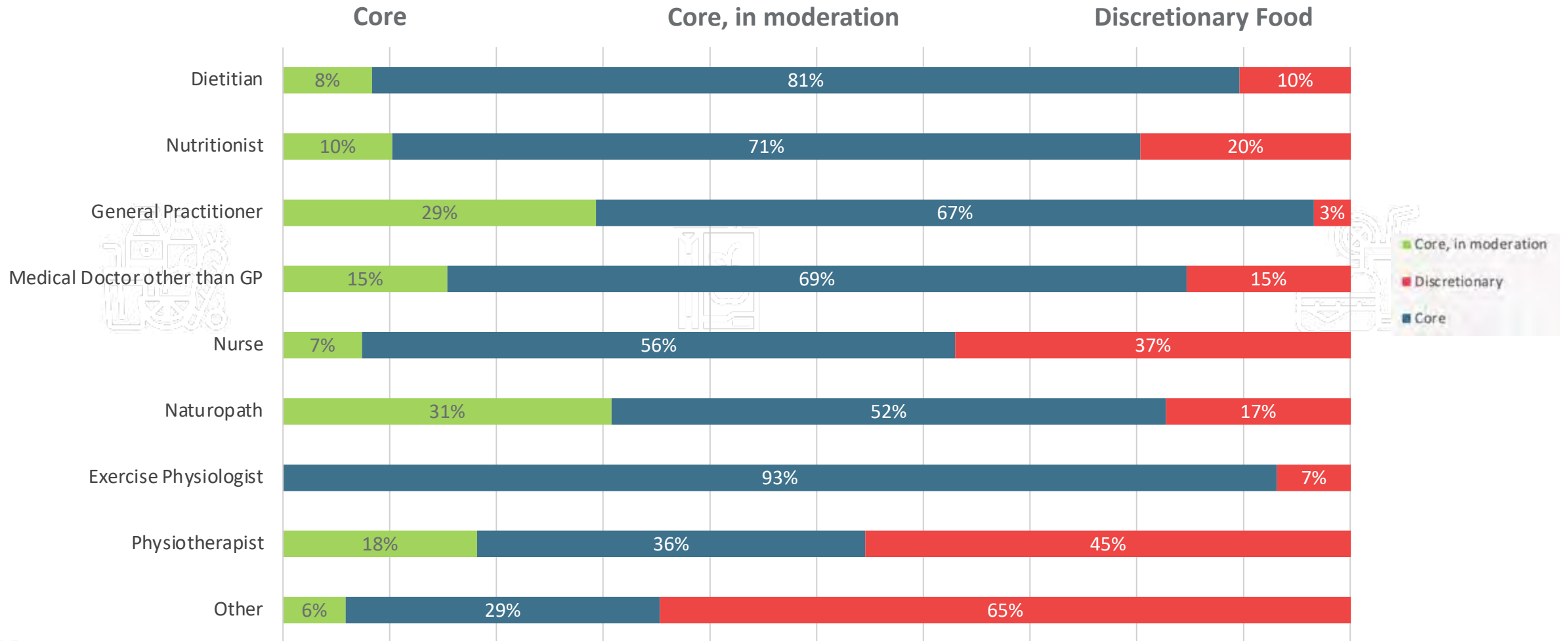
The majority of respondents believe that 100% citrus juice should be included as a part of a core food group but consumed in moderation.

Q. Should 100% citrus **juice** be a core or discretionary beverage within the dietary guidelines?



Dietitians and GPs were two of the three groups least likely to consider that 100% citrus juice should be included as a discretionary choice in the Australian dietary guidelines. Nurses and physios are key groups with negative perceptions on juice.

Q. Should 100% citrus **juice** be a core or discretionary beverage within the dietary guidelines? (by profession)





□ results

Fruit vs juice.

How does the knowledge and understanding of HCPs of citrus fruit compare with that of citrus juice?

Overall, 100% citrus juice was considered to be preferential compared with sugar-sweetened beverages (soft drink/cordial) and was considered to be a good source of nutrients.

➤ **100% citrus juice is viewed as being unfavourable compared to whole fruit and water.**

Q. Please briefly describe your reasoning behind citrus **juice** being core vs discretionary.

In favour of 100% juice as a core inclusion:

A good alternative to fruit when fruit is unavailable or not preferred

A good source of vitamins and minerals, especially vitamin C

A way of using up 'ugly' fruit in a nutritious way



Key concerns about juice as a core inclusion:

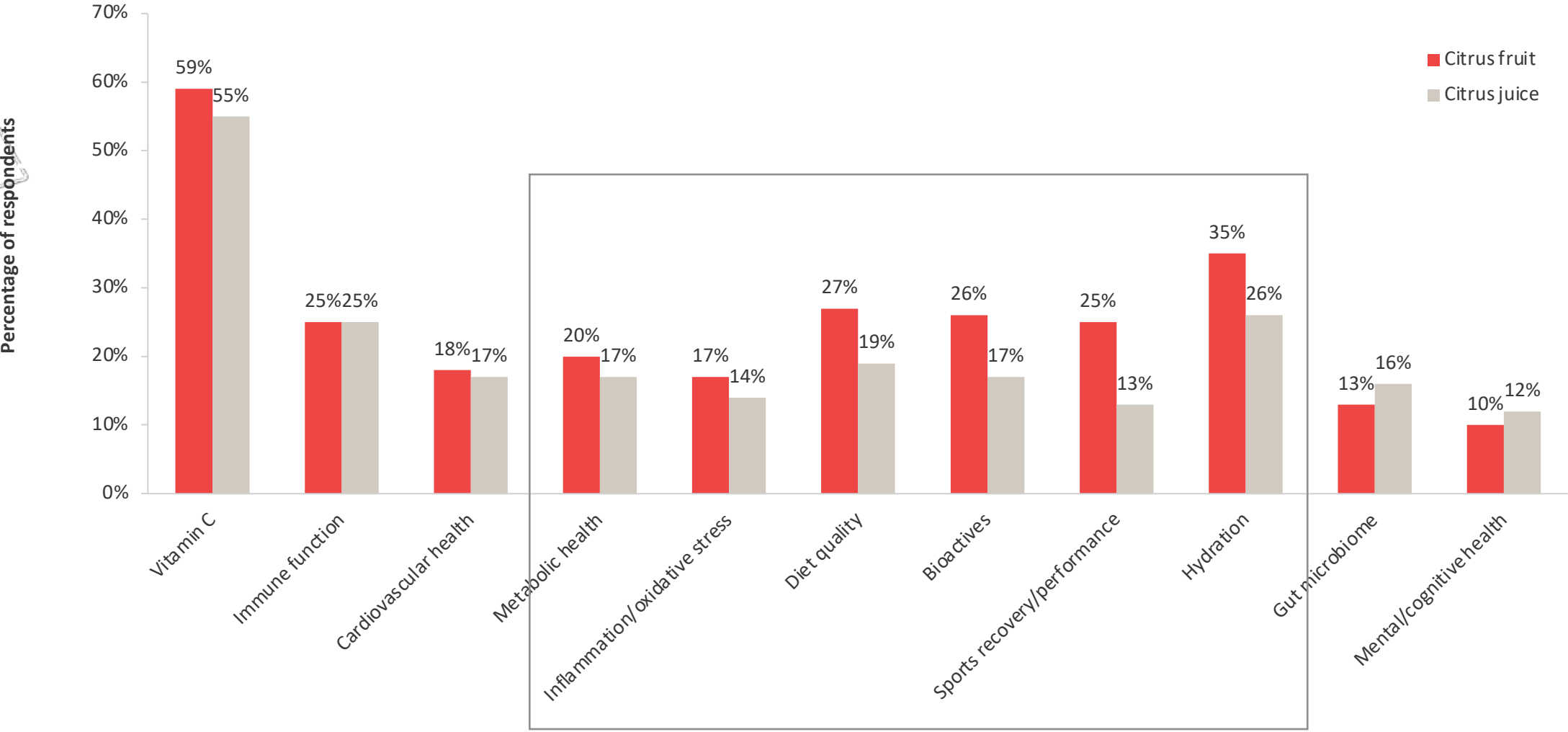
High sugar/low dietary fibre

Too easily overconsumed

Can spike blood sugar levels and contribute to kidney stones

**“Better to eat the whole fruit,
but better to drink juice than
coke.”**

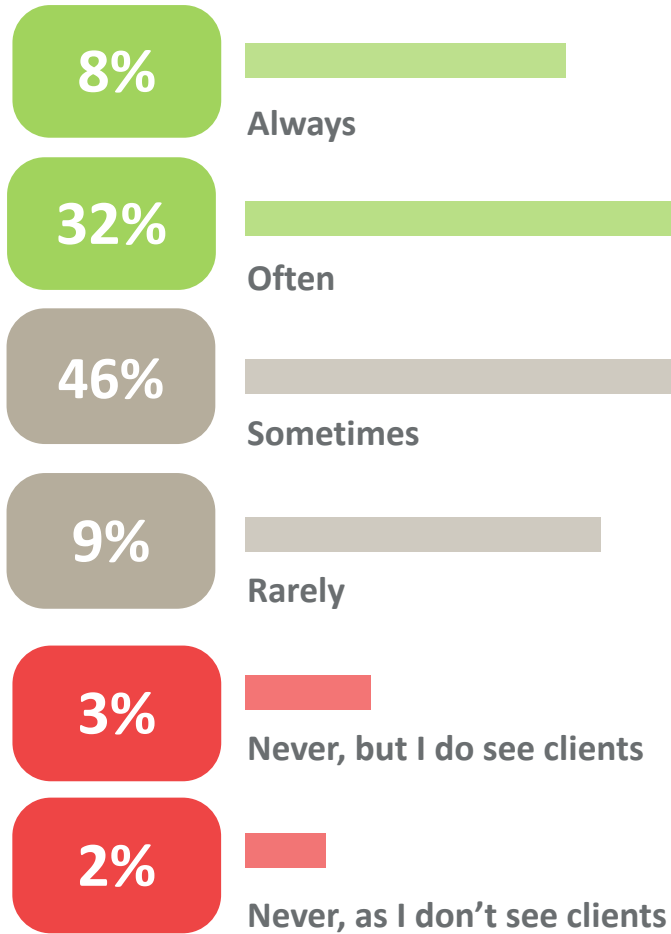
While HCPs considered fruit and juice to be equivalent in providing vitamin C, and supporting immune and cardiovascular health, fruit was superior to juice for most other health benefits including diet quality, hydration and the provision of bioactives. Juice ranked slightly higher for microbiome support and brain health.



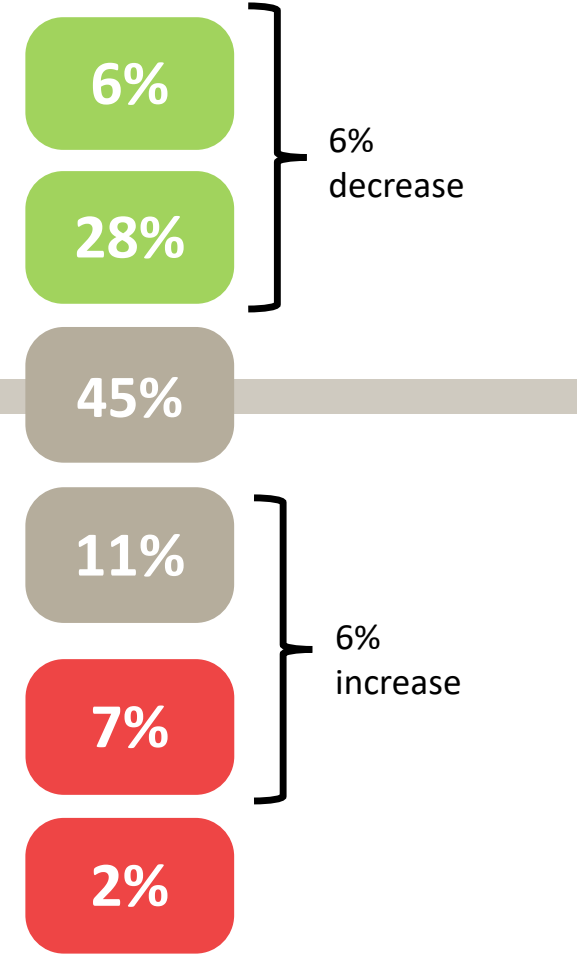
n = 364

HCPs are 6% more likely to recommend citrus fruit to their clients compared to citrus juice.

Frequency of recommending:
Citrus fruit



Citrus juice



n = 364



□ results

Other considerations



There was a strong demand for credible, evidence-based, patient ready resources that discuss citrus beyond a source of vitamin C. There was a high level of interest in the specific health effects of citrus fruits, and practical usage information.

Q. Please provide any additional questions or thoughts on the type of information that you would like to see provided about the health or nutritional properties of Australian citrus fruit.

1. Beyond vitamin C - Information on the health effects of citrus fruits, including any that are unique

“I also believe if **more information of the overall health benefits of citrus fruits such as the benefit to immunity and inflammation properties for example are listed rather than just a good source of vitamin C** may entice individuals to consume more in their daily diets

“Better understanding of the health benefits of citrus and juice

“Happy to see a compiled information of benefits

“I would like to see the specific health benefits of the various components of citrus fruit. For example: colds, anti-aging, and even some serious diseases

2. Patient-ready resources for citrus fruits and their juice that educate and inspire with credible evidence, that also address storage and usage

“I don't believe there is much out there on citrus fruits in particular so would love some more information and resources! **They are sometimes seen as the boring winter fruits so would be great to inspire some people with their health benefits.**

Full nutrient explanation/ infographics.
The benefits of whole fruit versus juice to better explain to patients the pros and cons.

“More info to help clients understand the value of citrus fruit in their daily diet.

“My time in appointments is limited so information would have to be vital for me to include it

Needs to be simple information about what fruit provides not medical terms with long names talking about gut biome as the average Australian has no idea what it all means

“Target the whole fruit! And ways to incorporate in the 'ugly' fruits

“How do you store the citrus fruit?

“**Don't overstate the health benefits.**



▣earnings ▣
▣ecommmendations



Survey Questions and promotion

Learnings	Recommendations
<ul style="list-style-type: none">• 364 respondents, exceeding the target of 200.• When the survey launched, we had good responses from advertising, but a high drop-out rate was occurring at the survey start.<ul style="list-style-type: none">○ Initially the survey had a background of citrus fruit. Changing the background from fruit to white reduced the drop-out rate, and completion rates improved.○ The open time was extended by 2 weeks to account for time lost.• Non-paid strategies performed well and face book advertising was efficient delivering >KPI and was strong on recruiting GPs to the sample size.	<ul style="list-style-type: none">• All future surveys to use white background for improved readability• Continue to build database and relationships with GPs for dissemination of this project and future Hort Innovation projects• Continue Facebook recruitment using data obtained from previous campaigns, and consider allocating some budget to other platforms (e.g. LinkedIn), which may capture higher value respondents.



HCP knowledge understanding recommendation: citrus fruit

Learnings	Recommendations
<p>INCREASED CONFIDENCE NEEDED</p> <ul style="list-style-type: none">The majority of HCPs (up to 71%) were at least somewhat confident to discuss the nutrition and health benefits of citrus fruit or correct misinformation; however, a limited number were very confident (9%) and almost 1/3 lacked confidence.	<ul style="list-style-type: none">Drive regular communication about specific nutrition and health benefits of citrus fruit to foster engagement and increase the knowledge necessary to get HCPs more regularly recommending citrus fruit.
<p>FAMILIARITY WITH NUTRITION > BIOACTIVES</p> <ul style="list-style-type: none">The majority of HCPs (68%) rated themselves as being familiar with the nutritional properties of citrus fruit and almost half (48%) regularly recommended citrus fruit because of these properties. Familiarity with the bioactive properties of citrus fruit and their key health benefits was however lacking, limiting recommendation based on these things.While common bioactive groups were recognised by HCPs (such as carotenoids at 38%), individual bioactives such as hesperidin were not well known.	<ul style="list-style-type: none">Provide targeted communication around the bioactive composition of citrus fruit and the associated health benefits, to drive increased knowledge and awareness, making citrus fruits front of mind when it comes to health and leading to increased recommendations in the diet.
<p>LIMITED KNOWLEDGE BASE ACROSS PROFESSIONS WITH MISMATCH IN RECOMMENDATIONS VS RESEARCH</p> <ul style="list-style-type: none">The most widely recognized benefit of citrus fruit was vitamin C, at almost double all other benefits; recognition for the other health benefits of citrus fruit was often lacking. Familiarity was similar across professions.While cardiovascular health was a key reason for recommendation, this is not a researched benefit of citrus.	<ul style="list-style-type: none">Focus on driving education around the non-vitamin C health benefits of citrus fruit for all HCPs, as well as the key, researched health associations.



HCP knowledge understanding □ recommendation: citrus fruit

Learnings

KNOWLEDGE ABOUT BREADTH OF NUTRITION AND HEALTH EFFECTS OF CITRUS FRUIT LACKING

- While well-known nutrients and the benefits of citrus fruit were identified by many HCPs (such as provision of vitamin C and sugars), knowledge of other key nutrients provided by citrus, such as calcium and fibre were only noted by around 1/3 of respondents and even less knowing about folate, potassium and pectins. In addition, 39% of respondents incorrectly believed citrus to be source of protein.
- Up to 24% of HCPs did not recommend citrus fruit due to being unfamiliar with their benefits or having adverse effects on the teeth.
- Interestingly, Naturopaths were least likely to identify provision of vitamin C for citrus. Dietitians and GPs, who were more likely to know about vitamin C, were also more likely to recommend citrus for its nutritional properties.
- Both GPs and Dietitians were more likely to recommend citrus for CVD and immune benefits. Naturopaths were more likely to recommend for culinary, bioactive, immune properties and improved iron absorption.

Recommendations

- Development of Q and A educational material covering information surrounding the wide range of nutrition and health benefits, as well as adverse effects, of citrus fruit, to ensure that HCPs have access to and share the correct information with their clients; specific nutrients such as folate could be highlighted for key demographic groups, such as people planning pregnancy.
- Driving communication messages targeted to the HCP group and what resonates with them.
 - Dietitians on the greater bioactive story and emerging gut health benefits and correcting misinformation
 - Naturopaths particularly on being natural rich source Vitamin C and connecting to greater nutrient/health/culinary benefit will be key to unlocking their recommendation,
 - GPs on key issues they deal with in practice that are already resonating - CVD and immune health.
 - Practice nurses – should be considered with view to target misconceptions on juice.



HCP knowledge → understanding → recommendation: citrus fruit

Learnings

LACK OF RECOMMENDATIONS FOR ORANGES

- While over half (53%) of HCP recommendations were for grapefruits or lemons/limes, only 10% of recommendations were for oranges, and 15% for mandarins.
- By profession, Naturopaths were the leading group recommending grapefruit, whereas GPs and dietitians more likely to be recommending lemons and limes.

Recommendations

- Focused education and awareness about the unique health benefits of each citrus fruit type, to ensure consideration of each fruit as playing a unique role in the diet, leading to recommendations for all citrus varieties.
- Use additional surveys to understand and address the drivers of recommendations for grapefruit and lemons/limes over oranges and mandarins, such as how each fruit is being used or perceived health effects, including why these recommendations change across professions. Use targeted communication to balance recommendations following data sourcing.



HCP knowledge → understanding → recommendation: citrus juice

Learnings	Recommendations
<p>LIMITED KNOWLEDGE BASE OF CITRUS JUICE</p> <ul style="list-style-type: none">The most widely recognized benefit of citrus juice was Vitamin C (55%), at double all other benefits; recognition for the other benefits of citrus juice, including both health and provision of bioactives, was lacking.	<ul style="list-style-type: none">Focus on driving education around the additional health benefits of citrus juice, to build on the vitamin C story, and showcase the multitude of positive nutrients and bioactives contained in citrus juice; lead education about nutrient synergy and the health benefits this provides to create a paradigm shift for juice.
<p>MAJORITY OF HCPs FEEL THAT CITRUS JUICE SHOULD BE A “CORE, BUT IN MODERATION” FOOD</p> <ul style="list-style-type: none">While results varied by profession, up to 81% of HCPs felt citrus juice was a core food, although should be consumed in moderation, indicating reservations and/or lack of understanding about its inclusion as an everyday food in the diet.	<ul style="list-style-type: none">Provide targeted communication around the role of citrus juice in the diet and whether consumption should be “everyday” or in moderation; use results of umbrella review as a foundation, translating into HCP communication material, including brochures and webinar.
<p>NO CONSENSUS ON STATUS OF CITRUS JUICE AS CORE VS DISCRETIONARY FOOD ACROSS DIFFERENT PROFESSIONS</p> <ul style="list-style-type: none">While one third of naturopaths and GPs placed citrus juice as a core food, with no limitations on amount, up to 65% of nurses, physiotherapists and “other” HCPs placed citrus juice as discretionary.It appeared that the less educated a professional is in the nutrition and health benefits of juice, the more likely they were to consider it a discretionary food.	<ul style="list-style-type: none">Targeted communication across all HCPs providing education around the role of citrus juice as a core vs discretionary food in the diet; use results of umbrella review as a foundation, translating into HCP communication material, including brochures and webinar.Educating dietitians to be key influencers of other HCP to target such as practice nurses, particularly in private practices to correct misinformation, particularly on juice.



HCP knowledge → understanding → recommendation: citrus juice

Learnings	Recommendations
<p>MISINFORMATION LIKELY UNDERPINNING VIEWPOINTS REGARDING CITRUS JUICE AS DISCRETIONARY</p> <ul style="list-style-type: none">• Key concerns about juice as a core food included being too high sugar and low in dietary fibre, being too easily overconsumed, and having the potential to spike blood sugar levels and/or contribute to kidney stones; these concerns indicate a lack of knowledge on the health properties and effects of citrus juice, particularly surrounding bioactive content and effects on metabolism and gut microbiota.	<ul style="list-style-type: none">• Develop a communication campaign aiming to showcase the health and nutrition benefits of citrus juice, including its nutritional composition, and effects on chronic disease, blood sugar, and the gut microbiota.



HCP knowledge understanding □ recommendation: fruit vs juice

Learnings	Recommendations
<p>OVERARCHING VIEW THAT FRUIT IS SUPERIOR TO JUICE</p> <ul style="list-style-type: none">• Although juice was regarded as a better option than sugar-sweetened beverages such as “coke”, it was viewed as being inferior to both whole fruit and water. Juice was seen as a second option, for when fruit was not available. This viewpoint was underpinned by the “high sugar, low fibre” story that sits around juice.• While whole fruit and juice were rated comparably for some health benefits, including vitamin C and immune function, citrus fruit was viewed more favourably for many health benefits. Many HCPs do not perceive juice to be a source of bioactives, to improve dietary quality, to support metabolic health, or to improve sports performance, indicating a lack of understanding about the health benefits associated with the consumption of fruit juice and leading to reduced recommendations for juice vs fruit.	<ul style="list-style-type: none">• Focus on driving education around the roles and equivalence of fruit and juice in a healthy diet, particularly for fruit juice as being able to provide a serving of fruit in the diet.• Increase awareness and understanding about the true effects of citrus juice on dietary quality, composition of nutrients and bioactives, effects blood sugar, as well as microbiome health, with as the provision of bioactives as prebiotics.• Provide education and communication around the comparison of fruit and juice across all health benefits, showcasing their equivalence, as well as unique benefits where they exist, to highlight that BOTH play important roles in a healthy diet and both increase and balance recommendations.



HCP knowledge → understanding → recommendation: fruit vs juice

Learnings	Recommendations
<p>KEY BARRIERS TO BOTH CITRUS FRUIT AND JUICE RECOMMENDATIONS ARE PERCEIVED ADVERSE HEALTH EFFECTS + LACK OF KNOWLEDGE</p> <ul style="list-style-type: none">• The predominant reasons HCPs did not recommend citrus fruit to their clients was not being unfamiliar with health effects, cost, and perceiving them as bad for teeth.• The predominant reasons HCPs did not recommend citrus juice to their clients was being too high in sugar, being unfamiliar with nutritional properties, and being too acidic and bad for teeth, indicating both a lack in knowledge as well as the existence of misinformation.	<ul style="list-style-type: none">• Development of Q and A educational material covering information surrounding the nutrition and health benefits, as well as any adverse effects, of citrus juice, to increase recommendations and ensure that HCPs have access to and share the correct information with their clients.



Other considerations

Learnings	Recommendations
<p>RESOURCES ARE NOT BEING USED</p> <ul style="list-style-type: none">• Most HCPs were either unaware of citrus fruit resources or do not use them; however, those that do use resources find them useful and Australian Citrus is a website that is a 'go to'.• When resources are used, the content may not be credible.	<ul style="list-style-type: none">• Increase the provision and promotion of targeted resources focusing on the health, nutrition, and bioactive benefits of citrus fruit to improve buy-in from HCPs, keep citrus fruit top-of-mind, foster learning, and increase recommendations.• Develop HCP web-page containing all the relevant information on Citrus Australia website.• Provide easily accessible resources to ensure that HCPs are receiving and passing on the most credible information on the nutrition and health benefits of both citrus fruit and juice.
<p>STRONG DEMAND FOR CREDIBLE, EVIDENCE-BASED, AND PATIENT-READY RESOURCES</p> <ul style="list-style-type: none">• High level of interest in knowing about citrus beyond it being a source of vitamin C and its wide range of health effects, as well as practical usage information, indicating both a lack of, and a need for, credible and evidence-based citrus fruit and juice resources.	<ul style="list-style-type: none">• Produce and provide HCP and consumer-ready resources based on the most credible and highest quality evidence, covering both the nutrition and health benefits beyond vitamin C (including key bioactives), as well as practical "how-to" information for the inclusion of citrus fruit and juice in the diet.





□imitations





Key Limitations

- Uneven spread of respondents across professions; the majority of respondents were dietitians.
- While the number of dietitians was high (n=97), the number of respondents from other singular health professions was small (<60), limiting conclusions by type of HCP.



Conclusions





The key findings

- **Lack of knowledge** regarding bioactive composition of both citrus fruit and citrus juice.
- **Inconsistency in knowledge** across professions.
- **Misinformation** about health effects and nutritional composition of citrus juice, as well as its equivalence with citrus fruit.
- **Perception** that juice is not as good than whole fruit
- **Lack of citrus resources** that are credible, evidence-based, and patient-ready.



The key recommendations

- Develop **communications strategy** focused on providing information around the nutrition and health benefits of both citrus fruit and citrus juice, with a particular focus on bioactives and the whole nutrition package; use umbrella review as foundation for citrus juice.
- **Target specific professions with individualised strategy & messaging** to ensure engagement with message and uptake of knowledge across HCPs.
- Produce and **provide credible, evidence-based, and patient-ready resources** detailing the breadth of nutrition and health benefits of citrus fruit and juice, as well as culinary information.



Next Steps

- NRAUS to update the comms plan and key messaging based on these findings.
- NRAUS to update the monitoring and evaluation plan with specific targets based on these findings.



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info@nraus.com



www.nraus.com

Thank you

APPENDIX 3

CT21006: Citrus HCP
End of project ASR

August 2024



Background

- **Project code:** CT21006
- **Project name:** **Project leader:** Dr Flavia Fayet-Moore
- **Delivery partner:** FOODiQ Global (formerly Nutrition Research Australia)
- **Report author:** FOODiQ Global
- **Contact:** Flávia Fayet-Moore
- flavia@foodiq.global | 0415 990 050



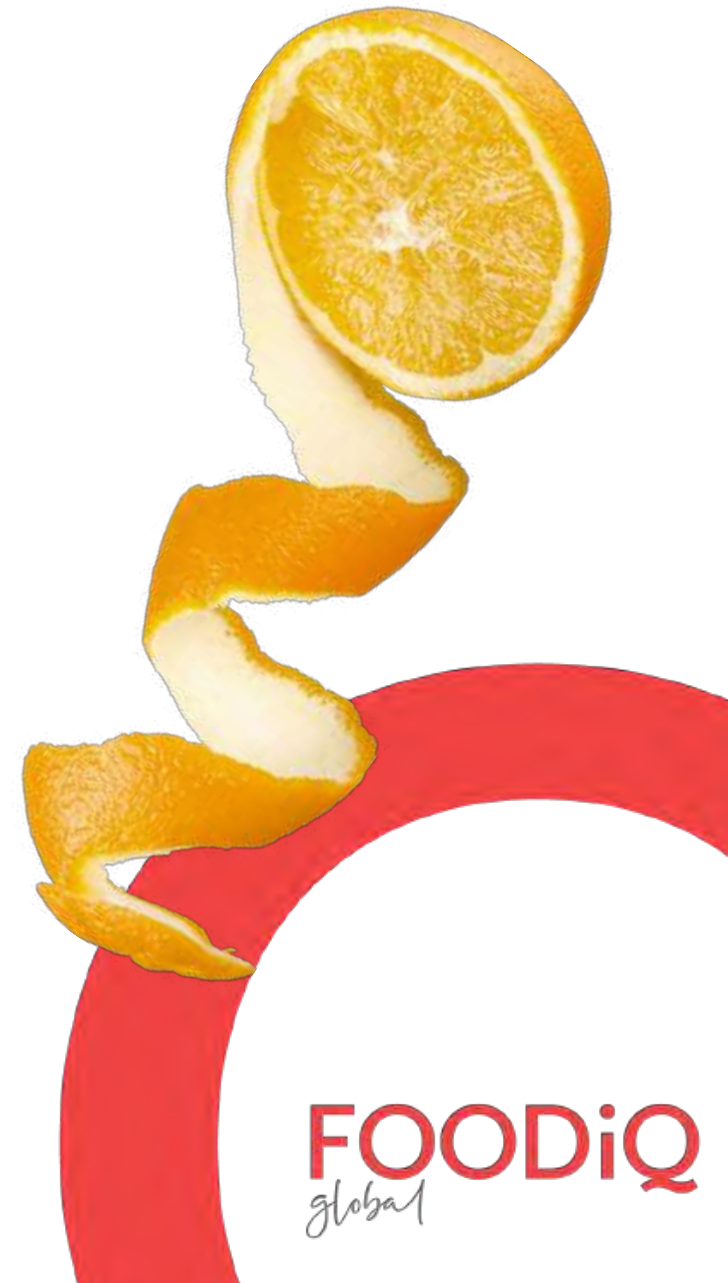
Objectives

1. Help measure the impact of the project on changes in knowledge and recommendations in those who accessed the project resources, compared to those who did not, with reference to baseline data, where appropriate
2. Gather insights on the current level of knowledge and recommendations to inform future research.

This report describes the findings from the 2nd audience sentiment survey among health professionals (HPs), following on from the baseline data report in December 2022.

Project outcomes

- Increase HP awareness of nutrition & health benefits of citrus as measured in the project end ASR (compared with baseline)
- Increase HP who can accurately identify the nutrition & health benefits of citrus as measured in the project end ASR (compared with baseline)
- Increase in HPs who are 'confident' or 'extremely confident' in discussing the health benefits of citrus as measured in the project end ASR (compared with baseline)
- Increase in HPs who are 'confident' or 'extremely confident' in correcting misinformation as measured in the project end ASR (compared with baseline)



Methods



Approach

A digital recruitment campaign to recruit a minimum of 200 health professionals (HPs)

- 6 weeks (18th July – 26th August 2024)
- across paid Meta social media channels, complemented with organic strategies
- dedicated EDM to Citrus and FOODiQ Global databases
- promoted with the chance to win 1 of 5 \$100 Visa gift cards.
- To be eligible, participants had to reside in Australia, and either be a health professional or studying to become one.



FOODiQ

Can we please ask for your expertise on citrus?

Complete this short 5-minute survey to share your knowledge and go in the draw to win 1 of 5 \$100 gift cards

Hort Innovation CITRUS FUND

This project has been funded by Hort Innovation using the citrus research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

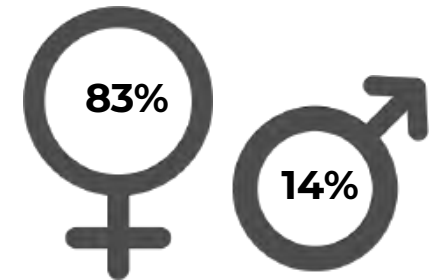
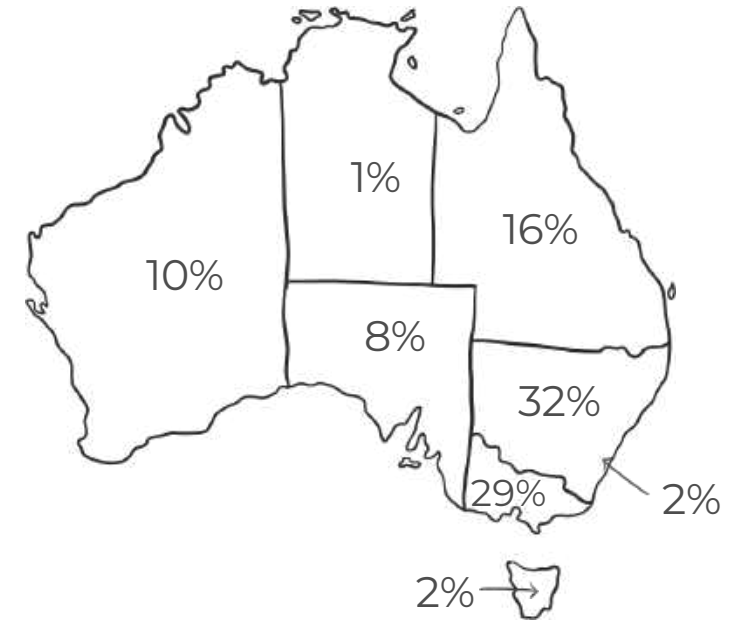
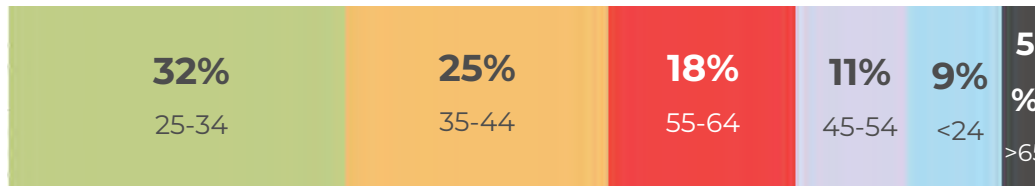
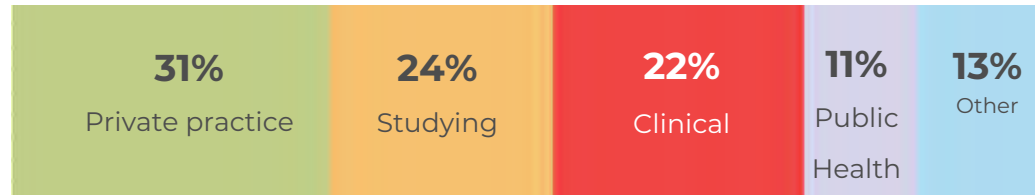
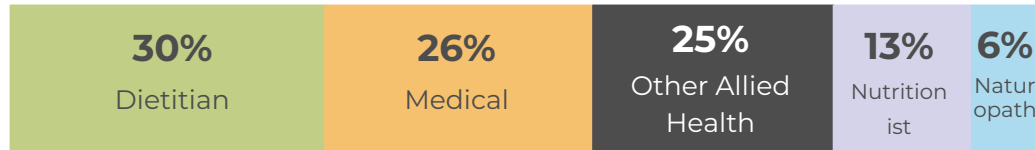


Results



Survey statistics

615 click throughs → 227 eligible HP – 111 completed in full



Resource Access & usefulness



23% of participants had accessed the Citrus Hub resources. **Target: 50%**



96% of participants that accessed the FOODiQ Citrus Hub resources found them useful. **Target: 80%**

- 34% very useful and I would like more
- 28% very useful
- 20% useful
- 13% somewhat useful



of those who accessed resources would like more.



What do health professionals think of the resources?



I have printed a couple out for display in our clinic waiting room as a break from the bleak purely 'get this done now' type messages.

I find it to be very informative and helpful, as well as educational.

Simple, Clear and precise, well researched, scientific & evidence based.

I find it to be very informative and helpful, as well as educational.

Well presented, engaging, provides a concise way to discuss with clients.

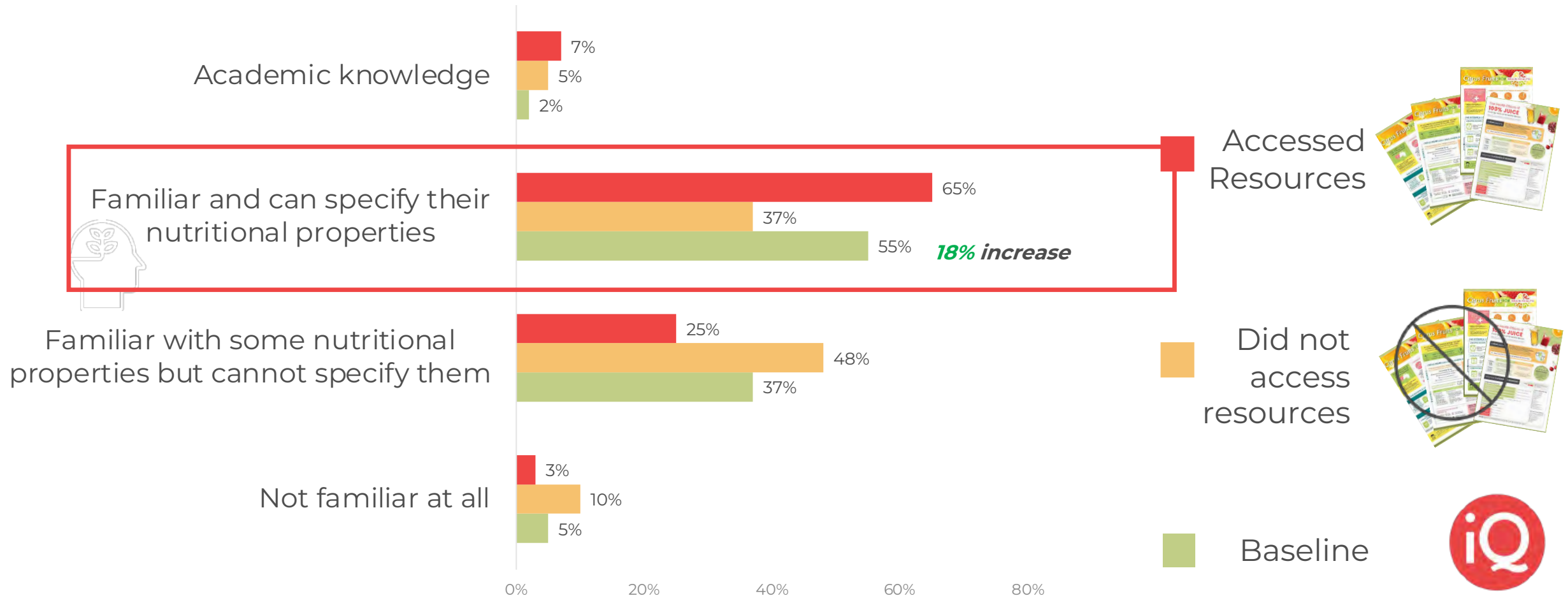
Great information and great design.



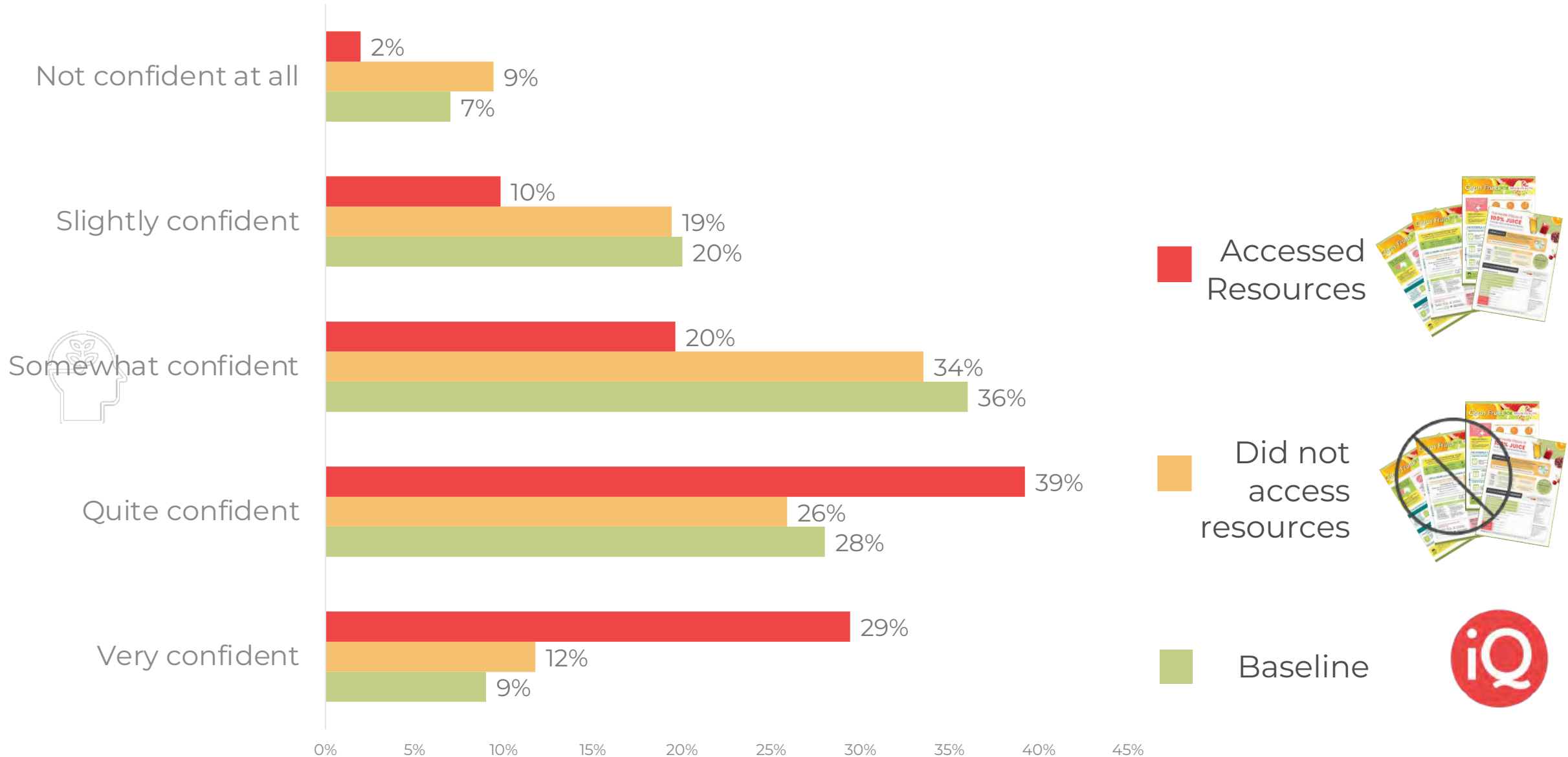
Results Citrus fruit



Those who accessed resources increased their self-reported familiarity with the nutritional and bioactive properties of citrus.



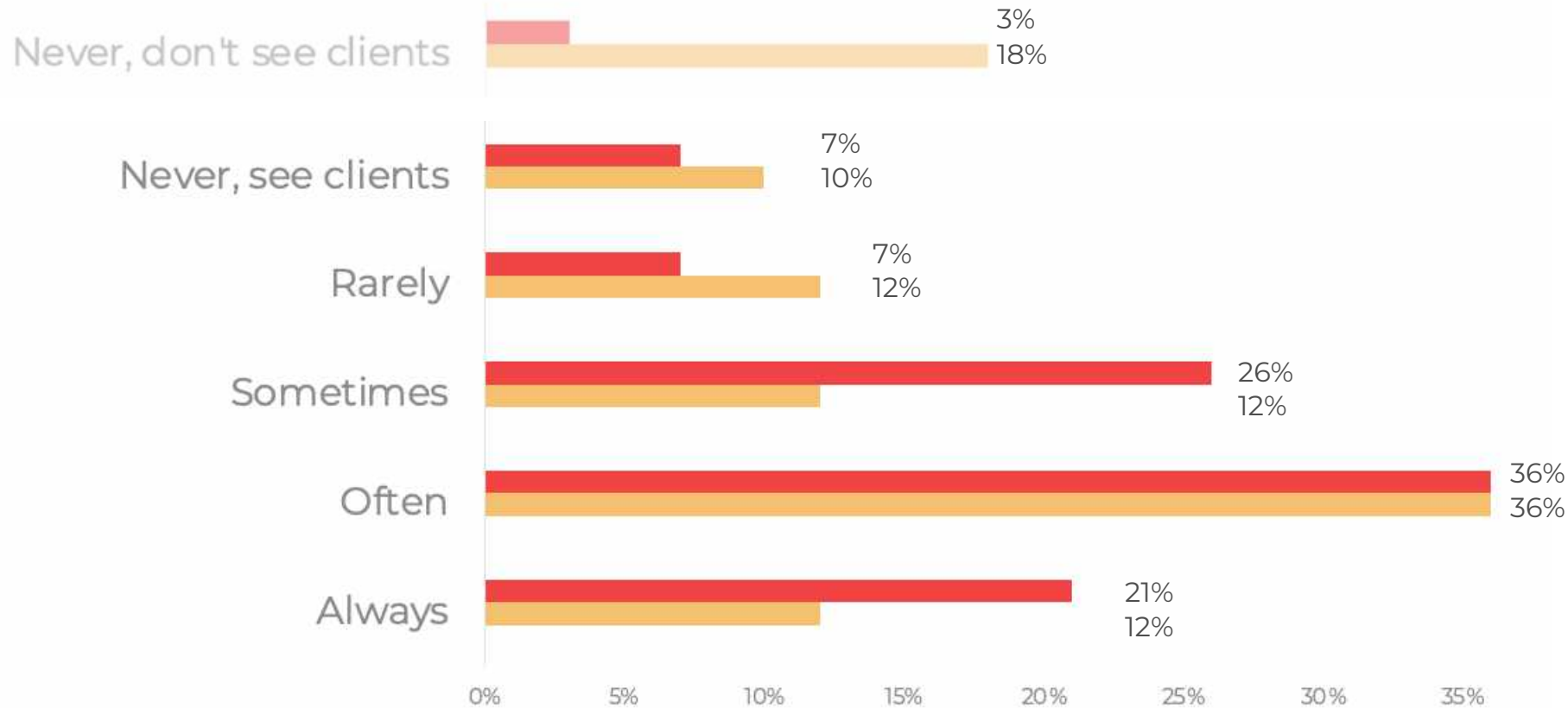
Accessing resources increased confidence in discussing citrus nutritional and health benefits.



Accessing resources = higher likelihood recommendation juice



Which statement **best describes** how often you **specifically recommend citrus** to your clients or patients?



Accessed Resources



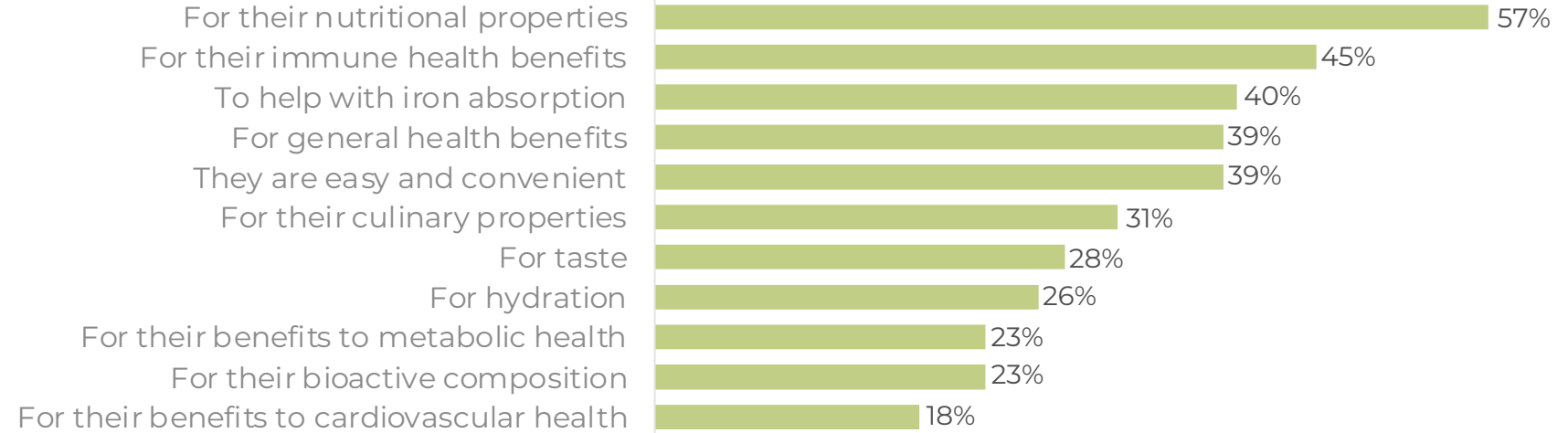
Did not access resources



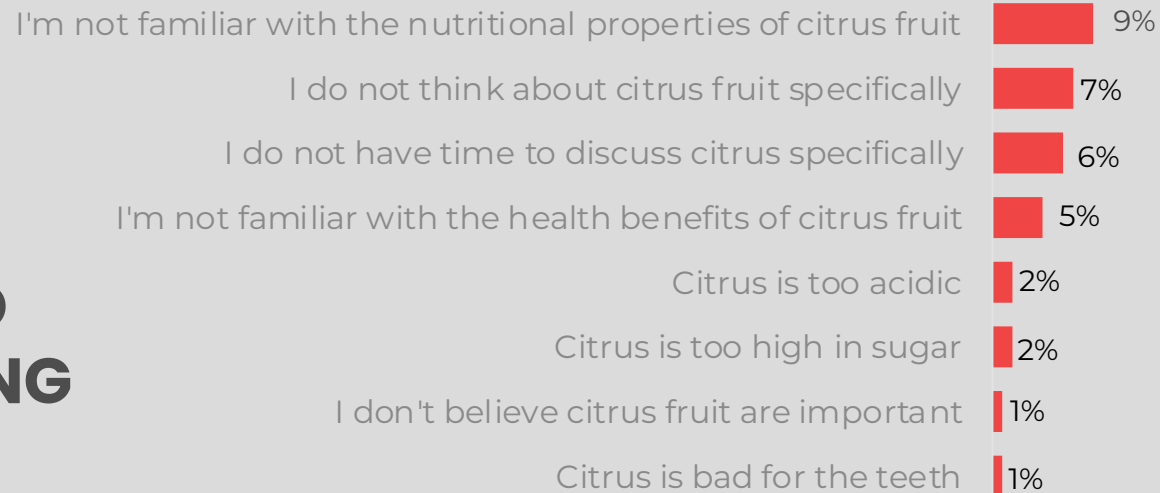
Of those who saw clients, respondent were twice as likely to not recommend citrus if they had not accessed resources. **86% of those that accessed resources reported recommending citrus to clients**, compared to 72% of those who did not access resources



DRIVERS FOR RECOMMENDING CITRUS



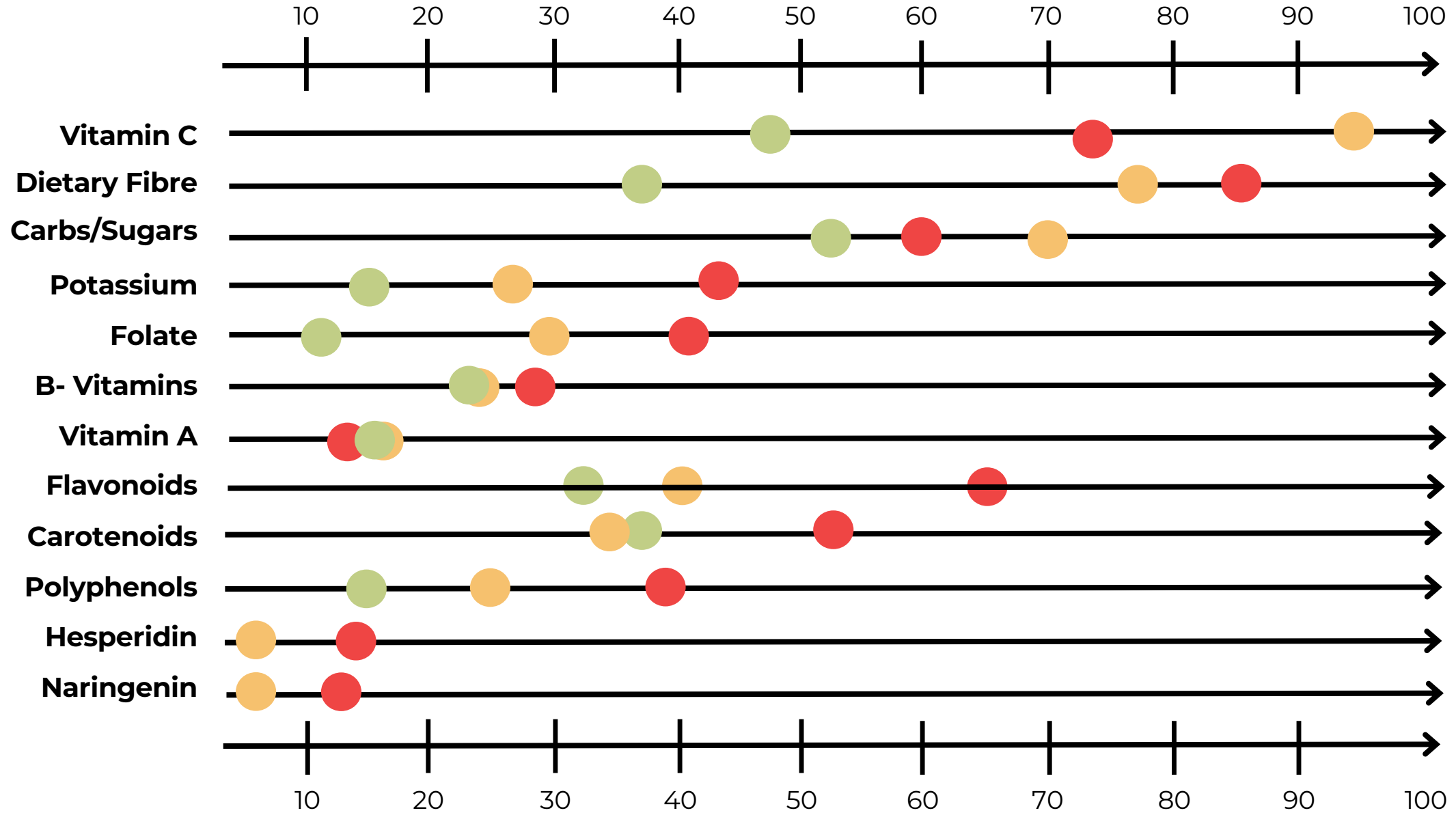
BARRIERS TO RECOMMENDING CITRUS



% of total respondents

Knowledge increased

● Baseline ● Didn't access ● Accessed

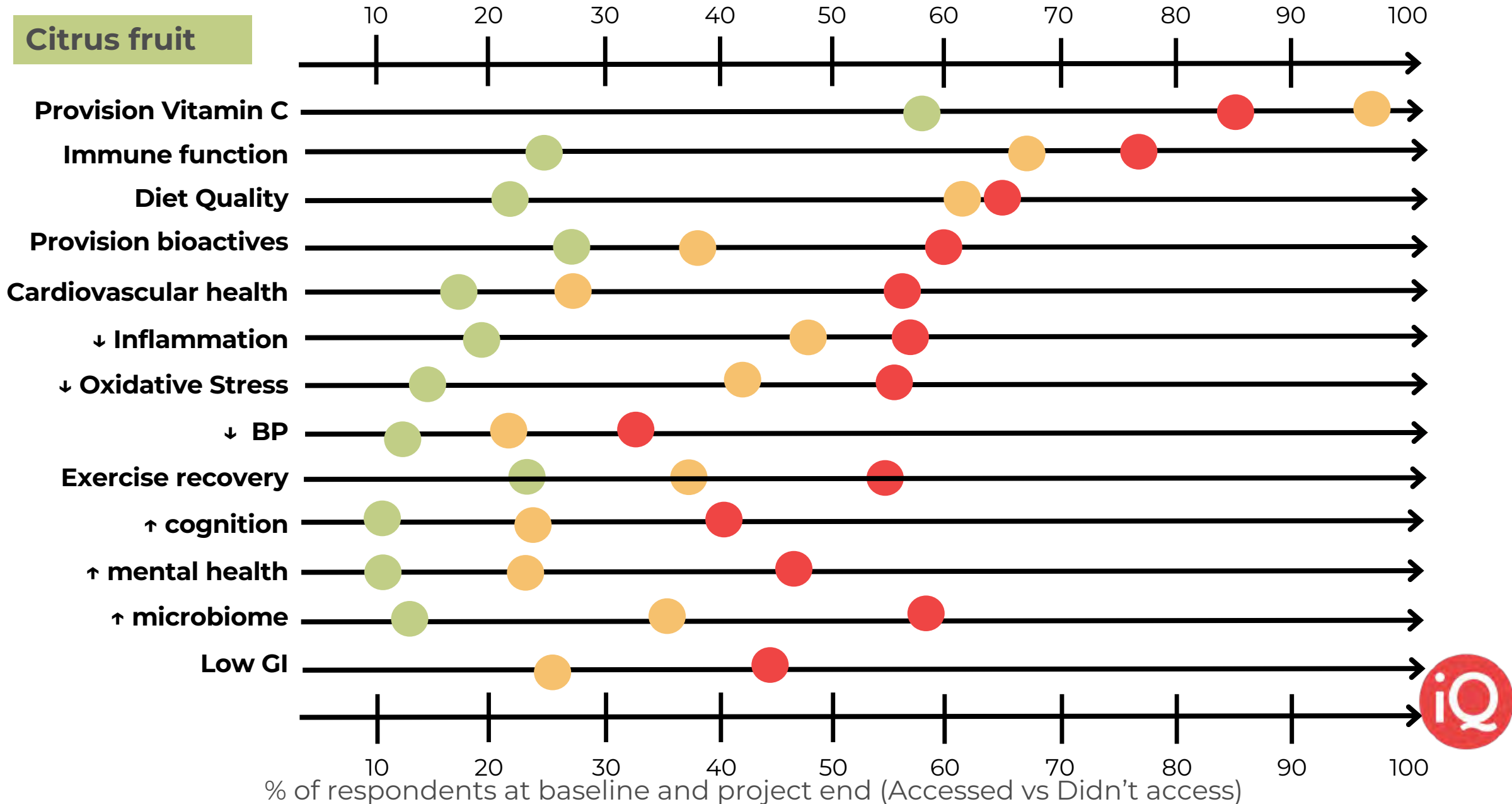


% of respondents at baseline and project end (Accessed vs Didn't access)



Knowledge increased

● Baseline ● Didn't access ● Accessed

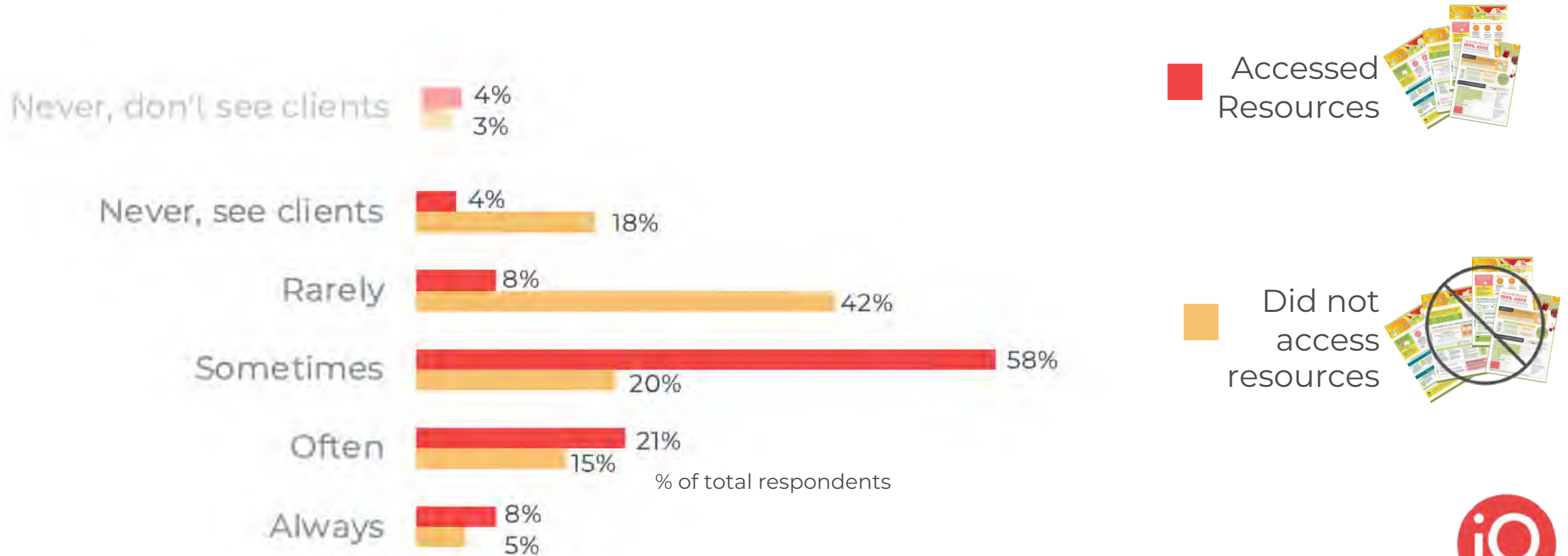


Results Citrus juice

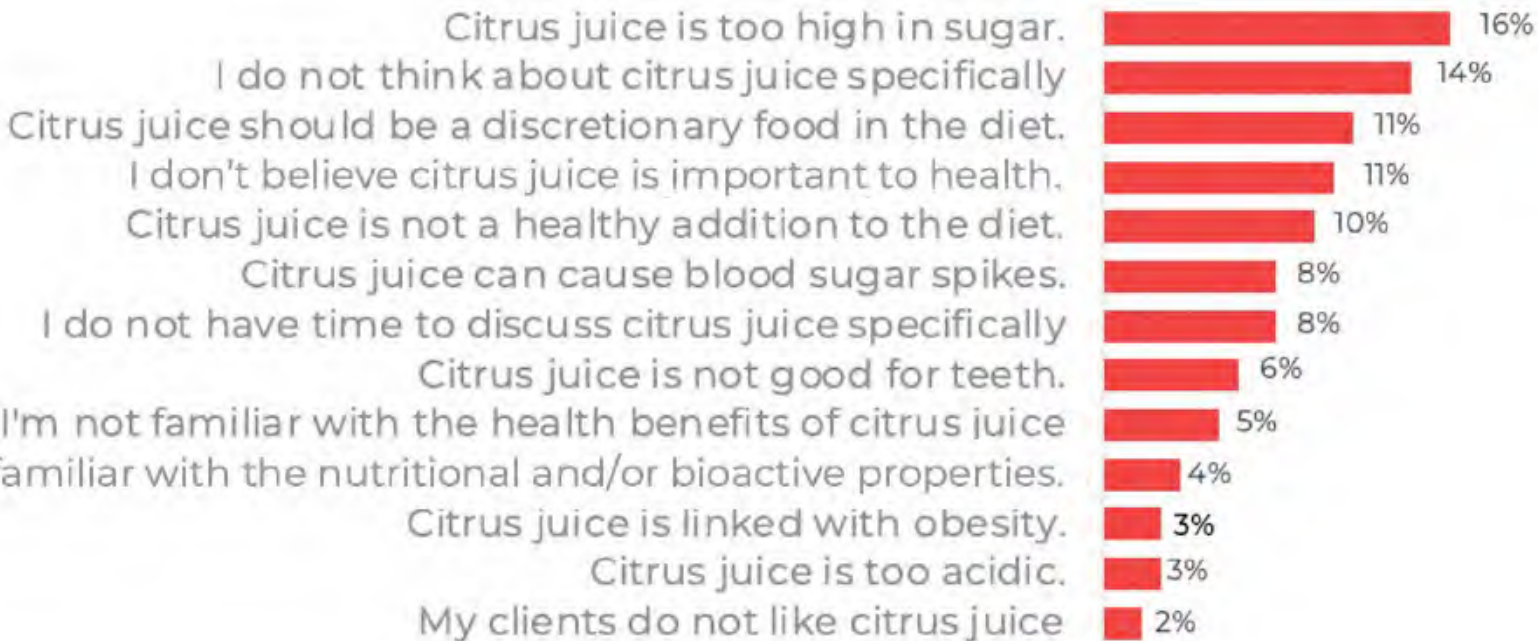


Over four times more likely to not recommend juice if did not access resources.

Which statement **best describes** how often you **specifically recommend citrus juice** to your clients or patients?



Perceived high sugar content and not top of mind top 2 barriers to recommendation.

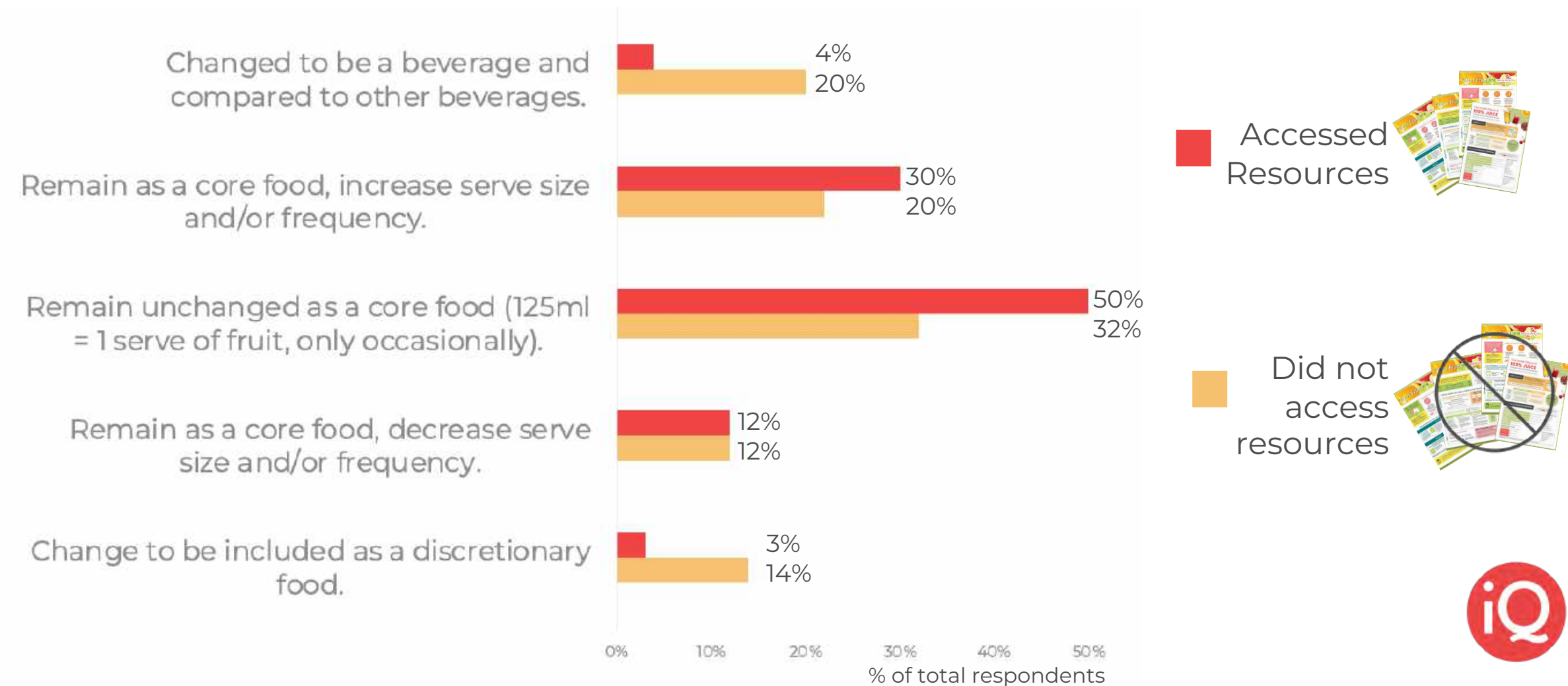


BARRIERS TO RECOMMENDING CITRUS JUICE



Sentiment towards the position of juice improved

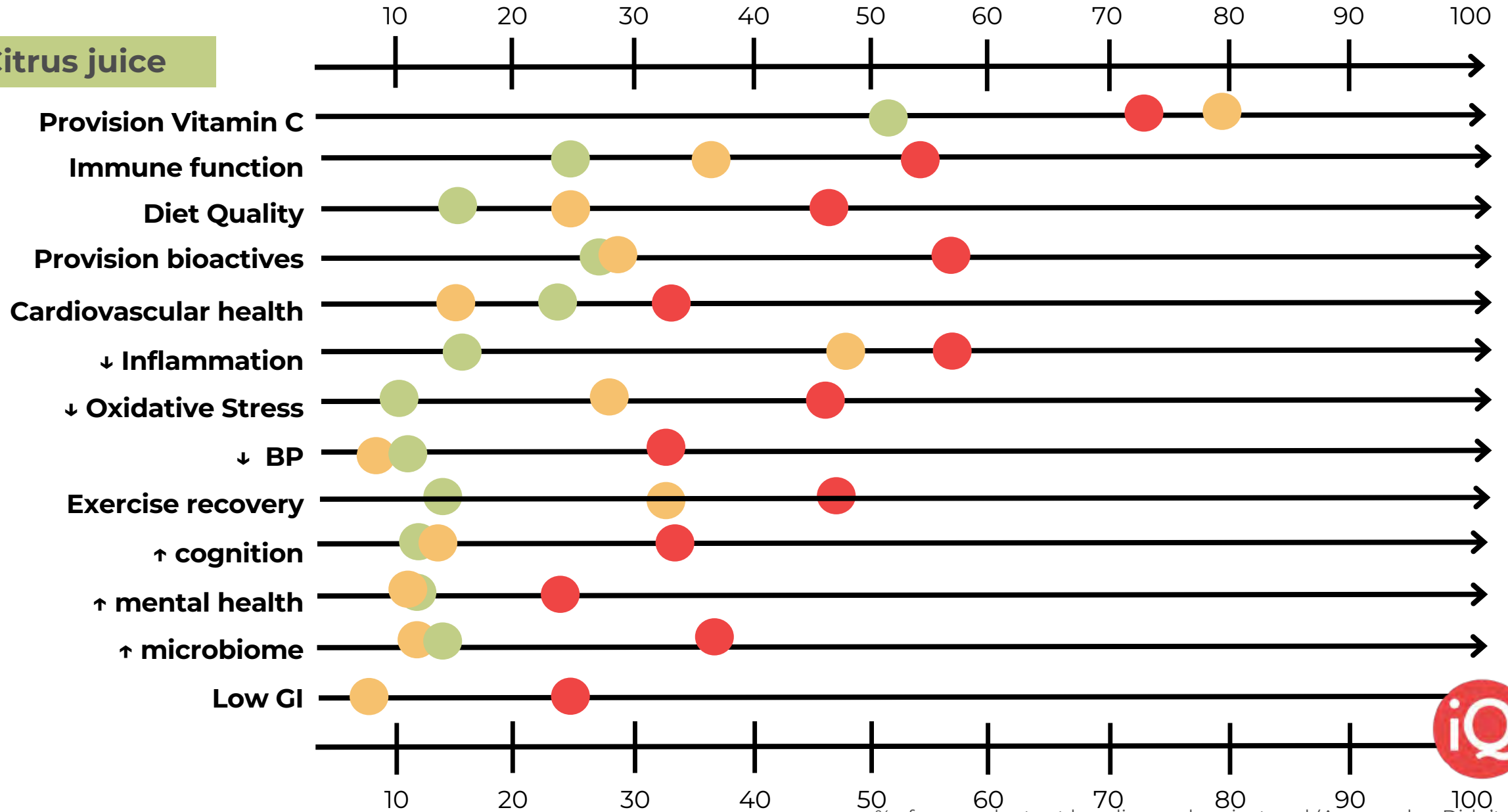
Where do you think 100% juice should fit in the revised Australian Dietary Guidelines?



Knowledge increased

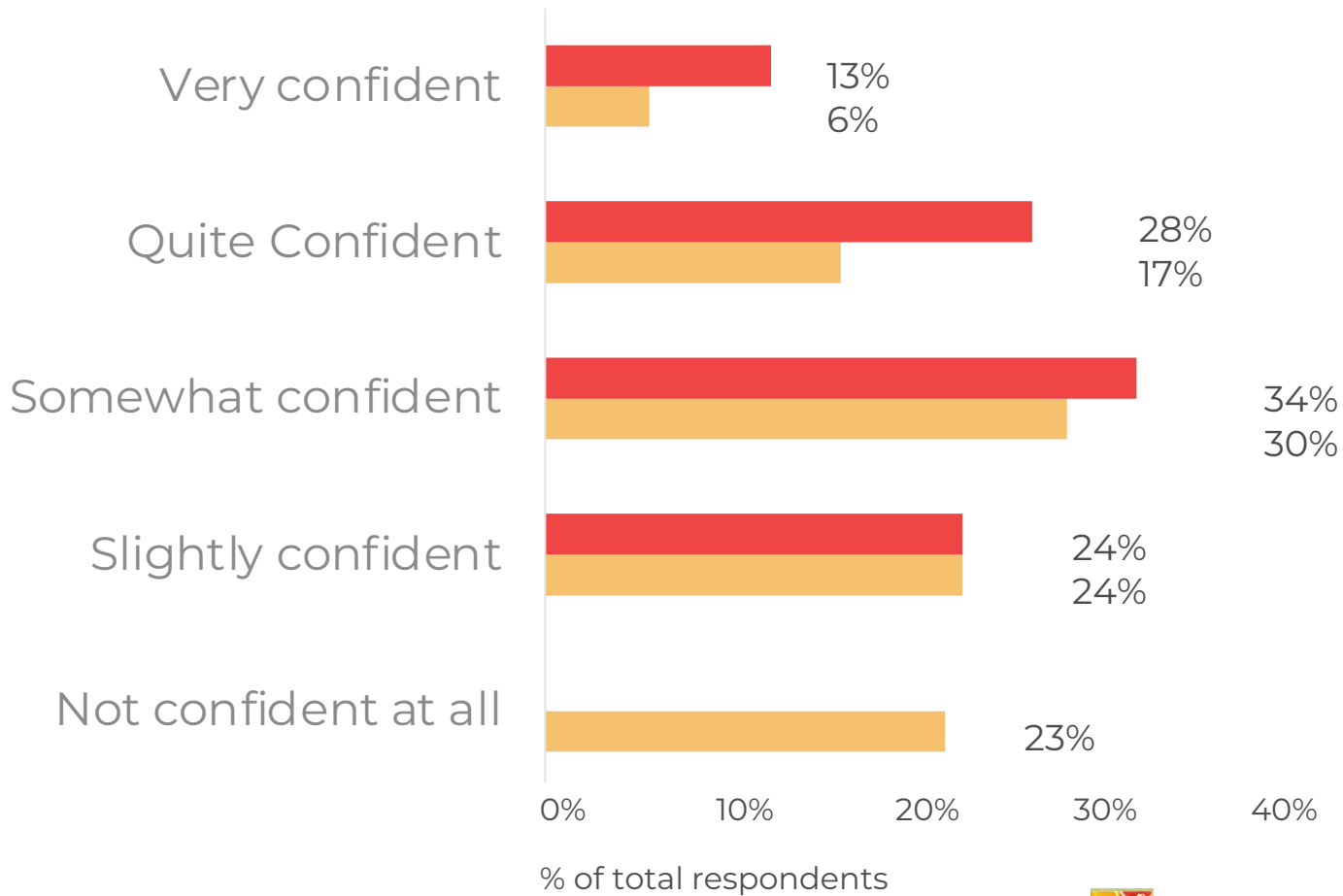
● Baseline ● Didn't access ● Accessed

Citrus juice



% of respondents at baseline and project end (Accessed vs Didn't access)

Confidence in correcting misinformation about citrus fruit and juice higher if accessed resources



Baseline 25% very or quite confident



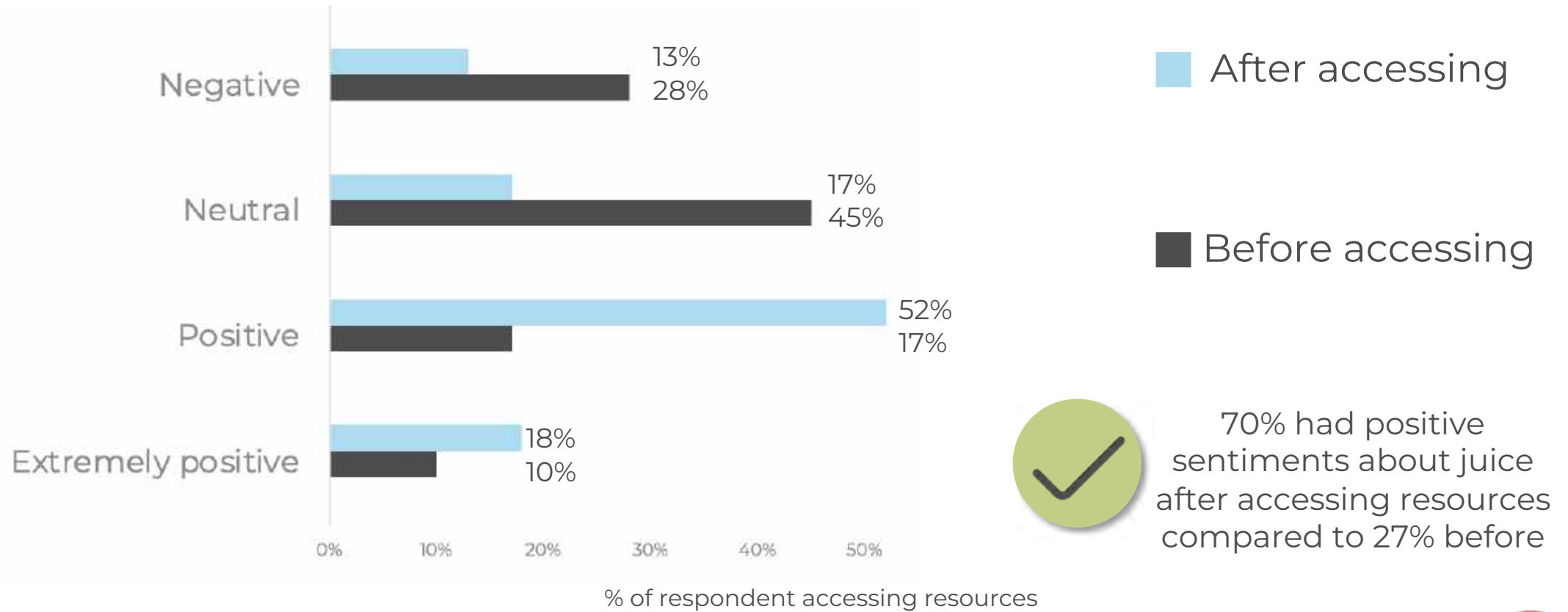
Nearly twice as likely to feel 'very or quite confident' if accessed resources.



1 in 4 who had not accessed resources had no confidence compared to zero who had.



Sentiment toward juice increased after accessing resources



What else would HP like to see?



Updates in the science ongoing.



Practical tips for selection and label reading for juice.



Varied formats of resources.



Specific information about types of juices.



I'd love to have updates with the most recent studies in the future



Practical advice on the different types of juices and how to pick the right type for health benefits.



Nice big poster versions of the fact sheets would be great for the GP clinic.



Would like to know more about pulp vs. non pulp, filtered vs not filtered, cloudy vs. clear.



Learnings & recommendations



Survey learnings and recommendations



Learning

- ✓ Audience surveyed more likely to be female than at baseline
- ✓ Similar distributions of professionals in final and baseline.
- ✓ High click through rate, but significant early drop out meant completion rate was lower than desired.
- ✓ Percentage of respondents having accessed the resources was lower than anticipated, limiting opportunities to stratify by profession.



Recommendation

- ✓ Increase recruitment target in follow-up (end of project) relative to baseline recruitment to account for diversity and stratification by accessed vs. did not access.
- ✓ Maintain diverse recruitment techniques for future surveys.
- ✓ Additional survey touch-points at point and time of access may yield additional results. Participants may have accessed the resources, but not recently.
- ✓ Incentive value or chances to win may need to be increased.



HCP Knowledge & behaviour learnings and recommendations



Learning

- ✓ Resource access appears to have been powerful for changing knowledge, recommendation and confidence, particularly for juice, but awareness of the resources was lower than hoped.
- ✓ HP knowledge on the key project education messages increased the most supporting that focused messaging strategy had intended outcome.
- ✓ HPs were 1.5 times more likely to recommend citrus and juice if they had accessed the resources.



Recommendation

- ✓ HP communications benefit from using focused messaging
- ✓ Ongoing continuous HP communication to be maintained to increase reach
- ✓ Specifics are of interest to HPs, so breaking down juice types more clearly may benefit overall recommendations



Limitations & Considerations



Limitations & Considerations

1. Rebrand (NRAUS to FOODiQ) may have impacted brand recognition of resources in follow-up survey.
2. The number of respondents from singular professions, combined with the lower-than-projected number of participants who had accessed the resources, limited the analysis by type of health profession.



Thank
YOU!



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APPENDIX 4

Citrus Fruits FOR IMMUNITY



As new infectious challenges emerge and cold and flu viruses continue to circulate widely¹, interest in foods for immunity is strong.



Citrus is commonly believed to support immunity... but is it an evidence-based recommendation?



IMMUNITY RECAP

A healthy immune system is a balance of protective inflammation and anti-inflammatory pathways utilising antioxidants to prevent damage and support microbiomes. For both acute and chronic illness, this complex balancing act requires nutritional support² for optimal barrier, detection, targeting, elimination, and memory function.

CITRUS FRUITS are a unique nutrition package for immune support

VITAMIN C

CITRUS IS NOTABLE FOR VITAMIN C WHICH IS WELL-ESTABLISHED IN SUPPORTING IMMUNITY

Vitamin C is vital to:

- + barrier function & wound healing via collagen promotion⁵.
- + chemotaxis to recruit cells to targets⁵.
- + function of white blood cells^{3,5}.
- + antioxidant and anti-inflammatory activity⁵.

Vitamin C improves immune outcomes in meta-analyses

31 RCTs* ³	3 RCTs ⁴	24 RCTs ³	5 RCTs ³
Reduces duration and severity of common colds.	Reduces risk and duration of pneumonia.	No effect on common cold incidence generally.	Decreased infection in short-term high physical stress.

*randomised controlled trials

EMERGING SCIENCE SHOWS CITRUS BIOACTIVES SUPPORT IMMUNITY



Bioactive citrus flavonoids are in all parts of the fruit⁹.



Key citrus flavonones are not commonly found in other fruits⁹.

BIOACTIVES

Bioactive citrus flavonoids support immunity in 3 ways

- 1 Anti-microbial**
 - Hesperidin and hesperitin: reduce binding and replication of SARS-CoV-2, and free radical damage^{14,15}.
 - Hesperidin, hesperitin and quercetin: prevent influenza replication^{5,10}.
- 2 Antioxidant^{9,10,12}**
 - Enhance activity of human antioxidant enzymes, and inhibit pro-oxidant enzymes.
 - Absorb and neutralise free-radicals.
 - Hesperidin, naringenin and orange juice: reduced reactive oxygen species in RCTs¹³.
- 3 Anti-inflammatory**
 - Hesperidin and orange juice: reduced inflammatory markers in humans^{5,13}.
 - Naringenin, naringin and narirutin: anti-inflammatory effects (cells & animals)⁵.
 - Hesperidin and naringin: increased microbiome short chain fatty acids (SCFA) production, particularly immune modulating propionate¹⁴.

Major Citrus Flavonoids^{9,10,11}

Hesperidin
Hesperitin
Narirutin
Naringenin
Naringin
Diosmin
Nobiletin
Quercetin

FIBRE

CITRUS FRUITS HAVE A UNIQUE FIBRE PROFILE

MOST FRUITS & VEGETABLES

== PREDOMINATELY INSOLUBLE FIBRE

CITRUS FRUITS

== A BLEND OF SOLUBLE (PREBIOTIC) & INSOLUBLE¹⁶

Dietary fibres have direct and indirect impacts on the immune system.

- ✓ Soluble fibres (eg. pectins) abundant in citrus support gastrointestinal barrier function¹⁷ and feed the microbiome to support the gut-immunity axis¹⁸.
- ✓ Citrus peel dietary fibres: contain monosaccharides (arabinose, rhamnose, xylose)¹⁹ that increase anti-inflammatory SCFAs²⁰.

Vitamin C in citrus fruits; What we need vs what's inside⁷

	ORANGE		LEMON		LIME		GRAPEFRUIT		MANDARIN	
PEELED FRUIT 1 fruit (150g)	SDT% >35%	RDI% 173%	SDT% >21%	RDI% 106%	SDT% >21%	RDI% 104%	SDT% >24%	RDI% 120%	SDT% >19%	RDI% >93%
ZEST 1 tablespoon	>5%	27%	>3%	18%	>5%	24%	>3%	16%	>2%	11%
JUICE 125ml	>21%	106%	>23%	115%	>26%	131%	>21%	106%	>13%	67%

Adult Recommended Dietary Intake (RDI) = 45 mg/day. Suggested Dietary Target (SDT) = 220mg/day (men), 190 mg/day (women)⁶.

Citrus is simple and impactful

EASY AND PRACTICAL

- ✓ Familiar and easy to use and prepare.
- ✓ Available all year round, and abundant in winter when other local fruits may not be in season.
- ✓ Affordable.
- ✓ Recommending citrus reduces complexity while maintaining specificity – maximising likelihood of behaviour change²¹.

ENHANCES MEALS AND ENJOYMENT

- ✓ Versatile across meal occasions.
- ✓ Diverse uses in sweet and savoury dishes.
- ✓ Adds colour variety to meals.
- ✓ Unique sweet-sour combination may improve palatability, particularly when anosmia (loss of smell) impacts flavour perception during illness or aging²².

WHOLE FOOD

- ✓ More than vitamin C.
- ✓ Unique package of nutrients and bioactives to support immunity.

How to recommend citrus

 Whole as a snack	 As juice	 Slices in water or tea
 Grilled added to meals	 Freeze juice as ice blocks	 Slice segments into salads
 In salad dressings	 Use lemon or lime juice & zest to cure seafood or beef	 Add lemon juice & zest to your favourite soups

Take home message:

While there is no silver bullet for optimal immune function, citrus fruits not only add a variety of colours and zesty flavor to meals, but contain a unique combination of nutrients and bioactives important for immunity:



The evidence-base for the benefits of these components include studies of supplements in doses achievable from whole fruit intake.

The whole fruit is a unique package that can be recommended to support immunity.



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This brochure is intended for educational purposes only.



SCAN FOR MORE INFO

Citrus Fruits FOR BRAIN HEALTH

Brain health is moving to the forefront of dietary recommendations



- ✓ Depression and dementia now leading causes of disease burden¹.
- ✓ Diet an established determinant of brain health².
- ✓ Better brain health not only reduces chronic disease risk, it also means improved mental health and everyday performance².

COMMON BRAIN HEALTH MEASURES IN SCIENTIFIC STUDIES:



Cognitive function or performance:

High-level thinking such as attention, memory, decision-making, and judgment.

Measured over:



SHORT TO MEDIUM TERM



Depression:

Depressed mood, diminished interests, and impaired cognitive function.

Measured over:



MEDIUM TO LONG TERM



Cognitive decline:

Loss of memory or other cognitive functions in older age. Significant cognitive decline can result in dementia.

Measured over:



LONG TERM

THE EVIDENCE: citrus fruits benefit brain health outcomes over time

COGNITIVE FUNCTION

In randomised controlled trials, flavonoid-rich orange juice improves cognitive performance in healthy adults^{3,4}.



Greater psychomotor speed after consuming 240 mL orange juice.



Improved executive function and subjective alertness after consuming 240 mL orange juice.



Improved global cognitive function in older adults after consuming 500 mL orange juice daily.

DEPRESSION

In a prospective analysis of US female nurses, citrus fruits and citrus juices had a lower risk of depression⁶:



18% reduced depression risk with 2 or more servings of citrus fruits or juices daily.

DEMENTIA

In a prospective cohort study, citrus fruits was associated with reduced dementia incidence⁵:



18% reduced risk for citrus 3-4 times a week, and 23% reduced risk for citrus daily.

COGNITIVE DECLINE

In recent analyses of large prospective cohorts of US health professionals, citrus fruits and their juices was associated with better cognitive function in older age^{7,8}.



In a 2019 analysis of the Health Professionals' Follow-Up Study cohort, orange juice reduced the odds of poor subjective cognitive function by 47%⁷.



In a 2021 analysis of the Nurses' Health Study and Health Professionals' Follow-Up Study, higher intake of oranges, grapefruit, and citrus juices were associated with better cognitive function⁸.

Prospective cohort study = an observational study that is considered to provide the greatest level of evidence relative to the other observational study designs.

Randomised controlled trial = an experimental study considered to provide the most reliable evidence on the effectiveness of interventions.



In a cross-sectional study of over 2000 older adults, citrus fruits had one of the strongest positive associations with cognitive performance of all plant foods⁹.



Citrus fruits are a unique, whole food package



All citrus fruits contain: **Flavonoids, vitamin C** and **fibre**.
It is this unique, whole food package that is thought to benefit brain health.

FLAVONOIDS⁹⁻¹²



- ✓ A major class of polyphenols.
- ✓ Citrus fruits are one of the richest sources of flavonoids. Some flavonoids, such as hesperidin and naringenin, are specific to citrus fruits.
- ✓ High flavonoid intake associated with reduced risk of depression and reduced cognitive decline in cohort studies, and improved cognitive function in experimental trials.

VITAMIN C

- ✓ One serve (~150 grams) of citrus fruits can provide up to 173% of the Recommended Daily Intake of vitamin C^{13,14}.
- ✓ Vitamin C associated with improved brain outcomes including reduced risk of dementia¹⁵.

FIBRE

- ✓ Citrus fruits have a balance of soluble and insoluble fibre, including prebiotic fibres¹⁶.
- ✓ Fibre, particularly soluble fibre, has been associated with reduced risk of dementia¹⁵.

How can citrus fruits improve brain health?

Exact mechanisms for how citrus fruits could improve brain health are not fully understood. Potential mechanisms^{10,17,18} include:

PREBIOTIC

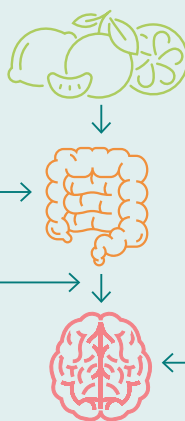
Both **flavonoids**¹⁹ and **soluble fibres**¹⁶ have prebiotic effects, feeding the gut microbiota and increasing the production of short chain fatty acids.

Flavonoids are broken down by the gut bacteria into smaller functional compounds that are more bioavailable³.

GUT-BRAIN AXIS

Flavonoids and **short chain fatty acids** can cross the blood brain barrier. Some flavonoids, such as naringenin, localise in the brain²⁰.

Flavonoids also increase blood flow to the brain⁴.



NEUROPROTECTIVE

Flavonoids have direct neuroprotective effects in the brain, including antioxidant activity, reducing neuroinflammation, and increasing helpful proteins and signaling pathways (e.g., brain-derived neurotrophic factor)³.

Vitamin C and **short-chain fatty acids** help to reduce oxidative stress and neuroinflammation, respectively, which are key contributing factors to brain disorders^{21,22}.

Take home messages:

- 1 Brain health benefits start with having citrus fruits 3-4 times per week. Citrus fruits can be consumed as whole, peel, and juice.
- 2 Citrus fruits are a key part of evidenced-based dietary recommendations for brain health.
- 3 Citrus fruits fit within minimally processed, plant-based and Mediterranean-style diets.

1 SERVE CITRUS = ~ 150 GRAMS =



References:

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This project has been funded by Hort Innovation using the citrus research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au



Citrus Fruits FOR HEART HEALTH

Heart health is still the most pressing health concern in Australia.



Heart disease is the **#1** cause of death in Australia¹.

- One death every 18 minutes and one hospitalisation every 80 seconds.
- Diet a widely established modifiable risk factor for heart disease.

COMMON HEART HEALTH MEASURES IN SCIENTIFIC STUDIES:



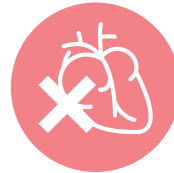
Markers of cardiovascular disease (CVD) risk:

Biomarkers that increase CVD risk such as high blood pressure (BP) and lipids.

Measured over:



SHORT TO MEDIUM TERM



Cardiovascular disease:

Diseases of the heart and blood vessels that includes coronary heart disease (CHD) and stroke.

Measured over:



LONG TERM



CVD mortality:

Death with CVD as the underlying cause.

Measured over:



LONG TERM

THE EVIDENCE: Citrus fruits benefit heart health outcomes

CVD MARKERS



In meta-analysis of randomised controlled trials, citrus fruits and citrus juices improve markers of CVD^{2,3}.

2.1%
FMD

Improvement in flow-mediated dilation (FMD) in a meta-analysis of 35 randomised control trials (RCTs) for **fruit juices (including citrus)** vs. control.

-3.1
mmHg
SBP

Reduction in systolic blood pressure (SBP) in a meta-analysis of 35 RCTs for **fruit juices (including citrus)** vs. control.

-2.4
mmHg
SBP

Reduction in SBP in a meta-analysis of 3 RCTs for **grapefruit** vs control.

CVD



In large prospective cohorts of US health professionals, higher intake of citrus fruits and their juices was associated with reduced CVD risk⁴.

19%
RR

Reduced risk (RR) of ischaemic stroke for **citrus fruits and their juices**.

25%
RR

Reduced risk of ischaemic stroke for **citrus juices alone**.

CVD MORTALITY



In a large prospective cohort study of US women⁵:

15%
RR

Reduced risk of CHD mortality with **grapefruit** consumption.

Prospective cohort study = an observational study that is considered to provide the greatest level of evidence relative to the other observational study designs.

Randomised controlled trial = an experimental study considered to provide the most reliable evidence on the effectiveness of interventions.



In the Nurses' Health Study and the Health Professionals' Follow-Up Study, citrus fruits (including juice) had one of the strongest protective associations for ischaemic stroke **of all fruit and vegetable types**⁴.



Citrus fruits are a unique, whole food package



All citrus fruits contain: **Flavonoids, essential micronutrients** and **fibre**.
It is this unique, whole food package that is thought to benefit heart health.

FLAVONOIDS



- ✓ A major class of polyphenols⁶.
- ✓ Citrus fruits are one of the richest sources of flavonoids. Some flavonoids, such as hesperidin and naringenin, are specific to citrus fruits⁶.
- ✓ High intake associated with reduced risk of CVD in a systematic review and meta-analysis⁷.

MICRONUTRIENTS



- ✓ Citrus fruits can provide up to 173% of the Recommended Daily Intake of vitamin C and 270 mg potassium^{8,9}.
- ✓ High dietary vitamin C intake associated with reduced CHD risk in a meta-analysis of prospective cohort studies¹⁰.
- ✓ High potassium intake reduces BP in people with hypertension and associated with lower risk of stroke in a systematic review and meta-analysis of RCTs¹¹.

FIBRE



- ✓ Citrus fruits can provide up to 3.2 grams of fibre and have a balance of soluble, insoluble, including prebiotic fibres¹².
- ✓ Soluble fibre lowers total and LDL cholesterol¹³ and total fibre intake was associated with large risk reductions in CVD and CHD¹⁴.

How can citrus fruits improve heart health?

Citrus fruits are likely to improve heart health through many mechanisms of action¹⁵⁻¹⁷, including:

ANTI-HYPERTENSIVE

Potassium and **vitamin C** lower blood pressure, which improves the health of arteries and reduce cardiac workload.

ANTI-INFLAMMATORY

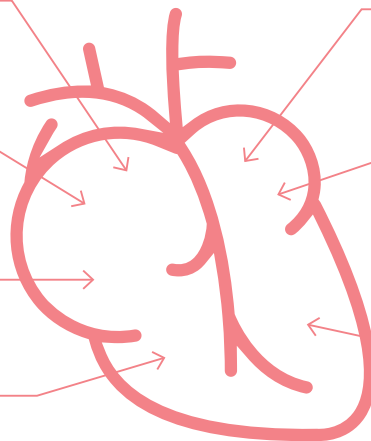
Citrus flavonoids, vitamin C and **fibre** have anti-inflammatory effects, protecting the heart and arteries from damage.

ANTIOXIDANT

Citrus flavonoids and **vitamin C** have antioxidant effects, reducing oxidative stress.

ANTIPLATELET

Citrus flavonoids act as antiplatelet agents.



LIPID-LOWERING

Citrus flavonoids such as naringin and **soluble fibre** have lipid-lowering effects.

PREBIOTIC

Fibre and **citrus flavonoids** modulate the gut bacteria, leading to the production of short chain fatty acids, which can improve lipid metabolism.

VASODILATOR

Potassium, vitamin C and **citrus flavonoids** contribute to vasodilation, decreasing blood pressure.

Take home messages:

- 1** Citrus fruits support a healthy heart in many ways.
- 2** All parts of the fruit (whole, peel, and juice) can help to support a healthy heart.
- 3** Citrus fruits are an evidenced-based recommendation that fits within minimally processed, plant-based, DASH (Dietary Approaches to Stop Hypertension) and Mediterranean-style diets.

1 SERVE CITRUS = ~ 150 GRAMS =



1 orange



2 mandarins



1 lemon



2 limes



½ grapefruit



½ cup 100% citrus juice

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SCAN FOR MORE INFO

Citrus Fruits

MORE THAN JUST VITAMIN C



What's **INSIDE** citrus fruits?

All citrus fruits contain health promoting **bioactives**, **essential nutrients**, and **fibre**^{1,2}.

It is this unique, whole food package that delivers health benefits, as part of a balanced diet.

ESSENTIAL NUTRIENTS

Vitamin C, potassium, and folate¹.

FIBRE

A balance of soluble and insoluble fibres², including prebiotic fibre for good gut bacteria^{3,4}.

CITRUS BIOACTIVES

Healthful compounds that contribute to the bright colours, flavours, smells, and antioxidant activity¹.

Some citrus bioactives (like hesperidin) are not commonly found in other foods⁵.



3 REASONS to eat more CITRUS



IMMUNITY

1 serve of citrus fruits can provide up to 179% of your daily vitamin C needs^{6,7} and can support immunity.



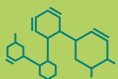
HEART HEALTH

Citrus fruits can lower the risk of cardiovascular disease.



BRAIN HEALTH

Citrus fruits may improve short-term brain function and help to lower the risk of depression and dementia.



CITRUS BIOACTIVES

✓ antimicrobial and anti-inflammatory effects to support the functioning of the immune system⁸.

✓ antioxidant, anti-inflammatory, and lipid-lowering effects to support the heart and arteries^{8,9}.

✓ reduces inflammation and increases brain supporting proteins⁸.



ESSENTIAL NUTRIENTS

✓ vitamin C can reduce the duration and severity of the common cold⁸.

✓ potassium can lower blood pressure¹⁰.

✓ vitamin C has antioxidant effects that can help to protect brain health¹¹.



FIBRE

✓ soluble fibre feeds the good gut bacteria for a healthy immune system⁸.

✓ soluble fibre can help to lower cholesterol¹².

✓ soluble fibre feeds the good gut bacteria which can help to protect brain health¹¹.

What is 1 SERVE of citrus?^{6,7}

DI = Daily Intake



1 ORANGE
(150 G)



2 MANDARINS
(150 G)



1 LEMON
(100 G)



2 LIMES
(100 G)



½ GRAPEFRUIT
(150 G)

The sugars in citrus fruits are naturally occurring⁷.

All citrus fruits are low in sodium⁷.

Essential nutrients³:

	1 ORANGE (150 G)	2 MANDARINS (150 G)	1 LEMON (100 G)	2 LIMES (100 G)	½ GRAPEFRUIT (150 G)
Energy kJ (DI%)	263 (3%)	300 (3%)	107 (1%)	113 (1%)	242 (3%)
Carbohydrates g (DI%)	12.6 (4%)	14.6 (5%)	1.9 (<1%)	1.2 (<1%)	10.7 (3%)
Sugars g (DI%)	12.6 (14%)	14.6 (16%)	1.9 (2%)	1.2 (1%)	10.7 (12%)
Sodium mg (DI%)	2 (0%)	4 (0%)	2 (0%)	3 (0%)	2 (0%)
Fibre g (DI%)	3.2 (11%)	2.3 (8%)	1.5 (5%)	3.0 (10%)	2.7 (9%)
Vitamin C mg (DI%)	71 (179%)	44 (108%)	35 (88%)	31 (78%)	63 (158%)
Folate µg (DI%)	83 (42%)	39 (20%)	11 (6%)	8 (4%)	21 (11%)
Potassium mg	270	240	120	83	218
Total polyphenols (bioactives) mg ^{14,15}	419	363	60	211	114

9 ideas to add a citrus BOOST

WHOLE AS A SNACK



SLICES IN WATER OR TEA

AS JUICE



GRILLED ADDED TO MEALS



FREEZE JUICE AS ICE BLOCKS



ADD LEMON JUICE & ZEST TO YOUR FAVOURITE SOUPS

USE LEMON OR LIME JUICE & ZEST TO CURE SEAFOOD OR BEEF



IN SALAD DRESSINGS



SLICE SEGMENTS INTO SALADS

6 zesty citrus FACTS



Citrus fruits were famously used to treat scurvy in sailors. Modern science revealed this to be due to the vitamin C content¹⁶.



Citrus fruits have been used for centuries in traditional medicine to help aid digestion, immunity, asthma, skin, and eye health¹⁷.



Citrus fruits are available all year round and stay fresh for longer than most other fruits¹⁸.



Squeezing lemon juice over cut fruits (like apple and avocado) slows oxidation and reduces browning¹⁹.



The outer peel of citrus fruits (called the 'zest') is edible and can be added to meals for an extra nutrition boost²⁰. This means that citrus fruits can be a zero waste food.



Citrus fruits are compatible with minimally processed, plant-based, Mediterranean-style, low FODMAP and gluten free diets^{21,22}.

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See the **SAVOURING CITRUS** recipe booklet for delicious citrus recipes



Hort Innovation
Building a new tomorrow

CITRUS FUND

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NRAUS
www.nraus.com

Citrus Australia

APPENDIX 5



Citrus Webinar

20th November

Citrus webinar Evaluation – Summary results



381 registered
(KPI >200 registered)
102 attended
live (KPI >100)

65% completed
evaluation (KPI
>80%)



97% found event
'Excellent' or 'very good'
(KPI >90%)

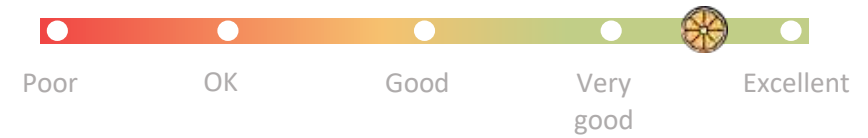


89% found information
presented 'extremely
useful' or 'very useful'
(KPI >90%)

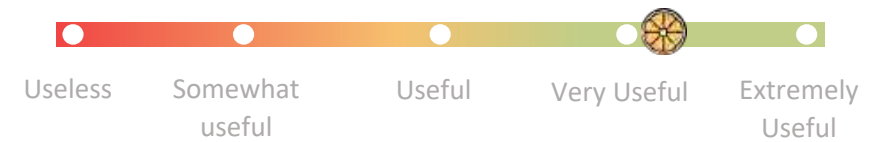


98% found event
'extremely engaging' or
'very engaging'

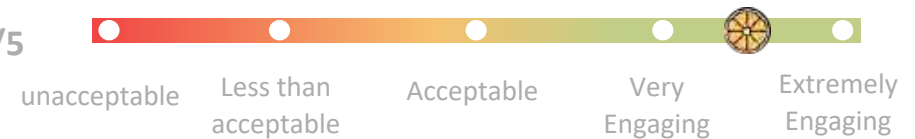
4.59/5



4.08/5



4.43/5



100% learnt something new in the
Citrus Webinar
(KPI >80%)

What was done well?

43% respondents in open answers said, 'All of it', 'Everything'

Presenters/Content/Slides

“Made the info usable as a practitioner/ therapist.”

“Presentations and speaking were clear and concise.”

“very vibrant slides and information was easily understood.”

“Latest research evidence”

Format/Timing/Organisation

“Well put together, flowed beautifully, packed full of valuable information.”

“I loved the kahoot quiz, very interactive and you learn more by being questioned on information.”

“Time of the day, clear and concise programme and presentations”

“The amount of content covered in the 1-hour timeframe.”

What drove engagement scores?

New information

“A lot of new information presented.”

“Learnt new things about citrus.”

“I learnt a lot of new things that I wasn't aware of.”

“Interesting topic showcasing forgotten fruits!”

“Learnt a whole lot. Realized how much I didn't know about citrus.”

“Combination of latest evidence and clinically useful information”

Format/presentations

“Authoritative, referenced information, engaging speakers and issues.”

“Fantastic webinar - very informative, the speakers are knowledgeable and well-articulated and the information fun! “

“Very relevant information, practical and appropriate levels of scientific evidence”

“Well researched and presented.”

“It felt short and sharp but at the same time I learned lots.”

“It was laid out really well and information was super knowledgeable.”

“Combination of latest evidence and clinically useful information”

Presenters

“Very enthusiastic and well-regarded presenters”

“Host and presenters were engaging in what they had to say and the delivery of the information .”

“Two great presenters and interesting presentations. Good to have key messages and scientific references included in the slides.”

“Speakers new what they were talking about and their passion for the topic was evident and inspiring.”

“Dr Emma's presentation super engaging and offering new ways to look at things.”

Kahoot/Quiz

“Best one yet. The broad spectrum overview with the exciting kahoot.”

“Opportunity to ask questions and 8 quiz questions to check our knowledge kept it interesting”

“Apart from the information, the kahoot game was fun. Beats a good old poll.”.

“Loved the Kahoot quiz in the middle! ”

“Loved the break between speakers by using the Kahoot! quiz. Great way to get everyone involved and getting their brains working!”

“I loved the kahoot part. It made me focus more.”

What were the most valuable learnings?

Food synergy

“The whole food benefits, more than vitamin c and fibre etc.

“The explanations of how to frame superfoods to take back the term and use it for good. I'm going to do that.”

“The value of citrus from a whole food's perspective”

“That citrus is a whole food and the importance of incorporating it into our diet.

“I learned that food is medicine.”

New 'News' on citrus

“To make citrus part of my diet and to talk about it with others.”

“Citruses aren't just high in vitamin C.”

“The angle of not just vitamin c but a matrix of nutrients

“Never knew how and what the amazing citrus fruit really is!!!!.”

“All about citrus foods that I didn't realise was important or valuable.

“How important citrus is to our health, and not to discount it.”

Benefits of citrus

“Citrus also positively effects neurological and cardiovascular health.”

“The overall health benefits that the fruit can provide“

“Explaining how beneficial citrus fruits are in terms of health benefits.”

“Composition of micronutrients and how they benefit individual health outcomes.”

“Reinforcing knowledge e.g. potassium in citrus aiding decrease of blood pressure, increasing cognition, fibre is 50:50 soluble: insoluble..”

Practical tips

“Practical ways of offering help to clients.”

“Loved the simple calls to action to back up the complex information.”

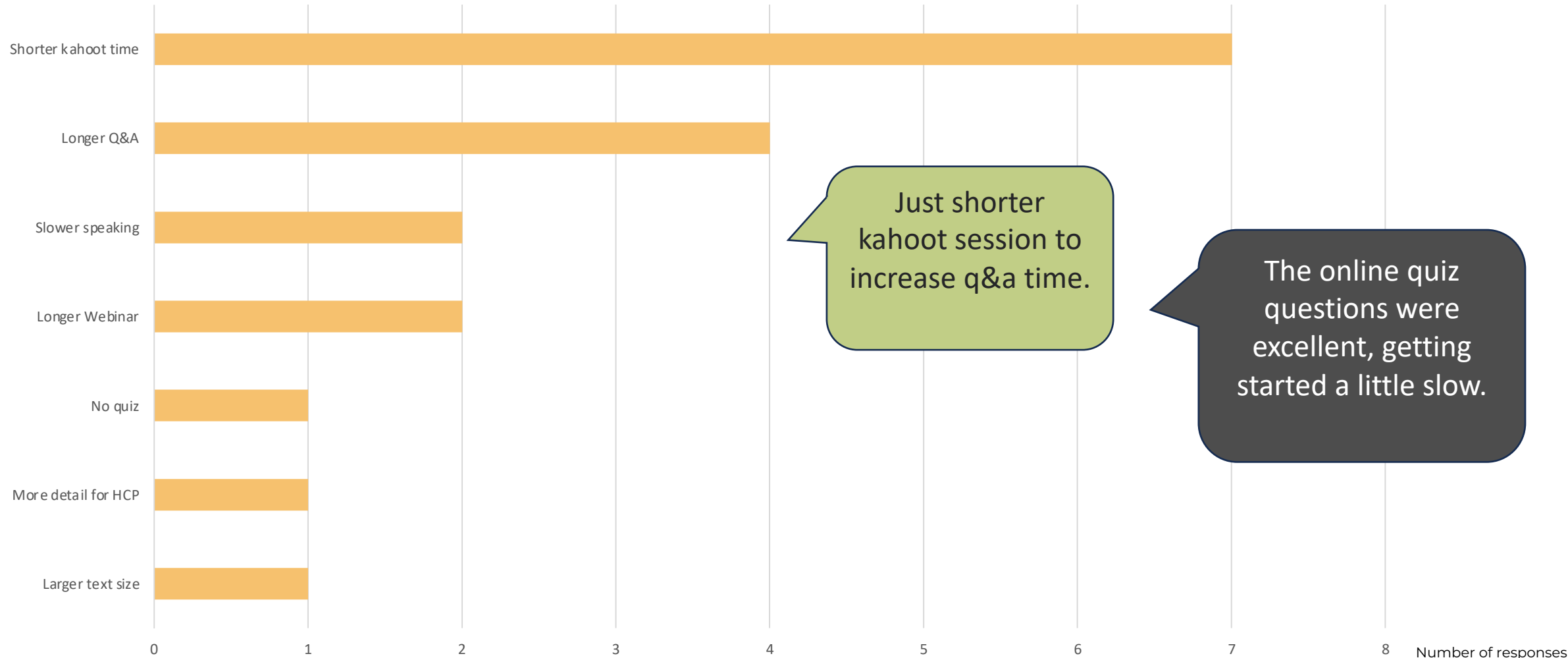
“Discussing how to communicate this information to patients and motivate them to eat citrus foods.”

“Potential uses for the various citrus fruits ”

“Slide on citrus being a unique package - great visual for clinic as well as info.”

What could be improved ?

Overall attendees were happy with the Webinar with the **main recommendation to shorten the quiz time**



APPENDIX 6



FOODiQ Webinar **EVALUATION**

For Hort Innovation

July 2024



Recap

On 4th June 2024, FOODiQ Global hosted a **health professional webinar** to update health professionals on the latest evidence of juice for health.

The event, **“Evolving Perspectives in Nutrition: Is it time for a fresh perspective on 100% juice?”**, explored the role of juice for health today.

The purpose of the event was to:

- Educate health professionals (primary target dietitians) on the role of juice within a balanced diet, including outlining its nutrient composition and latest research on health effects.
- Begin to create a coalition of support for HP to proactively be engaged in the 100% juice conversation and help to address misinformation.

The webinar is an evergreen resource that is housed on the Citrus Australia and FOODiQ websites for HP.

WEBINAR: FREE & VIRTUAL

Tuesday 4th June 2024

12:30 - 2:00 PM AEST

REGISTER for your chance to **WIN** one of 5 Ottolenghi's classic cook books

Hort Innovation CITRUS FUND

This project has been funded by Hort Innovation using the citrus research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

FOODiQ global

FOODiQ
global

Citrus webinar Evaluation – Summary results



366 registered
(KPI >200 registered)

105 attended live
(KPI >100)

34% (36 people) completed evaluation
(KPI >40%)

328 views
1 month post



89% found event 'Excellent' or 'very good'
(KPI >90%)



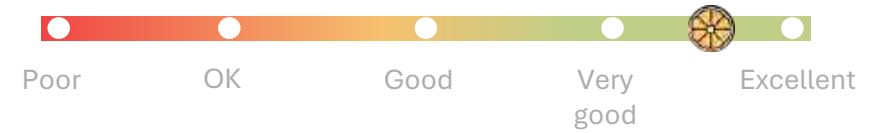
94% found information presented 'useful'
(KPI >90%)



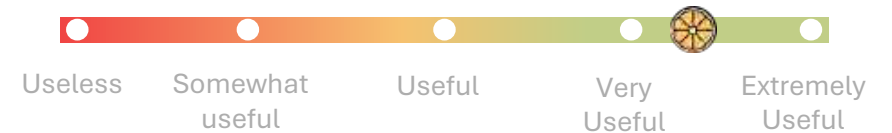
97% found event engaging

100% of attendees found the event informative

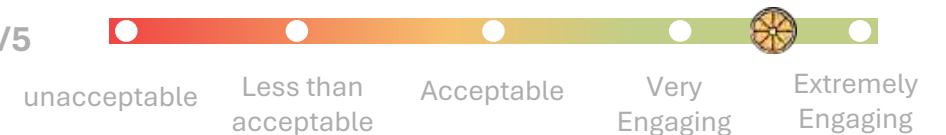
4.6/5



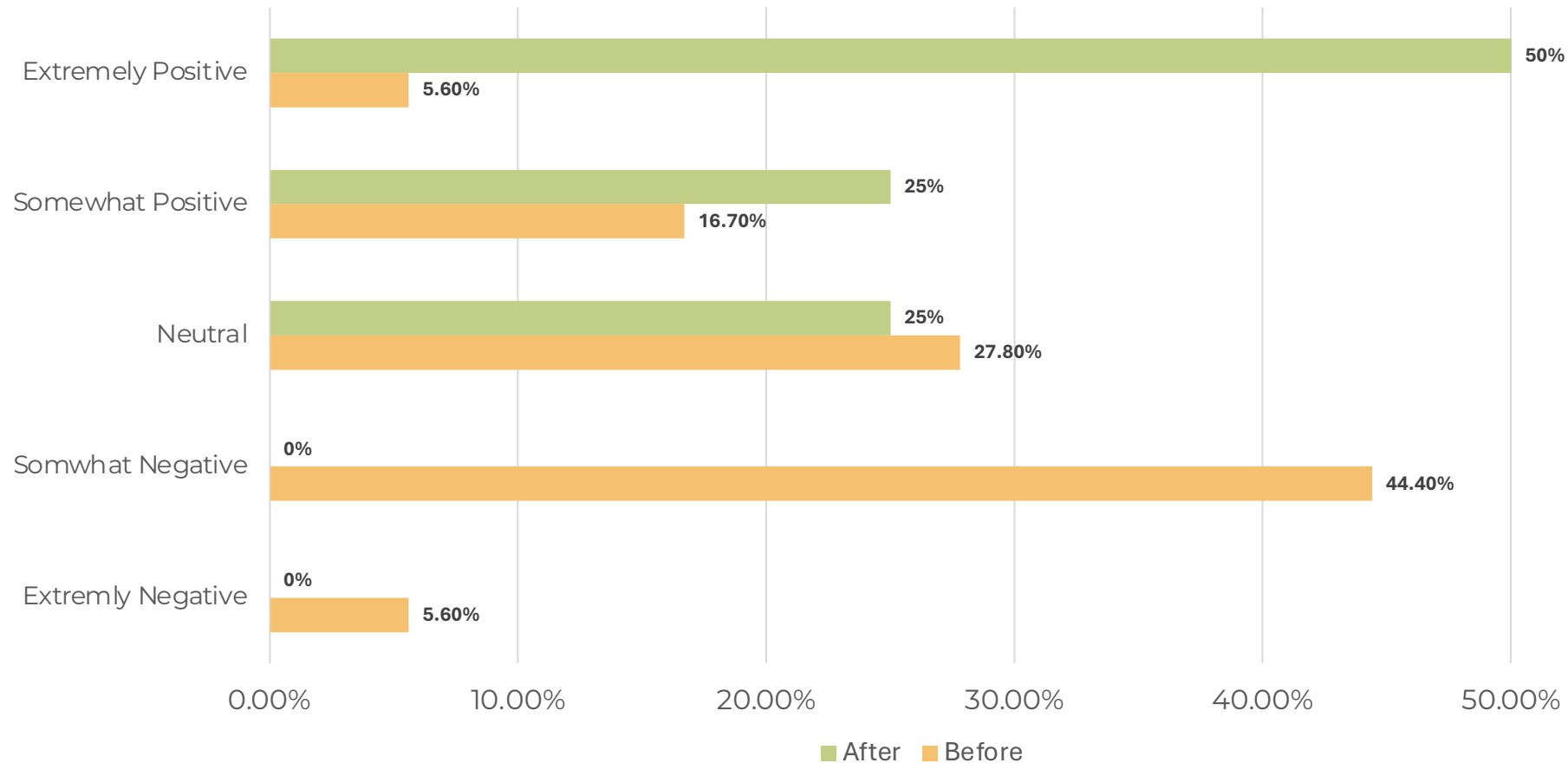
4.28/5



4.58/5



Impact: 75% attendees positive to juice post webinar vs only 22% prior



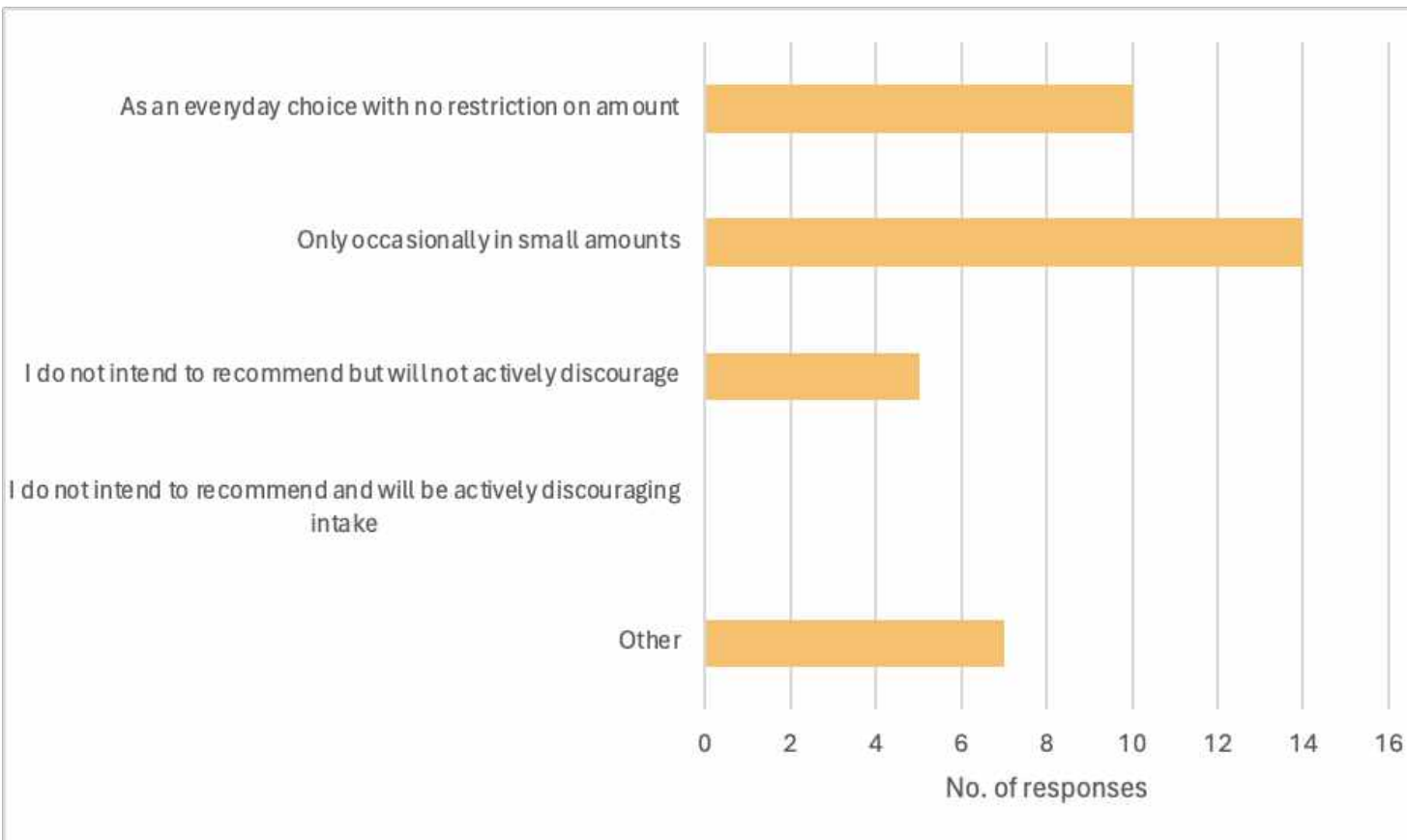
Opinion of 100% juice before and after webinar

Brilliant - great overview & challenged my thinking with latest evidence.

Reframed my opinion on juices and how they can be a part of a balanced diet.

1/3 respondents view juice now as everyday choice with no restriction on amount

'Other' Responses



"Would recommend juice on a case by case basis but in general terms I would recommend it more so than I would have before listening to the webinar."

"It would honestly be case by case. For those who do not enjoy eating fruits, I will recommend a juice"

"Everyday choice with quantity aligned with Dietary Guidelines. 1-2 serves per day = 125ml - 250ml per day. 100% juice only."

"Situation specific, but definitely an option especially if getting enough fruit (or food) is an issue."

"It can be an everyday choice but with amounts that are in line with dietary principles of balance and adequacy"

"I am positive for before and after. Yes intake if fresh squeezed juice daily I always support."

"I would recommend however I would preference whole fruit"

What was done well?

26% respondents in open answers said, 'All of it', 'Everything'

Presenters/Content/Slides

"clarity of presenters"

"Some great speakers. Energetic and kind hosting."

"Stellar host, I felt like I was watching tv. Grateful to access the resources after."

"Short, sharp talks from each of the presenters"

"Engaging, interesting & facilitator so positive, promoting science!!"

"I thought each presenter was given enough time for their respective segments."

"Presented poorly understood information well"

"A wonderful presentation and deep dive into the evidence, rather than just subjective opinions"

Format/Timing/Organisation

"I liked the format, and the multiple speakers. It was organised and never lagged or got boring."

"Everything from moderation to scientific research and flawless execution"

"Online webinar with polls and Q&A time"

"The PowerPoint slides and the organization"

"Very well set up and user friendly. Was very professionally run"

"Combination of practical, academic and thoughtful. Well organised and timed."

What drove engagement scores?

Presenters

“Presenters were clear”

“Good to see a mix of speakers, who know how to speak to us in the way we need. Brilliantly hosted.”

“Presenters spoke well and had clear messaging and slides”

“The host (good vibes and polish!) and unique presentation styles (and each different)”

“Loved the 4 speakers. Different insights.”

“Great speakers and fabulous host.”

“Loved the variety of panelists and the topics they presented on”

“Three engaging speakers. Good content on slide. Polls throughout. Dispelling myths.”

Format/presentations

“Great poll questions- speakers were so informative.”

“Start to finish the sessions were extremely engaging.”

“The slides were simple and easy to read and understand and the presenters made everything sound so simple and doable”

“Presenters and visuals were interesting”

“Interactive questions. Opportunity to comment on chat. Opportunity to ask questions of panel. Well facilitated. Thank you.”

“I found it very engaging, polls were interesting and good presenters.”

“The polls”

What were the most valuable learnings?

Evidence Based Research

“The science behind the information”

“Understanding the evidence base and dispelling myths. Dietary recommendations linked to evidence.”

“That myths were exposed and loved food processing talk!”

“The level of evidence that 100% juice can be beneficial to health rather than detrimental”

“High quality evidence communicated to support findings”

“Research on it”

“It felt a bit biased in places, but the last person to talk gave a much more balanced viewpoint.”

Glycemic index and polyphenols

“the amount of polyphenols in 100% fruit juice”

“Looking beyond sugar and the interactive effects of the components in juice + I fact that juice isn't high kilojoule or high GI!”

“The Glycemic Index and G Load factors knowledge was most useful.”

“Learning about polyphenols influencing GI, the amount of fruit actually in juice.”

“The Glycemic Index and G Load factors knowledge was most useful.”

“The impressive micronutrient value of 100% fruit juice was surprising + it's low GI and has a low GL.”

Nutrition and Health

“Lack of strong evidence to link Juice to negative health effects:”

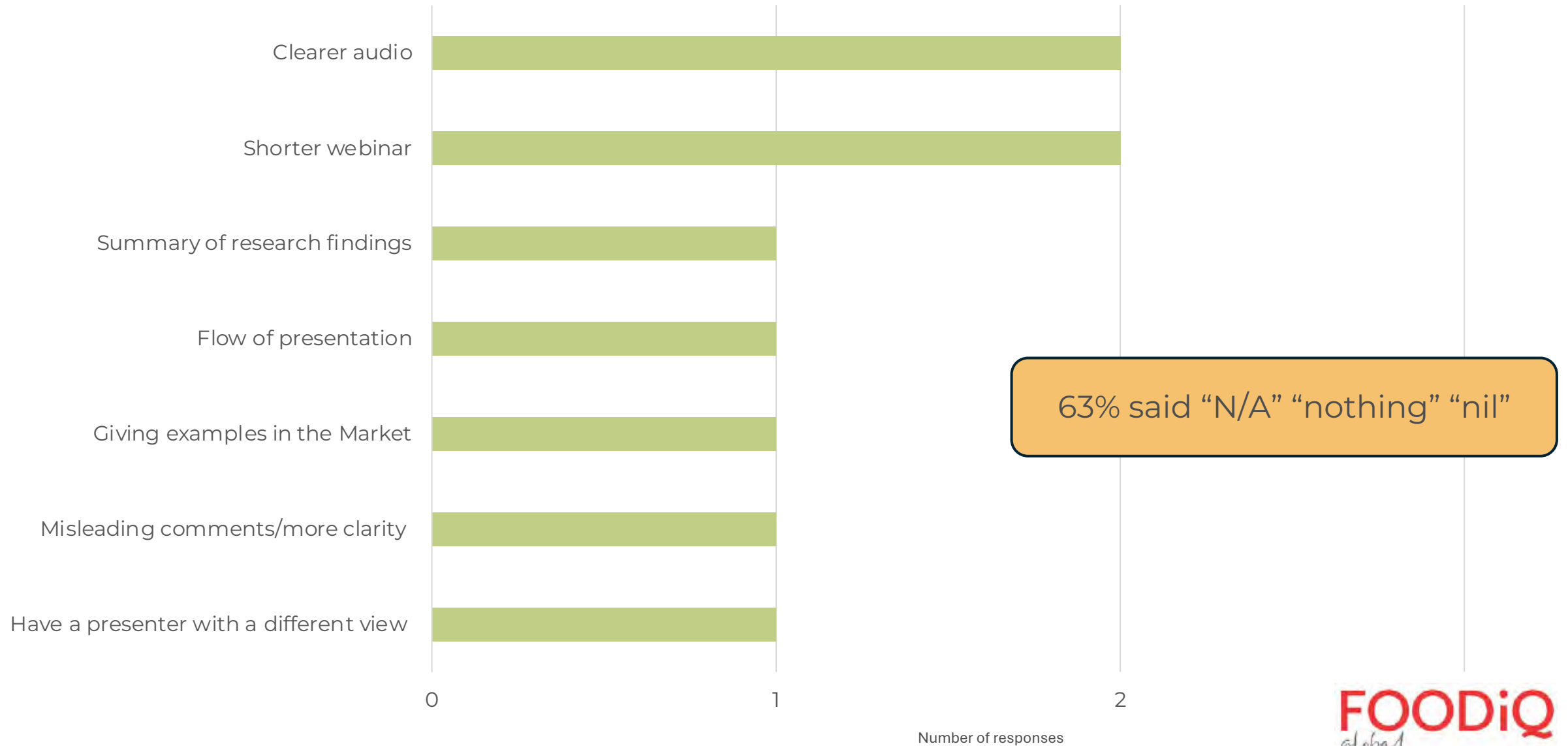
” I had never thought about how weird the recommendations for juice were compared to fruit and I hadn't realized how complex the interactions were in health”

“To take into account the overall nutritional value of fruit juice rather than just sugar content. And to consider the merit of recommending diluted fruit juice to children who are not accessing enough fruit and vegetables.”

“Fresh juice is an essential part of our diet. 1 glass per day is of benefit to our health & nutrition.”

“Neutral effect on blood glucose levels And tooth health”

What could be improved ?



Thank
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APPENDIX 7

AUSActive Webinar **EVALUATION**

For Hort Innovation

July 2024



Recap

On 12th June 2024, AUSActive hosted a **webinar** to update its membership of fitness professionals on the latest evidence of juice for health, where Tim Cassettari from FOODiQ Global presented.

The event, **“Unravelling the 100% Juice Myth”**, explored the role of juice for health today.

The purpose of the event was to:

- Educate active health and exercise professionals with the knowledge and confidence to make informed recommendations about juice within their scope of practice, outlining its nutrient composition and latest research on health effects and unique advantages in supporting active lifestyles.
- Begin to create a coalition of support for fitness HP to proactively be engaged in the 100% juice conversation and help to address misinformation.

The presentation is an evergreen resource that is both on AUSActive, Citrus Australia and FOODiQ websites.



With Mr Tim Cassettari, Storyteller and Nutrition Researcher focusing on how small changes can support more significant health and fulfilment.



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AUSActive webinar Evaluation – Summary results



135 registered
(KPI >200 registered)

75 attended live
(KPI >100)

57% (43 people) completed evaluation
(KPI >40%)

67 views
1 month post



88% found event 'Excellent' or 'very good'
(KPI >90%)

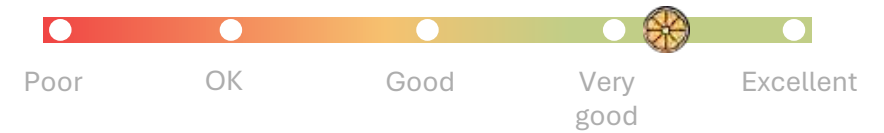


95% found information presented 'useful'
(KPI >90%)

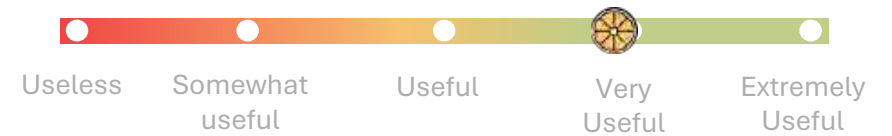


98% found event "engaging"

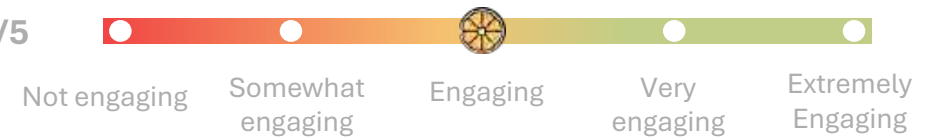
4.2/5



3.9/5



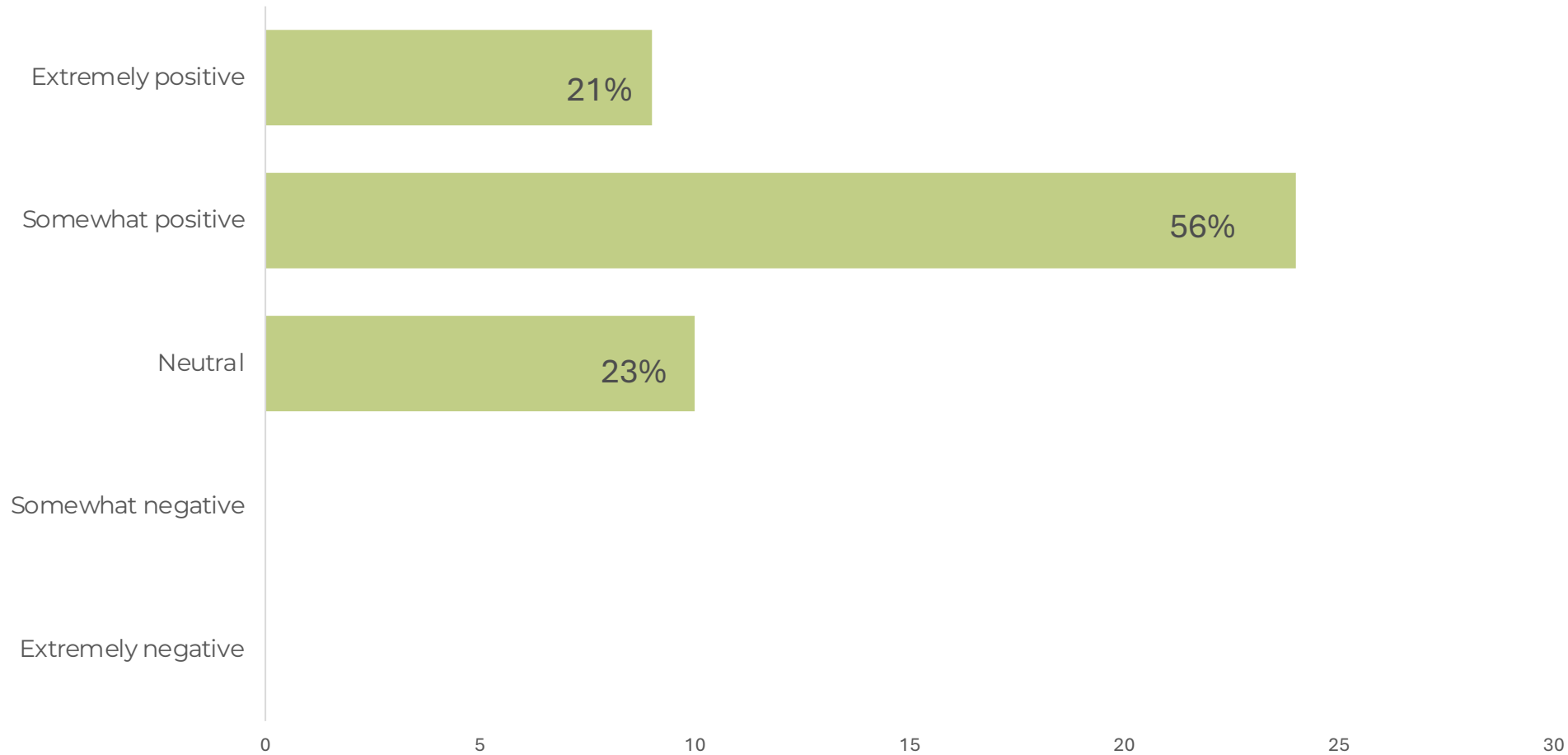
2.9/5



100% of attendees found the event informative

98% of attendees reported that they learnt something new
(KPI >80%)

Over 77% participants were positive to juice post webinar



What was done well?

Presenters/Knowledge/organisation

“I’m more visual , so I like power point info , where I can take a picture and save info .”

“People involved love what they do”

“The event was well-organized, with engaging speakers and a clear presentation of valuable information.”

“Visual presentation of research and easy listening voice of presenter”

“Presented in clear concise terms with loads of real-life reference”

“Information as to how reliable and accurate the studies were before coming up with the factual content”

“Presented in clear concise terms with loads of real life reference”

Polls/surveys/slides

“Charts and polls”

“Wealth of knowledge on the topic.”

“Facts cited”

“The surveys & the practical application scenarios.”

“The explanation of each subject in a brief but informative way”

“The polling and comments following the polls”

“Debunking myths”

“The on the spot surveys”

“The quizzes kept the audience engaged”

“Information was clearly presented. I liked use of polling and then having the answers explained.”

What drove engagement scores?

Presenter

“Tim was well prepared, and I liked the use of polling for audience engagement.”

“Good presenter , good questions Diagrams”

“Presented well”

“Showed his knowledge”

” Tim presented well & I liked the way he used the surveys & the different scenarios to educate us.”

“Our presenter was interesting, knew his stuff, and very informative.”

Polls/presentation

“I enjoyed the polls”

“Kept it simple not too scientific easy to understand”

“Facts really interesting from study results”

“I like the poll during the webinar”

“Lots of good graphics and interactive polls”

“Gave lots of questions”

“The polls were great for engagement”

“I really enjoyed the "Polls" sections to engage everyone's thoughts”

“loved the interactions and the surveys we had to do - kept you engaged the whole time”

What were the most valuable learnings?

Benefits of Juice/Approach to juice

“Orange juice is more than just vitamin c and it has a lot more benefits.”

“100% juice is valid part of healthy diet and can be a healthy food choice, particularly for someone who doesn't eat much fruit.”

“Juice has different benefits/ risks for different people”

“Orange juice in its pure form can be an excellent nutrient for athletes as long as you take certain precautions.”

“The most valuable learning for me was the importance of 100% fruit juice without added sugars and the recommended daily intake.”

“The positive benefit of 100% juice on gut and brain health.”

“To take a more holistic approach & take each individual's circumstances into consideration. Advise the client to consult with a dietitian if not sure.”

Myth busting/Sugar

“There are many more benefits in terms of nutrients to negate the sugar content”

“that it can be good for you - not just full of sugar”

” Despite the sugar content, there are many other benefits that come from consuming 100% juice”

“The myth debunking and the research findings”

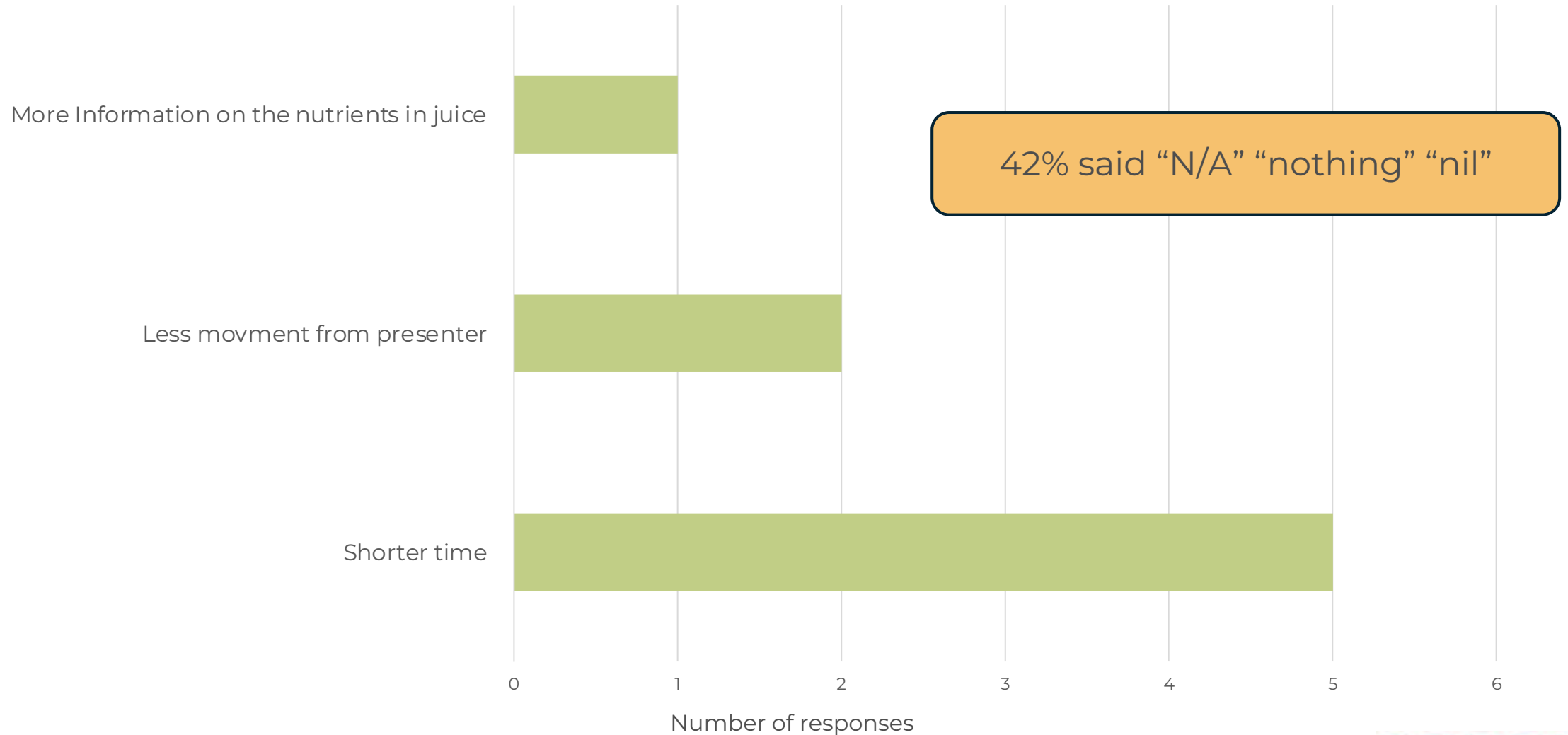
“That it's not as bad as what I thought”

“Learning what juice contains artificial sweetener what don't”

“More in depth learning on pros and cons and myths more so”

“The journal articles that were discussed”

What could be improved ?



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APPENDIX 8:

More to 'C' IN CITRUS

Long known for their vitamin C content, modern nutritional research shows there is much more to citrus fruits than just vitamin C.



WHAT'S new IN CITRUS?

OLD PARADIGM:
HIGH IN VITAMIN C = PREVENTS DEFICIENCY

NEW PARADIGM:
UNIQUE CITRUS PACKAGE = MANY HEALTH BENEFITS

The UNIQUE CITRUS PACKAGE

1 SERVE HAS UP TO^{1,2}:

- VITAMIN C**: 71mg (129% DV)
- POTASSIUM**: 370mg
- CITRUS POLYPHENOLS**: 489mg
- FOLATE**: 85mg (49% DV)
- FIBRE**: 3.2g (11% DV)

THESE COMPONENTS WORK IN SYNERGY TO SUPPORT HEALTH.

DV = Daily Value. 1 serve = ~100g
1 Australia New Zealand Food Standards Code - Schedule 1-40s and 15400s <http://www.foodstandards.gov.au/label/PDF/15400> & Australia Food Composition Database (2022) 3 <http://ghisla-response.eu/>

CITRUS POLYPHENOLS are BIOACTIVE

Bioactive [bio-ac-tive], adj: having or producing an effect on living tissue

CITRUS FRUITS ARE ONE OF THE HIGHEST SOURCES OF FLAVANONES (A TYPE OF POLYPHENOL) IN THE DIET.

1. Williams, Amanda (2010) <http://www.healthyfood.com/2010/06/08/citrus-fruit-benefits/>

Understanding SYNERGY IN CITRUS

SAME AMOUNT OF SUGARS, DIFFERENT EFFECTS ON INSULIN RESPONSE!

Time (mins)	Nectar-sweetened juice	Whole orange	100% orange juice
0	~50	~50	~50
30	~140	~110	~110
60	~70	~50	~50
90	~60	~40	~40
120	~40	~30	~30

THE POLYPHENOLS IN CITRUS CAN HELP TO SLOW THE ABSORPTION OF NATURAL FRUIT SUGARS

1. <http://www.healthyfood.com/2010/06/08/citrus-fruit-benefits/>

CITRUSLY DELICIOUS IDEAS in addition to whole fruit:

- DINNER:** Add juice & zest to soups or to cure seafood or beef
- B'FAST:** In cereal 100% juice
- SNACK:** Slices drizzled with extra virgin olive oil & cinnamon
- LUNCH:** Add sliced segments to salads

AIM FOR CITRUS AT LEAST 3-4 TIMES A WEEK, AS PART OF A BALANCED DIET.

The many HEALTH BENEFITS OF CITRUS

- HEART:** 19% reduced risk of heart disease¹
- BRAIN:** 18% reduced risk of dementia²
- GUT:** Improved gut microbiota composition³
- MOOD:** 18% reduced risk of depression⁴

THE NUTRIENTS IN CITRUS ARE ALSO IMPORTANT FOR IMMUNITY

1. <http://www.healthyfood.com/2010/06/08/citrus-fruit-benefits/>
2. <http://www.healthyfood.com/2010/06/08/citrus-fruit-benefits/>
3. <http://www.healthyfood.com/2010/06/08/citrus-fruit-benefits/>
4. <http://www.healthyfood.com/2010/06/08/citrus-fruit-benefits/>

For educational purposes only.



SCAN FOR MORE INFO





100% CITRUS JUICE: More to see than sugars

Scientific research now shows that we need to look beyond the sugars content to understand the health effects of 100% citrus juice

THE EVOLVING SCIENCE on 100% citrus juice

OLD
SUGARS +
LOW FIBRE
= UNHEALTHY

NEW
NUTRIENT +
BIOACTIVE PACKAGE
= CAN BE HEALTHFUL

"Restriction or avoidance of 100% juice are not supported by the current available evidence." Beckett et al 2024¹

1 Beckett (2024) <https://doi.org/10.1093/ajph/2024.14.1111>

100% citrus juice has HEALTH BENEFITS

BRAIN:
Improved cognitive function in the short and long term^{1,2}

HEART:
Reduced cholesterol^{3,4}, insulin resistance^{5,6}, and inflammation^{4,6}

GUT:
Improved gut microbiota composition⁷

1 Hudson (2022) <https://doi.org/10.3390/nu14081655>; 2 Yuan (2019) <https://doi.org/10.1038/s41598-019-40000-0>; 3 Mozaffarian (2020) <https://doi.org/10.1001/jama.2020.19773>; 4 Miyahara (2019) <https://doi.org/10.1002/ajp.13048>; 5 Li (2022) <https://doi.org/10.1002/ajp.13048>; 6 Avramidi (2019) <https://doi.org/10.1002/ajp.13048>; 7 Li (2022) <https://doi.org/10.1002/ajp.13048>

WHAT'S INSIDE 100% citrus juice?¹⁻⁴

NUTRIENT & BIOACTIVE PACKAGE

- Antioxidant nutrients (polyphenols)
- Natural enzymes (no added / low oil)
- Calcium-dependent nutrients (potassium, folate, vitamin C & vitamin B1)
- Water-soluble nutrients (carotenoids & polyphenols)

1 Australian Food Composition Database (2022); 2 Nelson (2019) <http://doi.org/10.1016/j.jfcr.2019.100001>; 3 Park (2019) <https://doi.org/10.1002/ajp.13048>; 4 Beckett (2024) <https://doi.org/10.1093/ajph/2024.14.1111>

How does 100% citrus juice COMPARE?¹

PER 100g	WHOLE ORANGE	100% ORANGE JUICE	SSB
Carotenoids (mg)	0.3	0.7	0
Vitamin C (mg)	51	46	0
Potassium (mg)	122	102	0
Fibre (g)	1.8	0.4	0
Sugars (g)	8.2	9.1	10.8

100% CITRUS JUICE = NUTRITIOUS BEVERAGE + AFFORDABLE SERVE OF FRUIT

1 <https://www.foodandnutrition.com.au/100-percent-citrus-juice>

100% citrus juice is COMMONLY MISUNDERSTOOD

- "No, the sugars & calories of 2-3 oranges"**
 - 250mL of 100% orange juice only has the sugars & calories of just over 1 whole orange
 - Not all the sugars & calories in an orange are in the juice
- "Always get your fruit in!"**
 - No increase in weight or waist circumference in adults¹
 - Less than 250mL recommended for very young children
- "Favorable for teeth?"**
 - Some dental erosion at very high doses (>750 mL/day) but evidence of harm in real-world conditions is mixed²

1 Australian Food Composition Database (2022); 2 Della (2021) <https://doi.org/10.1007/s00394-020-02429-7>; 3 Li (2019) <https://doi.org/10.1093/ajph/2019.9.1111>

HOW TO CHOOSE 100% citrus juice

JUICES THAT ARE:

- From oranges, mandarins, grapefruits, lemons & limes
- Fresh or reconstituted to original concentration
- With or without pulp
- Store-bought or home-made
- Enjoyed as a drink or added to meals

NOT JUICES WITH:

- Added sugars
- Added sweeteners
- Added nutrients

For educational purposes only.



SCAN FOR MORE INFO



APPENDIX 9:



Savouring citrus:

FRESH & VIBRANT
RECIPE INSPIRATIONS



Citrus Salad with Ginger & Chilli Dressing

SERVING SIZE: 4 PEOPLE

PREP TIME: 20 - 30 MINUTES

COOKING TIME: 20 - 30 MINUTES

Ingredients

- 1/4 cup (60ml) fresh lime juice
- 1/4 cup (60ml) extra virgin olive oil
- 1 tablespoon finely grated ginger
- 1 small red chilli, finely chopped (deseeded for less heat)
- 1/2 teaspoon caster sugar
- 1/2 teaspoon fish sauce
- 1 red grapefruit
- 3 oranges
- 3 mandarins
- 1 shallot, finely sliced
- 1/2 cup mint leaves
- 1/2 cup coriander leaves
- 1/2 cup parsley leaves
- 1/3 cup unsalted roasted peanuts, coarsely chopped



Fruit salads aren't just for desserts! This citrus salad provides a vitamin c boost along with a range of nutrients and bioactive compounds for good health. The mix of tangy citrus and fresh herbs provides a balance of flavours that can be served alone or with your choice of protein.

Method

Combine the lime juice, olive oil, ginger, chilli, sugar and fish sauce in a small bowl. Set aside for at least 15 mins to help infuse the flavours. Can be made 1 day ahead and stored in the fridge.

Cut off the peel and white pith from the grapefruit, cut in between each membrane to release the segments. Do this over a bowl to catch any juice. Once all segments are removed, squeeze the remaining membrane to release all the juices. Note: If you are unsure how to do this, search the web for a how to segment an orange video for some more tips.

Cut the peel and pith off the oranges and cut cross ways into round slices about 1/2 cm thick.

Peel the mandarins and cut in the same way as the oranges.

Arrange the grapefruit, oranges, mandarins on a serving dish with the shallot, mint, coriander, parsley.

Drizzle the ginger and chilli dressing on top, then finish off with the peanuts.

Per Serve: Energy: 1264 Kj | Protein: 6.4g | Fats: 9.62g | Carbs: 20.5g | Fibre: 8.8g | Vit C: 146mg

Citrus Salad with Ginger & Chilli Dressing



4 PEOPLE
(AS A SIDE DISH)



20 - 30
MINUTES



20 - 30
MINUTES

Fruit salads aren't just for desserts! This citrus salad provides a vitamin c boost along with a range of nutrients and bioactive compounds for good health. The mix of tangy citrus and fresh herbs provides a balance of flavours that can be served alone or with your choice of protein.

Ingredients

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1/4 cup (60ml) extra virgin olive oil

1 tablespoon finely grated ginger

1 small red chilli, finely chopped (deseeded for less heat)

1 1/2 teaspoon caster sugar

1/2 teaspoon fish sauce

1 red grapefruit

3 oranges

3 mandarins

1 shallot, finely sliced

1/2 cup mint leaves

1/2 cup coriander leaves

1/2 cup parsley leaves

1/3 cup unsalted roasted peanuts, coarsely chopped

Method

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Per Serve: Energy: 1264 Kj | Protein: 6.4g | Fats: 9.62g | Carbs: 20.5g | Fibre: 8.8g | Vit C: 146mg



Lemon, Thyme & Chicken Soup

Soup makes a great meal or snack, particularly when feeling poorly. This soup is an update on the traditional Greek Avgolemeno! The lemon provides a soothing feeling while adding bioactives and nutrients such as vitamin C to the broth, great when your immune system needs some support. Freeze leftovers to reduce waste.

Ingredients

1 tablespoon extra virgin olive oil

1 medium onion, diced

1 medium carrot, diced

2 celery stalks, diced

4 stalks thyme

3 garlic cloves, finely chopped

2 bay leaves

2 chicken breasts (about 350g)

8 cups (2 litres) chicken stock

3/4 cup (175g) risoni

2 lemons, zest and juice

2 whole eggs

1/4 cup parsley leaves, finely chopped

Salt

Black pepper



4
PEOPLE



50 - 60
MINUTES



1
HOURS

Method

Heat the olive oil in a large stock pot, cook the onion, carrot and celery for 8-10 minutes over medium heat until softened.

Add the garlic and lemon zest, cook for a further minute.

Add the bay leaves, thyme, chicken breast, chicken stock and some salt and pepper. Bring to boil then lower the heat to medium/low, cover with a lid and simmer for 15 minutes until the chicken breast is cooked through.

Take out the chicken breasts, bay leaves and thyme stalks, if leaves are still attached scrape some of them back into the pot.

Add the risoni to the pot and cook for another 10 minutes.

Shred the chicken breasts and add back to the pot.

In a medium heat proof bowl, whisk the eggs and lemon juice together. Scoop out 2-3 ladles of soup and pour it over the egg-lemon mixture as you continue to whisk it. This is a very important step to help prevent the eggs from curdling.

Add this mix to the stock pot and continue to cook on low heat for 5 minutes while stirring. The soup should thicken slightly, but if you notice the eggs curdling then turn off the heat.

Stir in the fresh parsley, adjust the seasoning with salt and pepper and serve.

Per serve: Energy: 1552 kJ | Protein: 29.7g | Fats: 8.1g | Carbs: 38.0g | Fibre: 6.2g | Vit C: 47mg

APPENDIX 10:

The health effects of 100% juice

An umbrella review

Nutrition Research Australia
July 2023





↑ SUGARS

↓ FIBRE

Methods



SLRs with MA



100% Juice



**GRADE &
Risk of Bias**

Results



15 SLRs & 144 MA:
Almost 2 million subjects



100% fruit juices only:
50 – 1200 mL / day



GRADE:
very low - medium

74% of MA reported no effect



Adult weight



Children weight



Liver function



CVD



Metabolic markers



Breast & colorectal
cancer

Intervention

Observational

20% of MA reported benefits



CVD markers
(SBP, DBP, Uric acid, FMD)



Inflammatory markers
(IL-6, CRP)



Stroke mortality
RR: 0.67 (0.60 – 0.76)

Intervention

Observational

6% of MA reported risks



T2DM

RR: 01.07 (1.01 – 1.14)



Prostate cancer

RR: 01.03 (1.01 – 1.05)



CVD mortality

HR: 1.2 (1.01 – 1.42)

Intervention

Observational



Sparkling
Apple

Apple

Low Sugar

Light

Light

Cran-Orange

Cran-Orange

Ruby Red

Ruby Red

FREE STROLLER

All Colgate Brand
Toiletries & Cosmetics
V8

V8
healthy greens
POWER BLEND

New
\$2.40

Cranberry Classic

Cranberry Classic

Cranberry Classic

Cran-Raspberry

Cran-Blueberry

Cran-Blueberry

Cranberry Classic

Cranberry Classic

Cranberry Classic

Cran-Raspberry

Cran-Blueberry

Cran-Blueberry

Cranberry Classic

Cranberry Classic

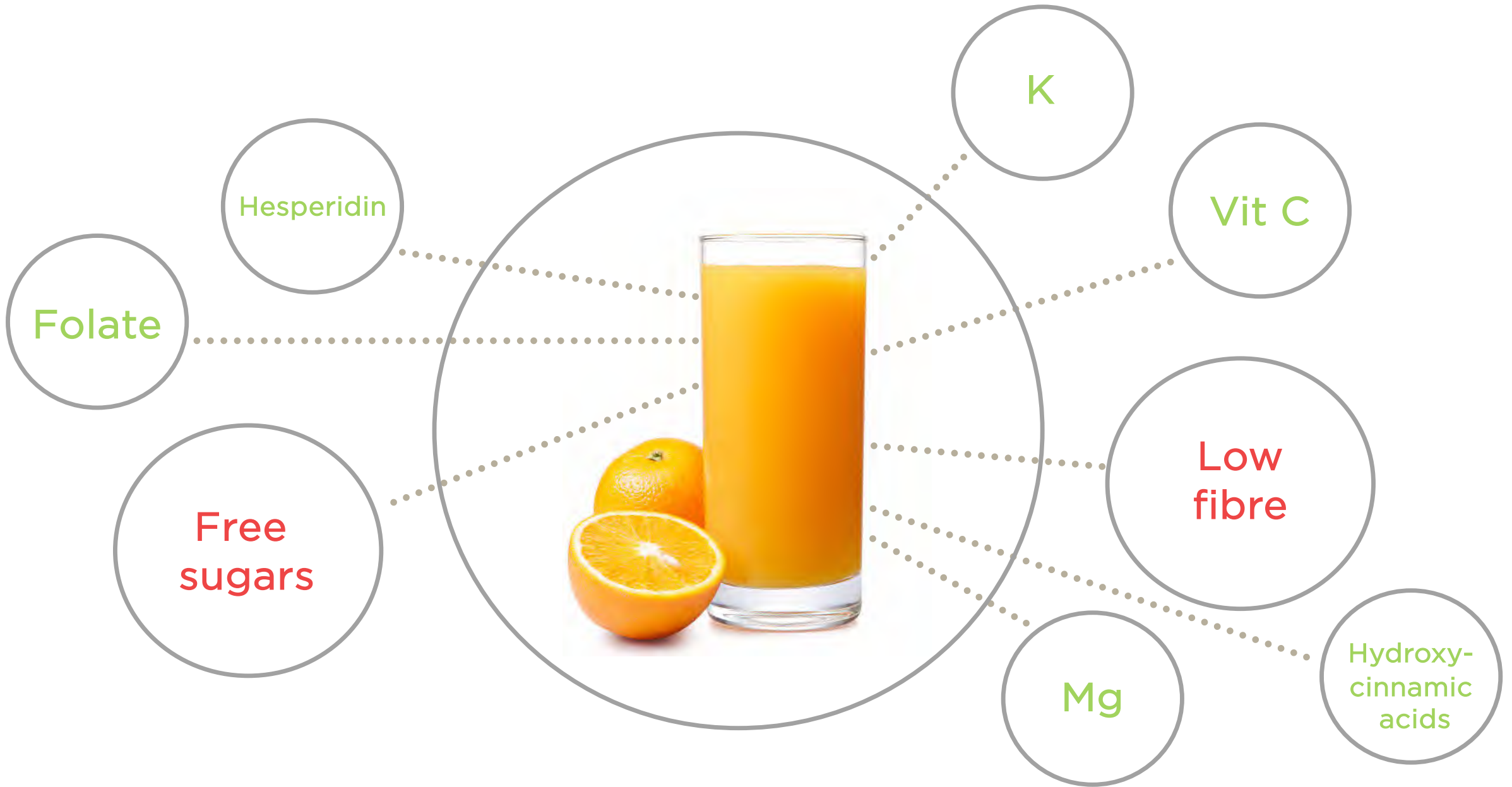
Cranberry Classic

Cran-Raspberry

Cran-Blueberry

Cran-Blueberry

**What could explain
these findings?**



**Free
sugars**



Digestion



Absorption



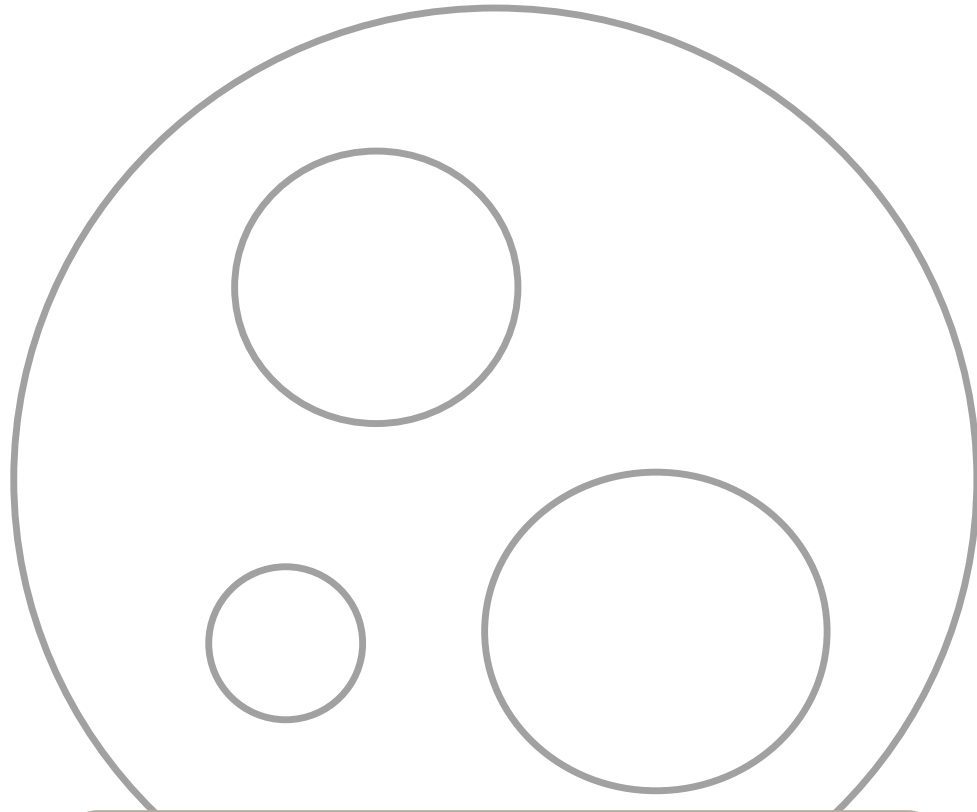
Uptake



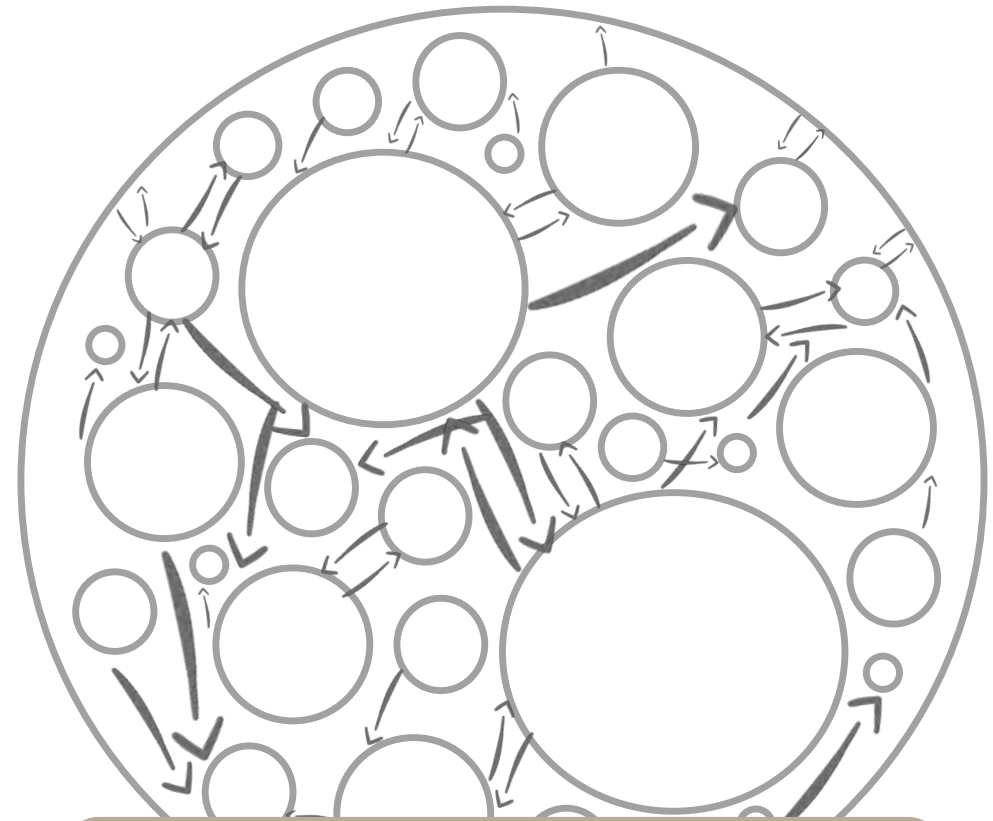
Polyphenols¹



Complexity theory



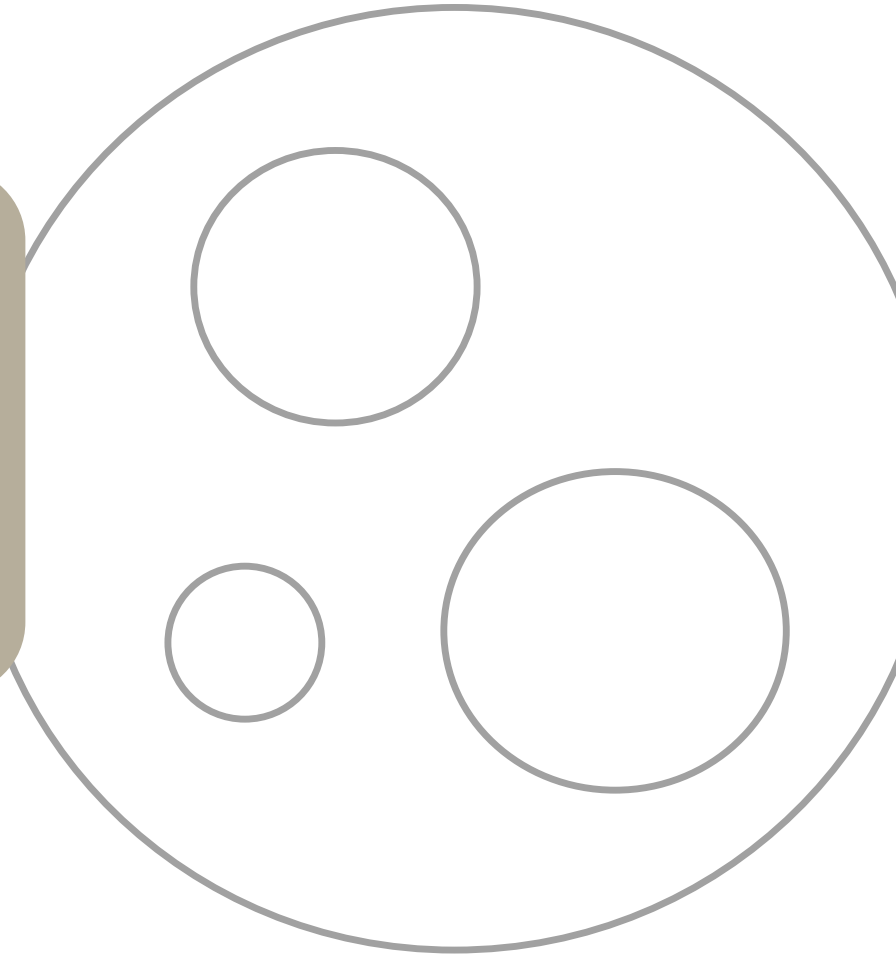
Simple system



Complex system

Simple system

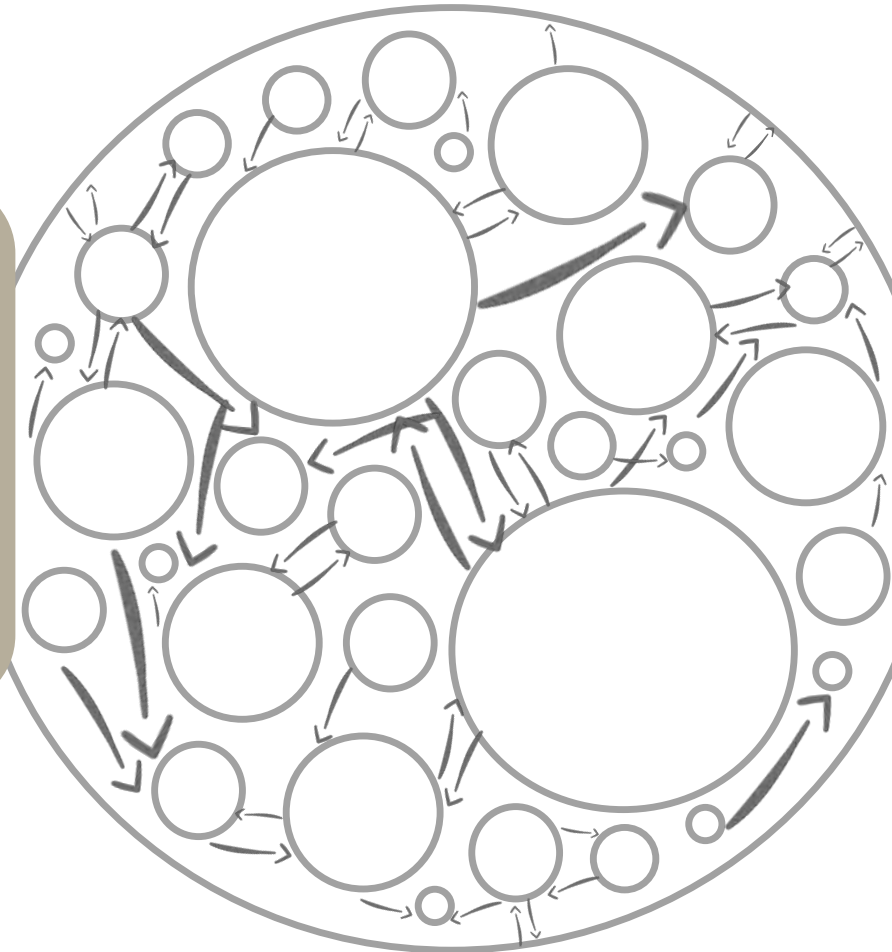
↓ components
↓ connectivity



= individual components¹⁻³

Complex system

↑ components
↑ connectivity



≠ individual components¹⁻³



↑ **SUGARS**
↓ **FIBRE**





↑ SUGARS

↓ FIBRE



Acknowledgements:

Emma Deckett

Flavia Fayet-Moore

Carlene Starck

Jutta Wright

Michelle Plumfield

**Hort
Innovation**
Strategic levy investment

**CITRUS
FUND**



SUBSCRIBE



APPENDIX 11:

The balance of evidence on **100% juice** & health: A systematic umbrella review of meta-analyses

FOODiQ
global

Formerly **Nutrition Research Australia**

Dr Emma Beckett, PhD, RNutr, Dr Flávia Fayet-Moore,
Carlene Starck, Jutta Wright, Michelle Blumfield

**Hort
Innovation**

**CITRUS
FUND**

AUSVEG



100% JUICE IS DISCOURAGED IN GUIDELINES



Vs.

UMBRELLA SYSTEMATIC REVIEW OF META-ANALYSES

FOODiQ
global

SLRs with MA

15 SLRs with 144 MAs (51 primary, 6 dose-response, 87 sub-analyses) – almost 2 million subjects

100% JUICE

100% Fruit juices only (50-1200 mL/day)
Intervention & Observational.

HEALTH OUTCOMES

CVD, inflammation, cancer, body composition,
liver function, metabolic health - mostly adults

GRADE

Very low – medium



MOST MAs SHOW NO RISKS



20%

76%

6%



Benefits



CVD markers
(SBP, DBP, Uric acid, FMD)



IL-6, CRP



Stroke



No effect



Adults & Children



Breast & colorectal



Risks



T2DM
RR: 01.07 (1.01 – 1.14)

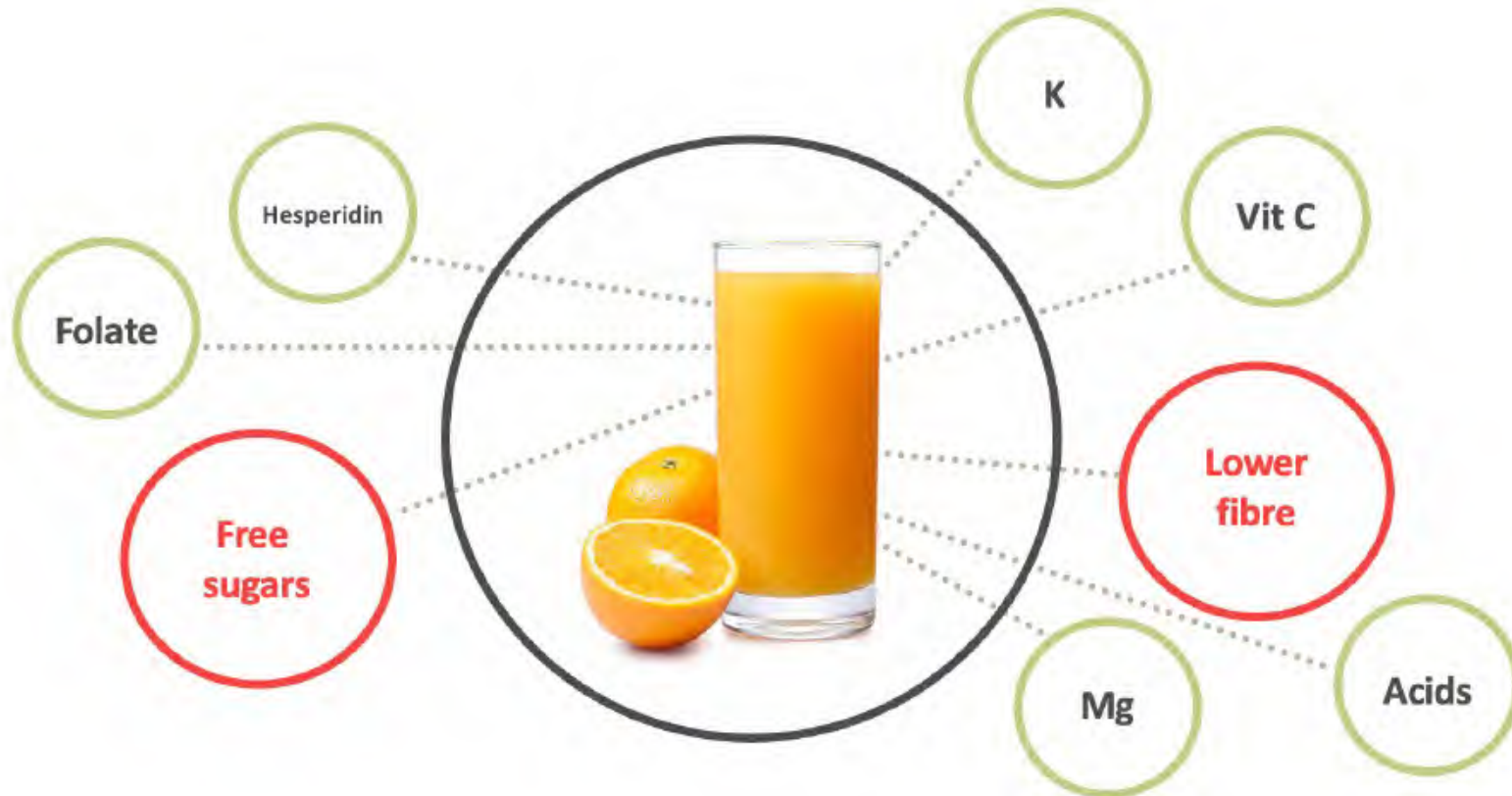


Prostate cancer
RR: 01.03 (1.01 – 1.05)



CVD mortality
HR: 1.2 (1.01 – 1.42)

RETHINKING REDUCTIONIST PARADIGMS



Juice

/dʒuːs/ noun



100%



Bioactives



Guidelines

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**Hort
Innovation**
AUSVEG

**CITRUS
FUND**

APPENDIX 12:

Dietitians Australia Conference

For Hort Innovation

August 2024



What was done?

Dietitians Australia (DA) is the peak body for dietetic and nutrition professionals, representing more than 8500 members around Australia & overseas. They hold an annual conference for members.

An Australian Citrus exhibition stand was organised at the 2024 DA conference in Brisbane in August.

The stand:

- showcased the latest science & research on 100% citrus juice, with a focus on 'more to see than sugars'.
- provided samples of 100% citrus juices, and
- encouraged sign-up to the Citrus Australia health professional database.





Outcomes

- ✓ Message and sampling exposure up to 585 delegates.
- ✓ 6+ hours of valuable face-to-face about the science of 100% citrus juice with members of the dietetic community – this was the focus, and we had positive interaction and feedback including from leading nutrition scientists and Australian Dietary Guideline Committee members.
- ✓ 350 resources handed out (vs. 600 KPI*).
- ✓ 39 new sign-ups to the Citrus health-professional database (vs. 80 KPI*).
- ✓ Delegates loved the stand, brochures and juices sampled.



*KPIs were set on expectation that there would be 1,000 delegates.

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APPENDIX 13:

FOODiQ
global

CT21006

Digital Activation Outreach

September 2024



Objective

Primary

1. Drive awareness of the citrus hub and project resources with HP.

Secondary

- Drive awareness of project key messages
 - More to see than vitamin C
 - More to see than just sugar
- Drive database sign ups.



Activity

Dietitian Connection

FREE citrus factsheets, resources & recipes



Citrus fruits have a famous place in nutrition history due to their rich vitamin C content, reversing signs of scurvy in sailors two centuries ago... but we now know there is a lot more to citrus fruits than vitamin C.

The latest research shows citrus offers a unique nutrition package that delivers benefits to brain health, cognition, immunity and heart health. Update your knowledge and stay at the forefront with a raft of evidence-based resources for you and your clients on this affordable yet 'forgotten superfood' at the Citrus & Health Hub.

Supported by Hort Innovation

ACCESS CITRUS HUB HERE >

Science update: How healthy is 100% juice?



Globally, the position of 100% juice in dietary guidelines varies greatly. In [this thought-provoking webinar](#) with Dr. Annelise Padayachee, Nicole Senior and Tim Cassettari, facilitated by Dr. Emma Beckett from FOODIQ global, you'll learn the latest science from a recent umbrella review on 100% juice and health effects. [Watch the webinar recording on the Citrus Health Professional Hub](#), where you can also explore client resources, recipes and fact sheets like this 100% Citrus Juice. More to see than sugars infographic.

WATCH THE RECORDING HERE >

Sponsored by Hort Innovation Citrus Industry

December 2023 & June 2024

Australian Practice Nurses Association



Want to help your patients with healthy eating?

Citrus fruits are well known for vitamin C, but there's more to the story. Citrus has a range of health benefits for your patients and can be used in a variety of ways with your clients. Citrus is a great addition to your diet and can be used in a variety of ways with your clients.

Access research access




Time for a REFRESH on 100% juice?

Latest research concludes that recommendations to avoid 100% juice are not supported by the current available evidence. It highlights we need to look beyond the sugar content to understand the health effects of 100% juice.


November 2023 & June 2024

Australian Natural Therapists Association



ANTA Member News
29 February, 2024

Hi Ants,



Citrus fruits are abundant and easy to take for granted but take a close look and you might find yourself surprised to see just how good they are for health - the science of citrus has come a long way from just preventing scurvy!

February 2024

AUSActive



Hi <First Name>,

Are you confused over the role of 100% juice for health?

The position of 100% juice in healthy eating guidelines has been controversial but latest scientific evidence says we need to look past the sugars content to understand the health benefits.



Watch the webinar here

June 2024

FOODiQ
global

Results



Solid social media results

	Impressions	Reach	Total clicks	Av CTR%	Sign up database
Social media (HP) Fruit	53,888	25,745	1531	2.8%	10
Social Media (HP) Juice myth-bust	162,000	60,852	1618	3.3%	30
	Video play	Watches 50%	Watches 100%		
Animation	84,650	77,669	54,753		



Channel results – 120K emails sent



	Audience	Open rate %	Reach	Total clicks	CTR %	
DC- Citrus Hub	11, 937	40%	4789	103	2%	Below average
DC Juice Myth-bust	12, 223	46%	5624	587	10.4%	Above average
ANTA- Citrus Hub	7000	28%	1931	208	10.8%	Average
APNA- webinar	29,619	31%	9184	140	1.5%	Average
APNA- Citrus hub	29,631	30%	8746	162	1.9%	Average
APNA- juice myth-bust	20,255	29%	8489	353	4.1%	Above average
AUSActive EDM – Juice myth-bust	10,000	49%	4900	111	2.3%	Average
		Total Reach	43, 663	1664		
KOL Influencers	>25,000					

KPI: >80,000 emails delivered to HCPs, >25% open rate

DC = Dietitian Connection ANTA = Australian Natural Therapist Association. APNA = Australian Practice Nurse Association. CTR = click through rate

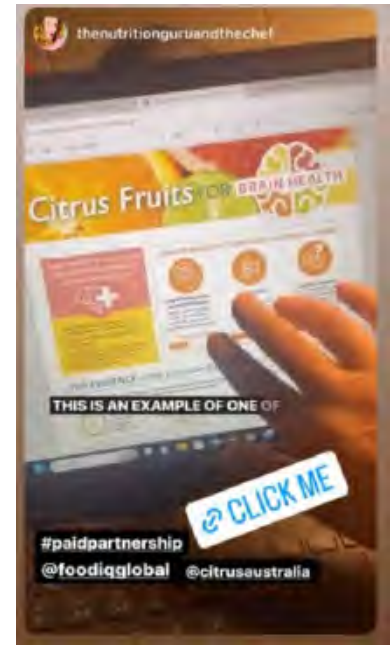
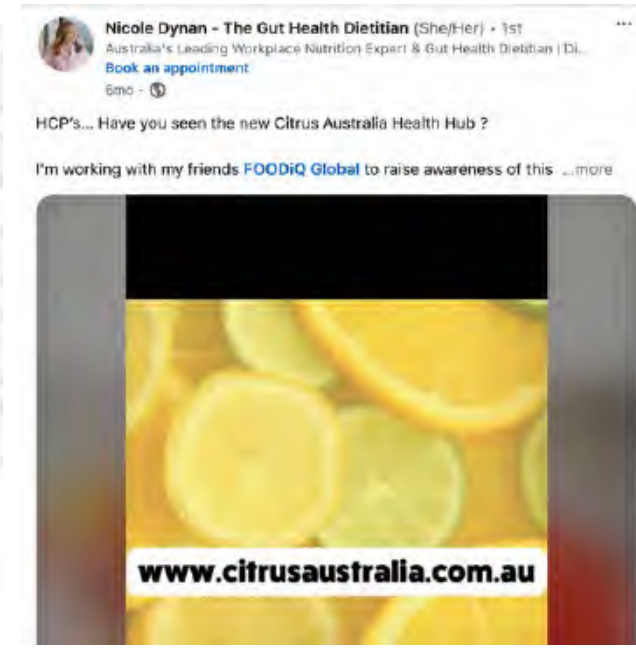
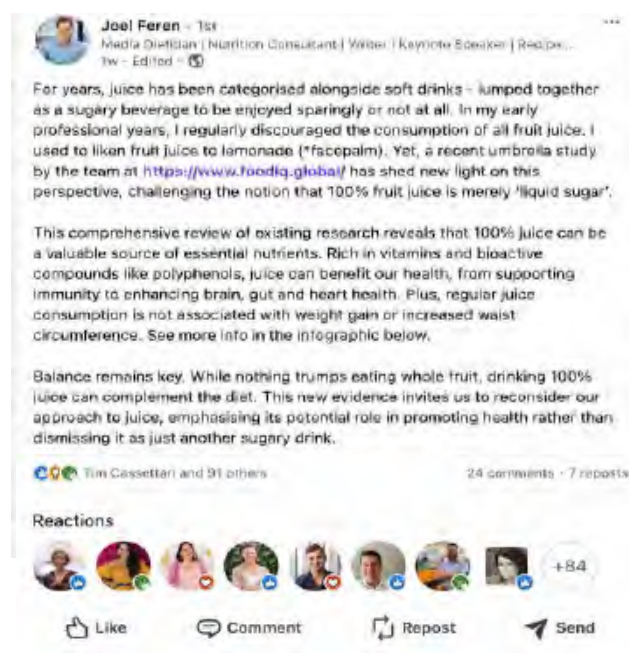
Juice EDMs topped the open rate targets

	Topic	Date sent	Open rate
EDM 1*	FOODiQ DB Recruit	20 th January 2023	46.7%
EDM 2*	Immunity Factsheet	28 th June 2023	23%
EDM 3	Brain health factsheet	22 nd July 2023	17%
EDM 4	Heart health Factsheet	29 th September 2023	19%
EDM 5*	Webinar 1 recruit	8 th November 2023	20%
EDM 6	Webinar recording	8 th November 2023	58%
EDM 7	Webinar 2 recruit/Juice paper	29 th May 2024	35%
EDM 8	Webinar recording	7 th June 2024	64%
EDM 9	Juice resources/animations	6 th August 2024	71%
EDM 10	ASR	23 August 2024	70%

*EDM sent to FOODiQ database. Open Rate Target = >25%



Digital activation – KOL Influencer





Learnings & Recommendations



Learnings & Recommendations



Learning

- ✓ Overall digital activation was effective in driving 146,000 HP impressions
- ✓ Citrus juice content (= new news) had greater engagement than citrus fruit.
- ✓ Video/animation content tends to drive greater engagement than static. Social content moving towards shorter bite sized video content.
- ✓ KOL influencers cost effective and credible way to amplify comms.



Recommendation

- ✓ A solus ad with engaging content is preferable when cost possible.
- ✓ KOL influencers should always be included as part of the strategy.

Learnings & Recommendations



Learning

- ✓ Building owned database is key long-term strategy as this is most cost-effective comms channel. Subscribers are highly engaged with up to 70% open rates and are ultimately at no cost.



Recommendation

- ✓ Work with professional body channels to experiment with creatives/hooks to drive better engagement.
- ✓ Develop an ongoing recruitment strategy to continue to build database long term.
- ✓ Move towards developing an 'always on' digital communication strategy with owned database to maintain top of mind awareness to drive recommendation.

Thank
YOU!



foodiqglobal



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foodiqglobal



info@foodiq.global



www.foodiq.global



APPENDIX 14:



Dear << Test First Name >>>,

Did you know that there is much more than C in C-itrus?

We'd like to invite you to join our community of healthcare professionals, to be the first to receive information and resources on Australian Citrus.

For instance, did you know:



Hesperidin - a unique citrus bioactive found in oranges - is found in levels up to five times higher in 100% orange juice than it is from fresh oranges?

Want to learn more about citrus? [Join our community](#) for:

- More citrus-ly good fun facts
- Invitations to webinars and events
- Free client-friendly resources

Sign up today

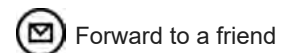
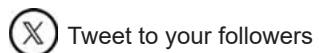
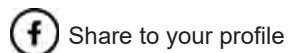
By subscribing to the database, you will receive information, resources and updates about the nutritional properties and health benefits of Australian citrus.

You can unsubscribe at any time.

The project has been funded by Hort Innovation using the citrus research and development levy and contributions from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

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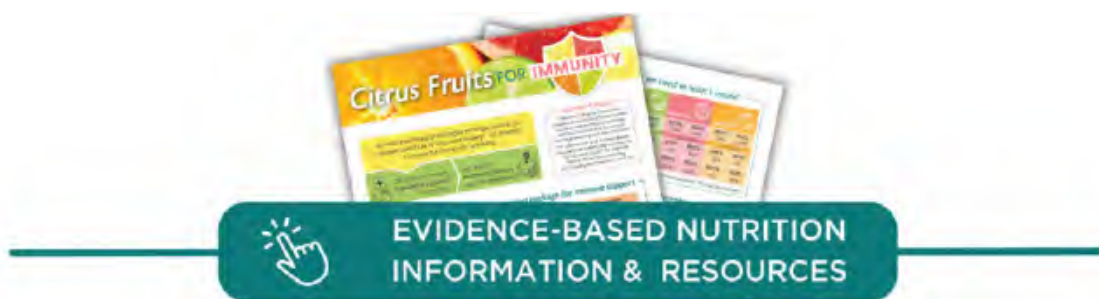
Winter is upon us, which means cold and flu season is as well. It's a time many clients are looking for new ways to ensure their immune system functions to the best of its abilities.

This winter, we're looking into the immune-supporting aspects of citrus fruits, and finding that **there's more to see than just vitamin C!**

Visit the brand-new **Healthcare Professional Hub** on the Citrus Australia website and see how citrus fruits, including oranges, mandarins, grapefruit, lemons, and lime contain a powerful package full of immune-supporting components like.....



You can read more citrus and immunity by visiting the [Citrus Australia](#) website and downloading the Citrus Fruits for Immunity fact sheet on the brand-new [Healthcare Professional Resource Hub](#).



Find evidence-based resources, like this informative fact sheet on [Citrus Fruits for Immunity](#), which summarises and synthesises the scientific literature base, in an easily digestible format.

Credible & reliable resources keep you updated with the latest research findings, ensuring you have access to the most current information and recommendations.



Bring the science to the kitchen and turn 'knowing' into 'doing' with our tasty and health promoting citrus recipes. Like this winter-warming and comforting thyme, lemon & chicken soup. The tangy and soothing lemon, provides a boost of vitamin C plus citrus flavonoids, to help support your immune system during the cold and flu season.

Lemon, Thyme & Chicken Soup



Serves 4. Preparation time: 50-60 minutes.

PER SERVE:

Energy 1552 kJ; Protein 29.7g; Fat 8.1g; Carbs 38.0g; Fibre 6.2g; Vit C 47mg.

Ingredients:

- 1 tablespoon extra virgin olive oil;
- 1 medium onion, diced
- 1 medium carrot, diced
- 2 celery stalks, diced
- 4 stalks thyme
- 3 garlic cloves, finely chopped
- 2 bay leaves
- 2 chicken breasts (about 350g)
- 8 cups (2 litres) chicken stock
- 3/4 cup (175g) risoni
- 2 lemons, zest and juice
- 2 whole eggs
- 1/4 cup parsley leaves, finely chopped
- Salt
- Black pepper

DIRECTIONS:

1. Heat the olive oil in a large stock pot, cook the onion, carrot and celery for 8-10 minutes over medium heat until softened.

2. Add the garlic and lemon zest, cook for a further minute.
3. Add the bay leaves, thyme, chicken breast, chicken stock and some salt and pepper. Bring to boil then lower the heat to medium/low, cover with a lid and simmer for 15 minutes until the chicken breast is cooked through.
4. Take out the chicken breasts, bay leaves and thyme stalks, if leaves are still attached scrape some of them back into the pot.
5. Add the risoni to the pot and cook for another 10 minutes.
6. Shred the chicken breasts and add back to the pot.
7. In a medium heat proof bowl, whisk the eggs and lemon juice together. Scoop out 2-3 ladles of soup and pour it over the egg-lemon mixture as you continue to whisk it. This is a very important step to help prevent the eggs from curdling.
8. Add this mix to the stock pot and continue to cook on low heat for 5 minutes while stirring. The soup should thicken slightly, but if you notice the eggs curdling then turn off the heat.
9. Stir in the fresh parsley, adjust the seasoning with salt and pepper and serve.

Yours in good health and citrus cheer,

The Nutrition Research Australia and Citrus Australia teams

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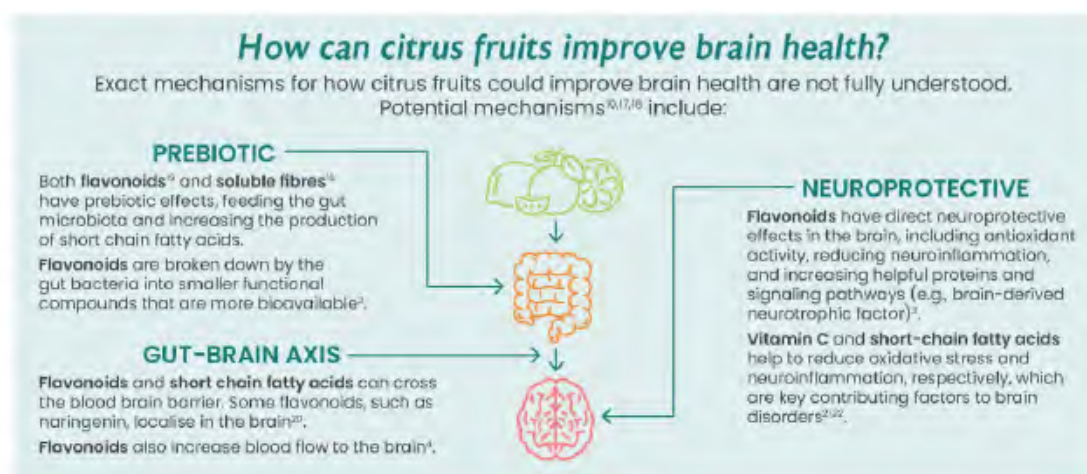
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Today is **World Brain Day**.

Maintaining good brain health is important throughout the entire life cycle, and nutrition is essential for the brain to perform its tasks effectively. Poor diet is also well-known risk factor that increases the risk of developing brain disorders, including depression and dementia, both leading causes of the disease burden in Australia.

When looking for brain healthy foods, you'll see that **there's more to see in citrus than just vitamin C**. The unique content of citrus flavonoids, soluble fibre and vitamin C are thought to work both directly and/or indirectly (via interactions in the gut) to support brain health.



Nutrition Research Australia (2023). Citrus fruits for brain health [fact sheet]. Available from: www.citrusaustralia.com.au/citrus-hub

Over the longer term, citrus intake is associated with lower rates of depression, dementia, and cognitive decline. However, evidence shows that benefits to cognitive function and performance begin from as little as **3-4 serves of citrus a week**.

Read more on **citrus** and **brain health** by visiting the [Citrus Australia](#) website and downloading the [Citrus Fruits for Brain Health](#) fact sheet on the brand-new [Healthcare Professional Resource Hub](#).



Visit the Citrus Hub to find evidence-based resources, like **Citrus Fruits for Immunity** and **Citrus for Brain Health**, which summarise and synthesise the scientific literature base, in an easily digestible format.

Credible & reliable resources keep you updated with the latest research findings, ensuring you have access to the most current information and recommendations.



PRACTICAL RECIPES, STORAGE TIPS, AND FUN FACTS

Bring the science to the kitchen and turn 'knowing' into 'doing' with our delicious and health-promoting citrus recipes - like this Lemon and Caper Baked Salmon, from our [Savouring Citrus Recipe E-book](#).

Lemons are not just for squeezing juice over cooked fish – cooking the zest brings out its sweetness, and teamed with oily fish such as salmon it adds a new depth of flavour and provides additional nutrients, like omega-3 fatty acids, that can together support brain health and function.



Lemon & Caper Baked Salmon



Serves 4. Preparation time: 30-35 minutes.

PER SERVE:

Energy 2354 kJ; Protein 30.1g; Fat 48.1g; Carbs 1.1g; Fibre 1.7g; Vit C 25mg.

Ingredients:

4 salmon fillets, bones removed, skin can be on or off.

2 lemons

4 tablespoons capers (in vinegar)

1/4 bunch parsley, finely chopped

Salt

Pepper

100mL extra virgin olive oil

Method:

1. Preheat oven to 180°C
2. Zest lemons and keep to side. Remove skin from lemons, cut into rounds about 1/2cm thick. In a hot pan or grill, lightly cook the lemon rounds till golden brown on each side.
3. Prepare 4 sheets of baking paper, approximately 30cm x 40cm.
4. Place salmon fillets skin side down on a sheet of baking paper.
5. Season fillets with salt and pepper, then place 3-4 slices of grilled lemon on top of each fillet.
6. In a bowl, mix together the capers, olive oil and lemon zest. Spoon evenly over each salmon fillet.
7. Wrap salmon fillets in baking paper ensuring they are well sealed, you don't want moisture to escape, place on baking tray.
8. Place in oven for 15 to 20mins, until just cooked.
9. Unwrap fillets, pour the juices into a small saucepan. Roughly chop the lemon and capers, add to the saucepan with the finely chopped parsley. Over a medium heat, bring to a simmer.
10. Serve fillets, with lemon and caper sauce drizzled over the top and a side of steamed or grilled vegetables.

Yours in good health and citrus cheer,

The Nutrition Research Australia and Citrus Australia teams

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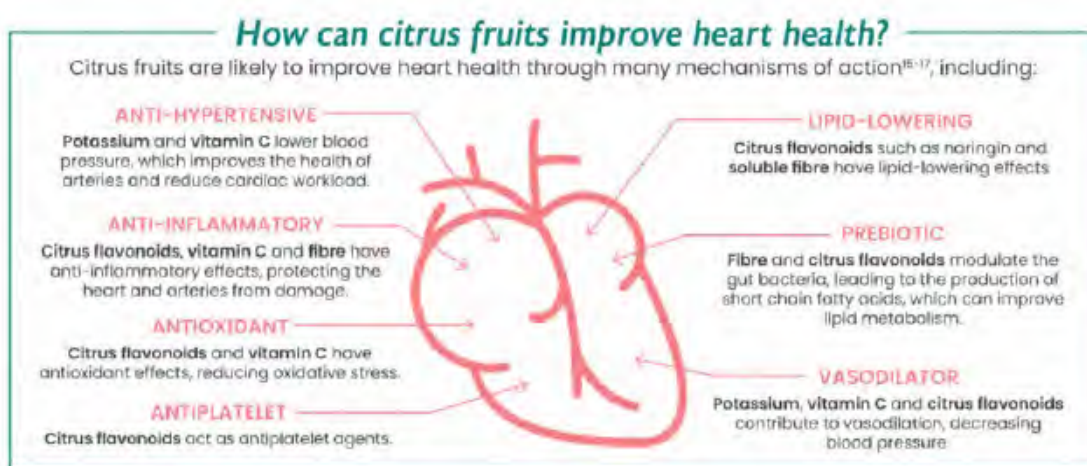
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Today September 29th is **World Heart Day!**

Heart disease is the top cause of death in Australia, killing one Australian every 18 minutes. Diet is well established as a modifiable risk factor for the development of heart disease, with dietary patterns high in fruits and vegetables considered core to a heart-healthy diet.

When looking for heart-healthy foods, you'll see that **there's more to see in citrus than just vitamin C**. The unique combination of citrus flavonoids, potassium, vitamin C and dietary fibre make citrus fruits an evidence-backed, **whole-food package** that protects heart health via multiple mechanisms.



Nutrition Research Australia (2023). Citrus fruits for heart health [fact sheet]. Available from: www.citrusaustralia.com.au/citrus-hub

Citrus fruits are also highly versatile - they can be easily incorporated into both sweet and savoury dishes, and all parts of the fruit (i.e. flesh, juice, and peel) can be used to help support a healthy heart. As a dietary recommendation, citrus fruits fit well in healthy eating patterns such as minimally-processed, plant-based, DASH, and Mediterranean-style diets.

Read more on **citrus** and **heart health** by visiting the [Citrus Australia](http://www.citrusaustralia.com.au) website. Download the free [Citrus Fruits for Heart Health](#) fact sheet that you can reproduce and share, from the brand-new [Healthcare Professional Resource Hub](#).





EVIDENCE-BASED NUTRITION INFORMATION & RESOURCES

Visit the Citrus Hub to find evidence-based resources, like **Citrus Fruits for Immunity, Brain Health, and Heart Health**, which summarises and synthesises the scientific literature base, in an easily digestible format.

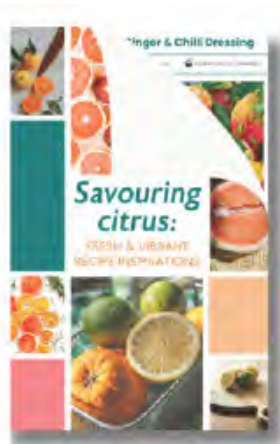
Credible & reliable resources keep you updated with the latest research findings, ensuring you have access to the most current information and recommendations.



PRACTICAL RECIPES, STORAGE TIPS, AND FUN FACTS

Bring the science to the kitchen and turn 'knowing' into 'doing' with our delicious citrus recipes - like this *Citrus Salad with Ginger & Chilli Dressing* from our **Savouring Citrus Recipe e-book**.

Fruit salads aren't just for desserts! With the weather warming up, this **citrus salad** makes a great side dish. Not only is this colourful salad a feast for the eyes, it provides a **vitamin c boost** along with a **range of nutrients and citrus bioactives**. The mix of tangy citrus and fresh herbs provides a balance of flavours, while extra-virgin olive oil and peanuts bring in monounsaturated fatty acids to support heart health.



Citrus Salad with Ginger & Chilli Dressing



Serves 4 people (as a side dish). Preparation time: 20-30 minutes. Cooking time: 20-30 minutes.

PER SERVE:

Energy 1264 kJ; Protein 6.4g; Fat 9.6g; Carbs 20.5g; Fibre 8.8g; Vit C 146mg.

Ingredients:

- 1/4 cup (60ml) fresh lime juice
- 1/4 cup (60ml) extra virgin olive oil
- 1 tablespoon finely grated ginger
- 1 small red chilli, finely chopped (deseeded for less heat)
- 1 1/2 teaspoon caster sugar
- 1/2 teaspoon fish sauce
- 1 red grapefruit
- 3 oranges
- 3 mandarins
- 1 shallot, finely sliced
- 1/2 cup mint leaves
- 1/2 cup coriander leaves
- 1/2 cup parsley leaves
- 1/3 cup unsalted roasted peanuts, coarsely chopped

Method:

1. Combine the lime juice, olive oil, ginger, chilli, sugar and fish sauce in a small bowl. Set aside for at least 15 mins to help infuse the flavours. Can be made 1 day ahead and stored in the fridge.
2. Cut off the peel and white pith from the grapefruit, cut in between each membrane to release the segments. Do this over a bowl to catch any juice. Once all segments are removed, squeeze the remaining membrane to release all the juices. *Note: If you are unsure how to do this, search the web for a how to segment an orange video for some more tips.*
3. Cut the peel and pith off the oranges and cut cross ways into round slices about 1/2 cm thick.
4. Peel the mandarins and cut in the same way as the oranges.
5. Arrange the grapefruit, oranges, mandarins on a serving dish with the shallot, mint, coriander, parsley.
6. Drizzle the ginger and chilli dressing on top, then finish off with the peanuts.

Yours in good health and citrus cheer,

The Nutrition Research Australia and Citrus Australia teams

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Dear << Test First Name >>,

When was the last time you stopped to think about **citrus**?

Citrus is so well known for its vitamin C content, that the two are nearly synonymous in our collective cultural knowledge. However, there's so much more to see in citrus!

Join **Professor Linda Tapsell** and **Dr Emma Beckett** in this **FREE** 60-minute webinar as they explore the fascinating interactions of nutrients and bioactive compounds in citrus fruits, and summarise the evidence-base that shows citrus fruits have beneficial effects on cardiovascular health, brain and cognitive health, and immune function.

[Register Now](#)



To say **thank you for being a valued member of our community of healthcare**

professionals, we want to give you the opportunity to submit any questions you have for the presenters about citrus fruits and health prior to the webinar starting.

Pre-submit your question



FREE WEBINAR


Is citrus the forgotten affordable SUPERFOOD?


Monday 20th November, 2023
13:00-14:00 AEDT (Syd/Melb/ACT time)

Citrus is well known for vitamin C, but that is only one small part of the story. Two and half centuries after citrus was shown to prevent and treat scurvy, **we now know there is much more to citrus fruits than just vitamin C!** Citrus is a great example of the research illuminating the importance of bioactives in addition to nutrients, and the marvel of food synergy, for health.

Join us for an engaging and insightful webinar that explores the latest science on **bioactives and food synergy**, and specifically empower you with the knowledge you need to make citrus fruits a top-of-mind choice to **support long term immunity, cardiovascular health and brain health**.

Hosted by registered nurse, educator and dynamic public speaker **Lucy Downey**, esteemed speakers, **Professor Linda Tapsell** and **Dr. Emma Beckett** bring their expertise in food and nutrition science, bioactives and food synergy to the table, to update you on the latest research and provide practical tips to support you in practice.

 **Professor Linda Tapsell:** A leading expert in nutrition and dietetics, with over 30 years of experience in the field.

 **Dr. Emma Beckett:** A food & nutrition scientist and media personality dedicated to promoting a better world through food and science.

Don't miss this opportunity to expand your expertise and network with like-minded

professionals in the healthcare industry. Join us and be part of the conversation!

Key Learning Outcomes:

- Understand two hot topics in nutritional science: food synergy and bioactives.
- Learn about the unique citrus nutrition package including bioactives not commonly found in other foods.
- Discover why citrus fruits are a surprising and affordable superfood.
- Explore how citrus fruits support immunity, cardiovascular health, and brain function.
- Learn how to leverage the credentials of vitamin C in your recommendations.
- Get to know the different types of citrus and their unique health benefits.
- Uncover the culinary cues and exciting citrus recipes that will transform your dietary recommendations.
- Explore why citrus fruits are nature's perfect package and the positive impact on the environment.

REGISTER FOR YOUR CHANCE TO WIN

Everyone that registers will have a chance to **win 1 of 5 zesty citrus prize packs**, containing Catherine Phipps' beautiful book "The Little Citrus Cookbook", along with a practical stainless steel combined Citrus Juicer and Pourer.



[Register Now](#)

We look forward to seeing you there!

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Dear << Test First Name >> ,

Thank you for registering for our webinar - we were pleased this week to host **Professor Linda Tapsell** and **Dr Emma Beckett** as they presented 'Citrus - the forgotten affordable superfood'

We had a great time and loved learning some new things about citrus!! **Thank you** to everyone who was able to join us live for the event.

In case you missed it, you can catch up on the webinar recording, download the slides, and download our informative resources from the **Citrus Hub**.

[Watch the Webinar](#)

[Download the Slides](#)

FREE DOWNLOADABLE AND PRINTABLE RESOURCES

All fact sheets available from the [Citrus Hub](#)



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Dear << Test First Name >>,

Have you registered yet for our **free webinar**?

 **WEBINAR: FREE & VIRTUAL**

*Evolving perspectives in nutrition:
Is it time for a refresh on 100% juice?*

  Tuesday 4th June, 2024

 12:30 - 2:00 PM, AEST



*Join FOODiQ Global's **Dr Emma Beckett** with **Dr Anneline Padayachee**, **Nicole Senior** and **Tim Cassettari** as they explore diverse views on 100% juice and unravel the complexities of nutrition science in this paradigm-shifting webinar.*

[Register Now](#)

The position of 100% juice in dietary guidelines varies greatly among countries. In the current Australian Dietary Guidelines, 100% juices are considered a core food, but caution is advised regarding overconsumption. **Why is there such little**

consensus on this and other topics in nutrition science?

Join us for this paradigm-shifting webinar as we delve into **the dynamic landscape of nutrition science**, the **challenges of translating research into practice**, and the **latest scientific findings on 100% juice**.

Join **Dr. Emma Beckett** for three thought-provoking talks from **Dr. Anneline Padayachee**, **Nicole Senior (APD)**, and **Tim Cassettari (APD)**.



Dr Anneline
Padayachee



Nicole Senior



Tim Cassettari

Everyone that registers to attend will be entered into a draw to win for a chance to win **1 of 5** copies of Ottolenghi's beautifully vibrant cookbook, **Simple**.



REGISTER NOW

As a valued member of our Citrus Health Professional Community, we would like to offer you the opportunity to pre-submit your questions to our expert panel, ensuring your questions get answered on the day.

Pre-submit your question to our panel

This webinar is hosted by FOODiQ Global (formerly Nutrition Research Australia) and has been funded by Hort Innovation using the citrus research and development levies and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture

We look forward to seeing you there!

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Dear << Test First Name >> ,

Thank you for registering for our webinar - we were pleased this week to host **Dr Emma Beckett, Dr Anneline Padayachee, Nicole Senior, and Tim Cassettari** as they presented "*Evolving perspectives in nutrition: Is it time for a refresh on 100% Juice?*"

Thank you to everyone who was able to join us live for the event.

In case you missed it, you can catch up on the webinar recording, download the slides, and download our informative resources from the **Citrus Hub**.

[Watch the Webinar](#)

[Download the Slides](#)

You can also download and read our open access article, **Health effects of drinking 100% juice: an umbrella review of systematic reviews with meta-analyses** (Beckett et al, Nutrition Reviews, 2024). [doi:10.1093/nutrit/nuae036](https://doi.org/10.1093/nutrit/nuae036)

FREE DOWNLOADABLE AND PRINTABLE RESOURCES

All fact sheets available from the [Citrus Hub](#)



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Dear << Test First Name >>>,

Historically famous for their vitamin C content, the synergistic nutritional profile of citrus fruits, including not only C but folate and potassium, **unique citrus polyphenols**, like hesperidin and naringenin, as well as a **blend of dietary fibres**, give citrus fruits an incredible range of health-promoting properties. Not only that, but their **culinary versatility** and **zesty flavours** make citrus a value-added addition to almost any diet.



Catch up on the latest news and information about all things CITRUS - including our **latest research on 100% juice** - by visiting Citrus Australia's Health Professional Hub. Here you'll find the latest research and resources to help your clients make the most of citrus

fruits.

NEW ON THE HUB



[Read our comprehensive umbrella review](#), summarising the current state of evidence around the **health effects of 100% juice**.

Long considered as a high-sugar fibre-free dietary concern, when the breadth of intervention and observation studies are synthesised, the evidence for 100% juice may just surprise you.

The balance of evidence from the review supports 100% juice (no added sugar) has neutral or positive effects on health, with limited evidence of harm.

Given the latest evidence and that 100% juice is one of the foods with the highest nutrient density for cost ratios, ([you can read more about that here](#)), it's time to reconsider juice's role in the diet.

Explore the extensive resources on this topic available on the hub to stay informed.



Want more detail? Check out our latest webinar 'Is it time for a fresh perspective on 100% juice', exploring the dynamic landscape of nutritional science, and how limiting focus on juice to just 1 or 2 nutrients is an inadequate model to explain its total health effects.



Short on Time? Check out this short, **2-minute video** which summarise the key findings of our umbrella review.



Ever wondered just what goes into producing 100% Juice? Juicing is a precision extraction technique preserving health promoting bioactives and yielding bio-accessible essential nutrients. **Watch this short video** to understand more.



Still have questions? Download and read our **Q&A**, which answers some of the most common questions we've had from our colleagues and friends about our research on 100% juice.



Want to spread the word? Communicate the latest research findings on 100% Citrus Juice using our educational and evidence-based **social media tiles**.

VISIT THE CITRUS HEALTH PROFESSIONAL HUB

Just a quick reminder of some of the other great resources we have available for you on the Citrus Hub for Health Professionals. These resources are **free** for you to **download**, **print**, and **share** with your clients, patients, and colleagues.



EVIDENCE-BASED HEALTH & NUTRITION RESOURCES

Learn about how regular consumption of citrus fruits is an evidence-based way to support health in our **informative fact sheets**.



PROFESSIONAL DEVELOPMENT

Join FOODiQ Global's **Dr Emma Beckett** and The University of Wollongong's **Professor Linda Tapsell** as they explore the culinary and health benefits of our forgotten everyday affordable superfood hero, the citrus fruit, in this recent **webinar**.



RECIPE INSPIRATIONS

Find citrus inspiration and help your clients make maximal use of citrus' culinary versatility with our **Savouring Citrus** recipe book.



WE WANT TO KNOW WHAT YOU THINK!!

We'd like to invite **health professionals** in Australia to complete this short survey on citrus and health. This survey will only take **~5 minutes**, and everyone who

completes it will be able to enter into a draw to win one of FIVE \$100- gift cards.

[COMPLETE THE SURVEY](#)

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Dear << Test First Name >>,

We'd like to invite health professionals in Australia to complete this short, 5-minute survey on **citrus and health**.

The results of this survey will help inform the Australian citrus industry of future research and education opportunities relating to citrus fruits and their juices.

[COMPLETE THE SURVEY](#)

This survey will only take **~5 minutes** to complete, and everyone who completes it will be able to enter into a draw to **win one of FIVE \$100- gift cards**.



Thank you for your consideration.

Kind Regards,

The FOODiQ team.

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APPENDIX 15:

APPENDIX 16:

CT00006: Citrus Industry Health & Nutrition Education Program

PRG Meeting 1

7th December 2022



Agenda

1. Introductions
2. Project Overview
 - Objectives
 - Target audience
 - Planned deliverables
3. Insights
 - Science
 - Audience Sentiment Research
 - Wider KOL Landscape
1. Feedback/Discussion





Introductions

Business Lead
 spokesperson



Dr Flavia Payet **CEO**
PhD, MNutrDiet, APD, FASLM

Flavia will oversee the project and ensure that overall project objectives and levy payer needs are met.

- ✓ 15+ years experience in business, research & communications.
- ✓ 50+ published papers and conference abstracts, specialising in dietary modelling.
- ✓ Australia's first CEO to establish an independent research, translational science, and education company.
- ✓ Australia's first dietitian to be board-certified Lifestyle Medicine practitioner.
- ✓ Well recognised and highly regarded by industry and health care professionals.

Project Manager

Strategy Expertise



Jutta Wright

APD, BAppSc MNutrDiet GDipHerbMed
Senior Dietitian

Jutta is lead project manager & working collaboratively with Michelle Blumfield project manager on CT21004: Scientific review for classification of unsweetened citrus juice in the Australian Dietary Guidelines

- ✓ Experience across dietetics including clinical, food industry, corporate health, community health, and private practice.
- ✓ Experience in identifying food trends and insights, strategic marketing, communication and product development guidance to food and health industries.
- ✓ Excellent communication skills, strategic thinking and consumer insights means Jutta delivers the highest quality nutrition science in a manner with real-world impact.

Our esteemed POG



Jacqui Simpson
R & D Manager
Hort Innovation



Nathan Hancock
Chief Executive Officer
Citrus Australia



Gabby Torpey
Media and Communication Officer
Citrus Australia



Alan Barclay
Researcher & Consultant
Dietitian



Bobbie Crothers
Nutrition & Public Affairs Manager
Coca Cola South Pacific



Joanna McMillian
Nutrition Scientist & Dietitian,
Author & Speaker





Project overview

The project: CT00006

Supports the **Strategic Investment Plan** of the Citrus Fund to increase domestic consumption of fresh Australian Citrus.

Project outcomes:

- Increase HCP **awareness of nutrition & health benefits** of citrus as measured in the project end ASR (compared with baseline)*
- Increase HCP who can accurately **identify the nutrition & health benefits** of citrus as measured in the project end ASR (compared with baseline)*
- Increase in HCPs who are **'confident' or 'extremely confident'** in **discussing the health benefits** of citrus as measured in the project end ASR (compared with baseline)*
- Increase in HCPs who are **'confident' or 'extremely confident'** in **correcting misinformation** as measured in the project end ASR (compared with baseline)*



The project

Intermediate outcomes:

- Citrus HCP database created.
- Clear understanding of HCP current perceptions and attitudes to citrus & health established.
- Robust strategic project plan finalised.
- Hort Innovation's and Citrus Australia digital platforms updated with the most contemporary research and resources.
- Developed project resources are being accessed and used by HCPs.
- Industry kept up to date on project.



Top-line approach □ Target Audiences





Current planned deliverables

Nutrition iQ™ Solution

1 Business needs

Understanding the business objectives including its short, medium and long term goals

2 Nutrition landscape

Mapping out the current landscape in relation to the problem or issue to be solved and collating supporting evidence to inform decision making and strategy

3 Pathways to success

Working together to navigate the nutrition landscape and identify gaps and opportunities to fulfill

4 Strategic solutions

Providing recommendations on the best approach for return on investment that maximises the existing opportunities

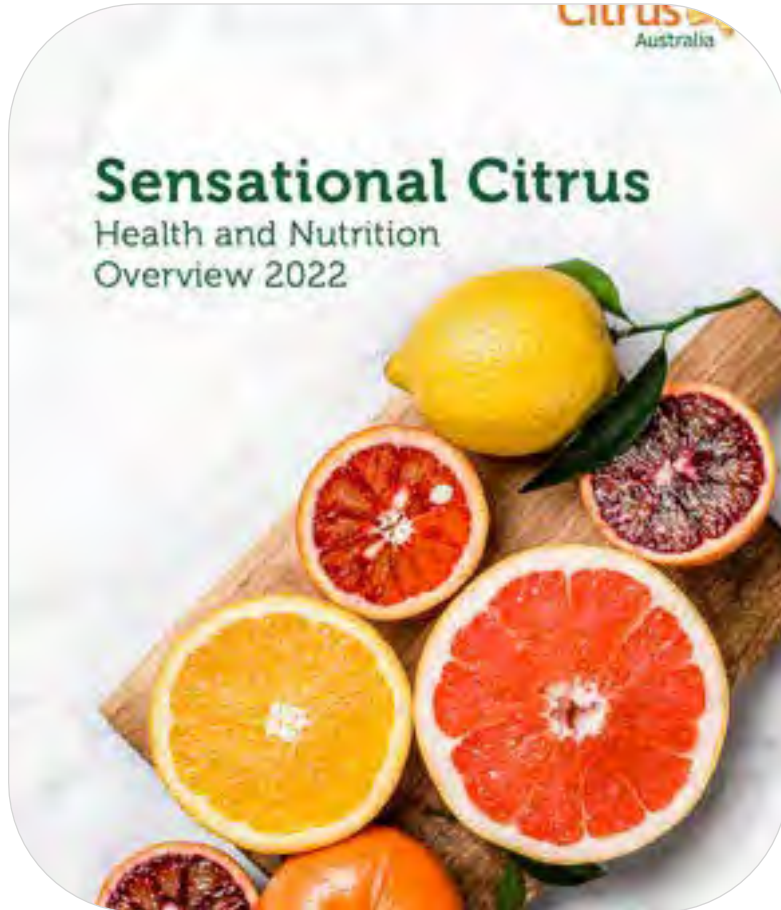
NRAUS' proprietary, four-step, tried and tested strategic process.

Role: Process to work collaboratively with key stakeholders to gain a united understanding of the current issues/challenges/needs and together make strategic enhancements on our proposed project methodology.

Status: Step 1 & 2 completed. Step 3 Pathways Workshop booked for Friday 9th December



Lead Generation Digital Reach Campaign



- **Sensational Citrus report** to be disseminated via digital platforms for download in exchange for sign up to database.
- **Project resources** to be disseminated through relevant channels and social media ads: Dietitian's Connection eNews (Dietitians & Nutritionists), Australian Natural Therapists Association (Naturopaths), The Australasian Medical Publishing Company (AMPCo), Royal Australian College of General Practitioners (RACGP), (General Practitioners), AUSactive database (Fitness Professionals), and NRAUS database (mix of HCPs).

Role:

- Acquire & grow Citrus HCP Database
- Disseminate collateral to HCP to maximise reach

Infographics Factsheets



- 2 x A4 6 panel – Citrus 101 & Citrus Juice Myth-bust
- 4 x 2 Page Patient facing factsheets – aim to solve common nutrition problems faced by HCPs using citrus fruit and juice – Gut health, Immunity, Plant-based (citrus to enhance iron) & Sport performance/recovery.

Role: Communicate impactful & motivating key messages that resonate with HCP targeted groups to meet project objectives.



Education



Dietitians Australia (July 2023): Exhibition booth where attendees treated to fresh juice bar while NRAUS spokespersons share engaging facts from science and resources.

GP focused Trade Article: Article by Dr. Flav published Australian Doctor online, on the increasingly important role of nutrition and vitamin C in infectious disease and immunity support, with citrus (fruit & juice) as the ideal solution for vitamin C.

GPCE (Nov 2023): Sponsored presentation presenting the latest up-to-date science on vitamin C and how delivery through citrus is part of the solution to viral infections and immunity support.

AUSactive Webinar (August 2023): Fitness professional webinar promoted via AUSactive, on how citrus and 100% citrus juice supports health, sports performance, and exercise recovery. Interactive session designed to myth bust and inspire fitness professionals to recommend citrus.

NRAUS-hosted Webinar (March 2024): Naturopath/Nutritionist focused. Citrus as medicine –Communicate the therapeutic value and potential of citrus and 100% juice in the Australian diet.

Role: Educate different HCP target audiences and build citrus HCP database.

Citrus Australia HCP Webpage



Citrus Australia HCP Webpage: Development of new healthcare professional web-page which will house resources.

Status: Plan to commence in quarter 1 2023

Next steps: Kickoff meeting with Citrus Australia 12 December 2023



Science Insights

The unique health effects of citrus

Citrus and CVD

- Total fruits and vegetable intake is associated with reduced risk of stroke, CVD, CHD, and stroke (SLR & MA, 81 prospective cohort studies)
 - **Citrus, 100% juice**, and pomes show greatest cardiovascular benefits from fruits
- Daily consumption of **orange juice** has been associated with a reduction in the onset of chronic diseases, improved lipid profiles, lower total cholesterol and reduced inflammatory markers (Silveiro et al 2015, Douradao et al 2015, Yi et al 2017)

Citrus and metabolic health

- AUSDIAB Study (Bondonno et al, 2021)
 - **Whole fruit**, but not fruit juice, associated with reduced risk of type 2 diabetes (prospective cohort); No increased risk type 2 diabetes with juice
- **Grapefruit** ↓ systolic BP (-2.43mmHg, 95%CI: -4.77, -0.09) (whole grapefruit but not grapefruit juice)
 - Small reduction in waist circumference ↔ body weight



Citrus and Cognition

Evidence improvements in global cognitive function from **orange juice** consumption in middle aged and elderly populations (Kean et al, 2015, Alharbi et al, 2016, Lamport et al 2016).

Citrus and Cancer

Citrus fruit intake associated with reduced risk of lung cancer (SLR&MA, 21 studies, 11 case/control, 10 prospective cohort)
Dose-response up to 60g/day with no further benefit beyond 80g/day
~9% reduction relative risk

Prebiotic effects:

- Consumption of 300mL /day **orange juice** for 2 months led to increased levels of the good gut bacteria Bifidobacterium and Lactobacillus and increased the production of short chain fatty acids.
- Prebiotic effect may be due to the presence of polyphenols as well as fermentable carbohydrates, fibre, and nitrates.

Unique Bioactives with direct effects on health

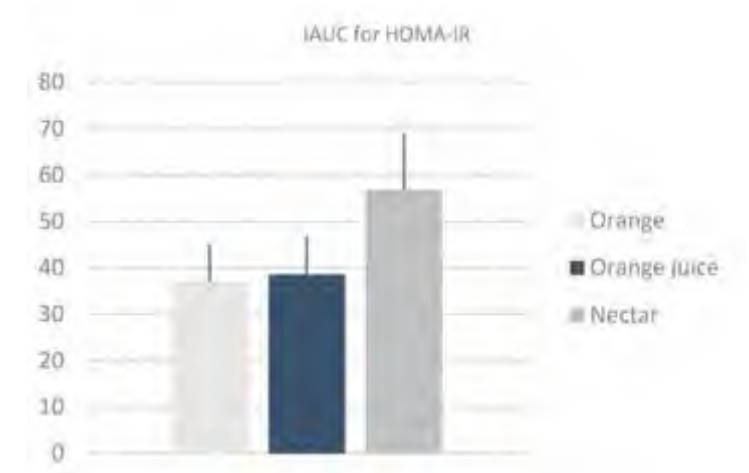
Naringin, Naringenin, Bergamottin, Bergapten, hesperidin

- Bioavailability of hesperidin greater for orange juice than whole oranges
- Commercially squeezed orange juice has 3 x more hesperidin than home-squeezed juice (<https://pubs.acs.org/doi/pdf/10.1021/jf5038163>)
- **Sensational Citrus:** absorption polyphenols higher from fruit juice than whole fruits



□ Lack of juice's negative impact on blood sugar levels potentially influenced by bioactives

- AUSDIAB Study (Bondonno et al, 2021)
 - No association between fruit juice intake and type 2 diabetes (yet juice is still considered to be 'unhealthy' despite no apparent increase in risk as whole fruit associated with reduced risk of type 2 diabetes)
- Whole oranges and 100% OJ have similar blood glucose effects in healthy individuals
 - Whole oranges and 100% orange juice have similar effects on post-prandial plasma glucose and plasma insulin in young healthy non-diabetic women (Papandreou et al, 2019)
 - Nectar-sweetened juice had higher glucose and insulin resistance
- Two systematic reviews that found 100% fruit juice such as orange juice has a neutral effect on glycemic and insulin control, despite being a source of natural sugars (Wang et al 2104; Murphy et al. 2017).
- Studies show that hesperidin, a polyphenol in oranges, slows the absorption of the natural sugars, which explains why both orange juice and whole oranges have a low glycemic index. (Byrd-Bredbenner C., et al., 2017)



Guidelines recommending that fruit juice may be consumed in moderation are consistent with the available evidence and should be used to inform food policies

Overbach et al 2018

Fruit juice appears to offer more benefit than risk and there appears to be no justification for discouraging fruit juice within a balanced diet for children and adults

Quinton & Myers 2020



Despite its sugars content, the evidence does *not* support that juice is harmful to health

Cardio-metabolic health and cancer

- No increased risk for $\geq 20\%$ or bodyweight gain.
- No conclusive evidence for adverse effects on liver disease, cancer, poor glycaemic control, or CVD.

Dental caries

- Systematic review of the literature found the evidence inconclusive. This review also found no association, or an inverse association, between $\geq 100\%$ orange juice and dental caries (decay) in prospective cohort studies (Lisak et al, 2018)
- Suggestion from CVDs high fruit juice intake associated with tooth erosion and dental caries in adults (Lisak et al, 2018)
- Meta-analysis found increased risk $\geq 20\%$ m³ per day in children.

Other outcomes

- Potential health benefit for blood pressure, cardiovascular function, stroke and cognitive function.

Suggested safe doses

- Adults $200\text{--}300\text{ m}^3$ per day.
- Children $100\text{--}200\text{ m}^3$ per day.

Project CO2 umbrella review currently undertaking grade assessments

- ✓ **Total records screened** 10,000 records across 4 databases
MEDLINE, PubMed, CINAHL and Cochrane Library
- ✓ Title and abstract screened 10,000 records
- ✓ Full text studies screened 1,000
- ✓ **Included studies** 100

Major effect of fruit juice found in 10 of 100 meta-analyses for the following health outcome categories

- ✓ Blood pressure
 - ✓ Stroke
 - ✓ HDL cholesterol
 - ✓ Inflammation markers
- Majority of data from 100 meta-analyses did not show any adverse effects of fruit juice consumption on health i.e., meta-analysis data were not significant
 - Only 10 out of 100 meta-analyses reported significant results that favoured the control i.e., not fruit juice to be investigated to understand if there are certain population groups or comparators that could put this in context.

100% juice plays a key role in nutrient intakes and diet quality



Nutrient intakes

- ✓ Important contributor of vitamin C, folate and potassium.
- ✓ Potassium from fruit juice linked to decreased blood pressure and stroke risk.
- ✓ Vitamin C enhances non-haem iron absorption and vitamin D activity.
- ✓ Dietary intakes from NHANES national health surveys have shown that both adults and children who drink orange juice have higher intakes of bioactive flavonoids, lower added sugars (Allott et al 2020)



Diet quality

- ✓ Dietary research has shown that drinking 100% orange juice is associated with healthier eating habits in general (Yang et al, 2018) better diet quality (Allott et al 2020) improved nutrient adequacy and improved biomarkers of health in adults (Pereira et al 2011, McNeill, 2012)
- ✓ Replacement with whole fruits had minimal effect on nutrient intake (only increase in dietary fibre)
- ✓ Overcomes key barriers to increasing fruit and vegetable consumption (practicality, convenience, and effort)

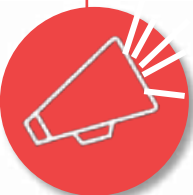
Reducing or eliminating 100% fruit juice could lead to unintended consequences such as reduced daily fruit intake and increased consumption of less nutritious beverages (for example, sugar-sweetened beverages)

Summary of an expert roundtable on the role of 100% fruit juice, 2019

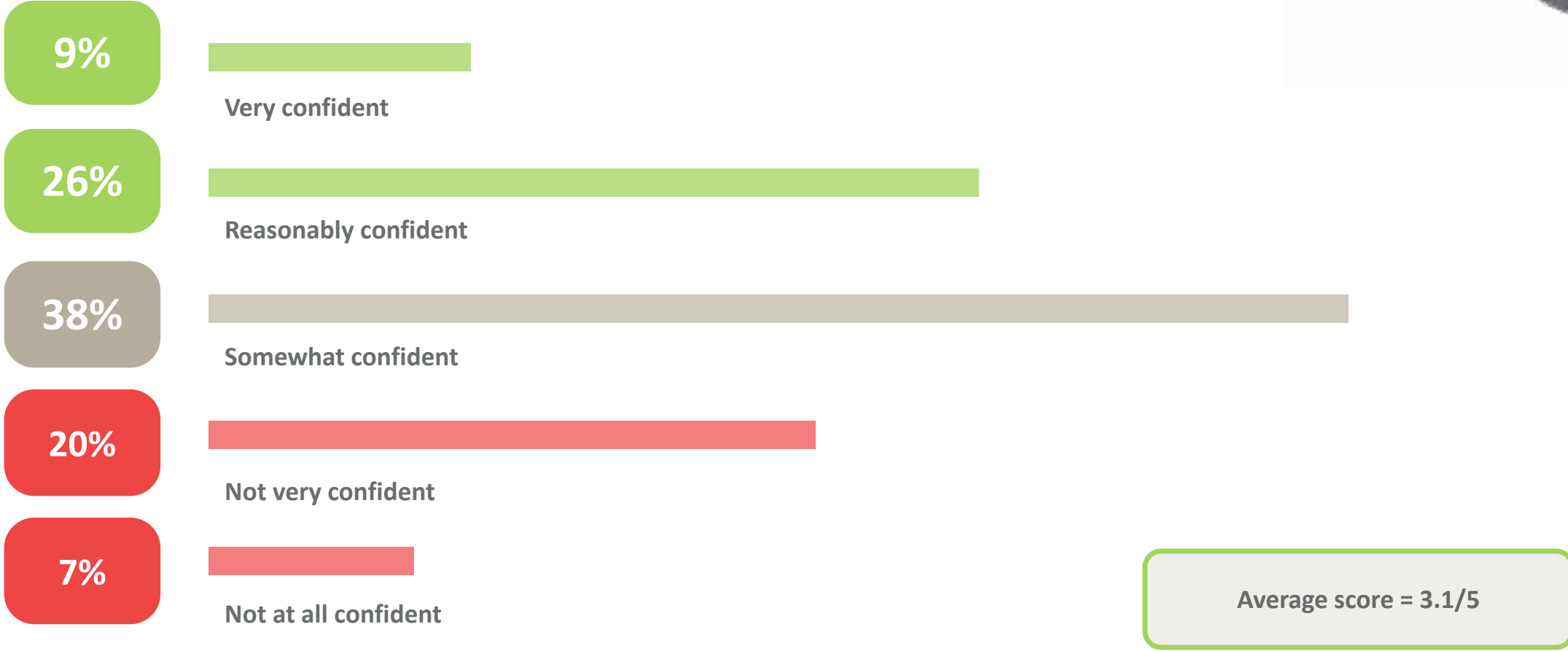


Audience sentiment
research - baseline

The majority of respondents feel at least somewhat confident in discussing the nutrition and health benefits of Australian citrus fruit with one third rating themselves very or reasonably confident.



Q. On a scale between 1 and 5, where 1 is 'not confident at all', and 5 is 'very confident', how confident do you feel in discussing the nutrition and health benefits of Australian citrus fruits?



n = 364

Confidence levels were similar across all professions, with nutritionists and physiotherapists feeling the most confident.

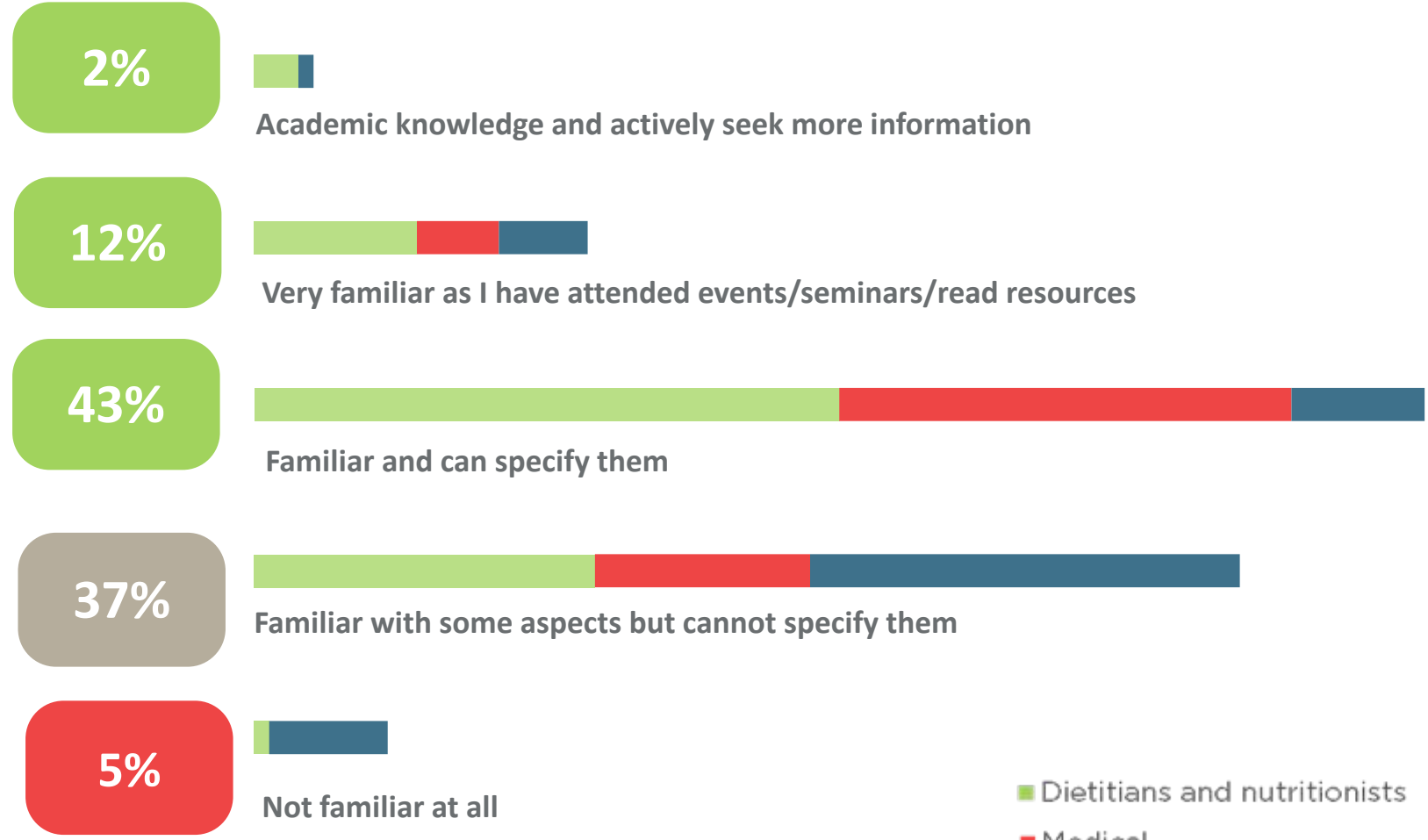
Q. On a scale between 1 and 5, where 1 is 'not confident at all', and 5 is 'very confident', how confident do you feel in discussing the nutrition and health benefits of Australia citrus fruit? (by profession)

Profession	n	Mean	SD
Dietitians	97	3.1	0.9
Nutritionists	58	3.4	1.0
Physiotherapist	11	3.4	1.6
General Practitioner	58	3.2	0.8
Nurse	27	3.1	1.1
Other allied health	3	3.0	0.0
Other	2	3.0	0.0
Naturopath	52	2.8	1.3
Exercise physiologist	29	2.8	0.9
Medical doctor other than GP	13	2.8	0.9

SD = standard deviation

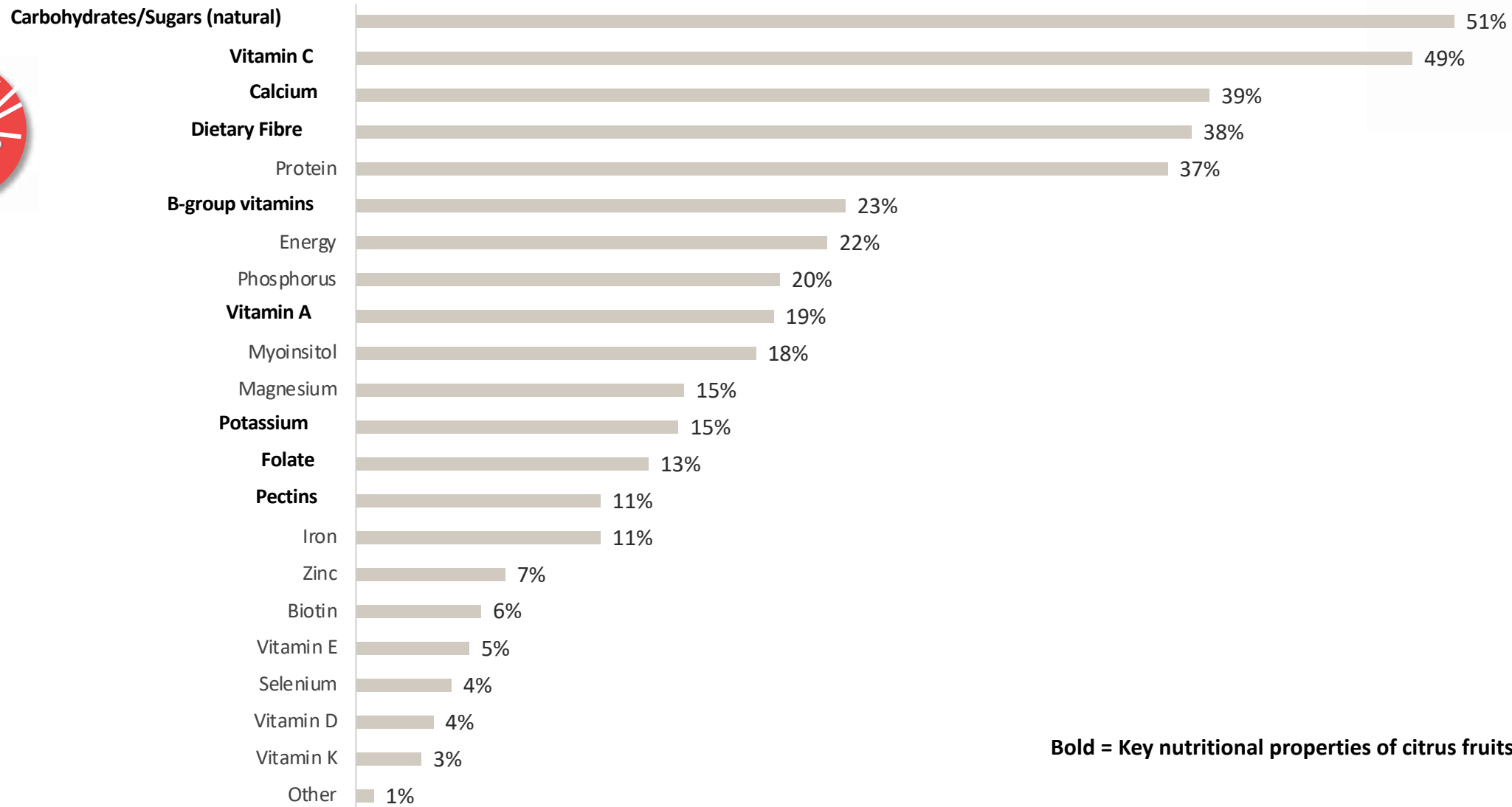
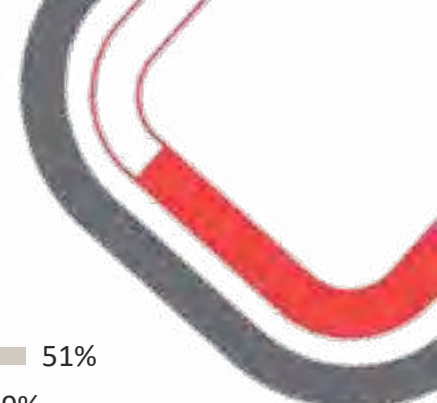


Most HCPs (particularly dietitians/nutritionists) report they can specify specific nutritional & health properties of Australian citrus fruit.



■ Dietitians and nutritionists
■ Medical
■ Allied health
n = 364

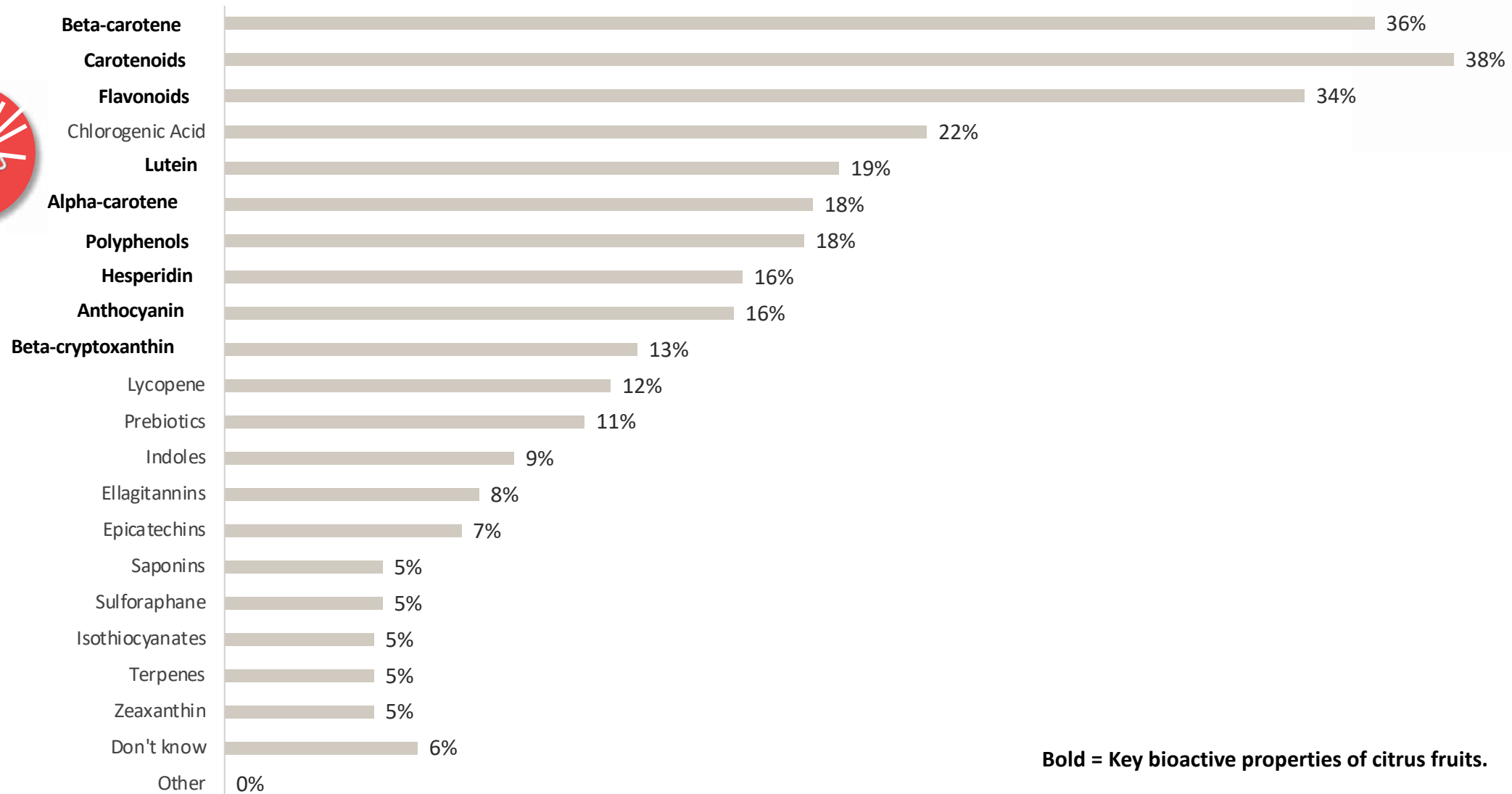
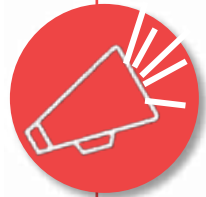
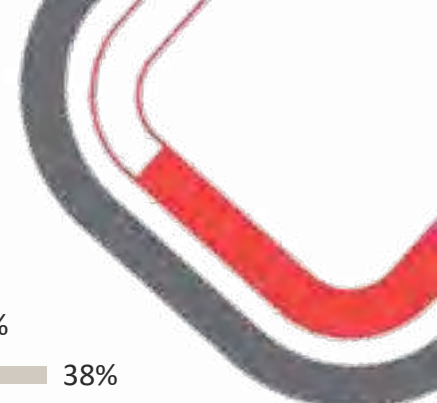
Put on closer look only half correctly can specify correctly and mostly limited to sugars and vitamin C & incorrectly think citrus is a source of protein.



Bold = Key nutritional properties of citrus fruits.

n = 364

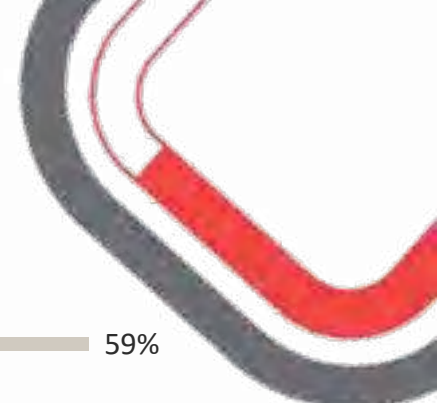
Less is known about bioactive content, with only 10% correctly identifying main classes carotenoids and flavonoids. Less known about specific sub-classes other than beta-carotene.



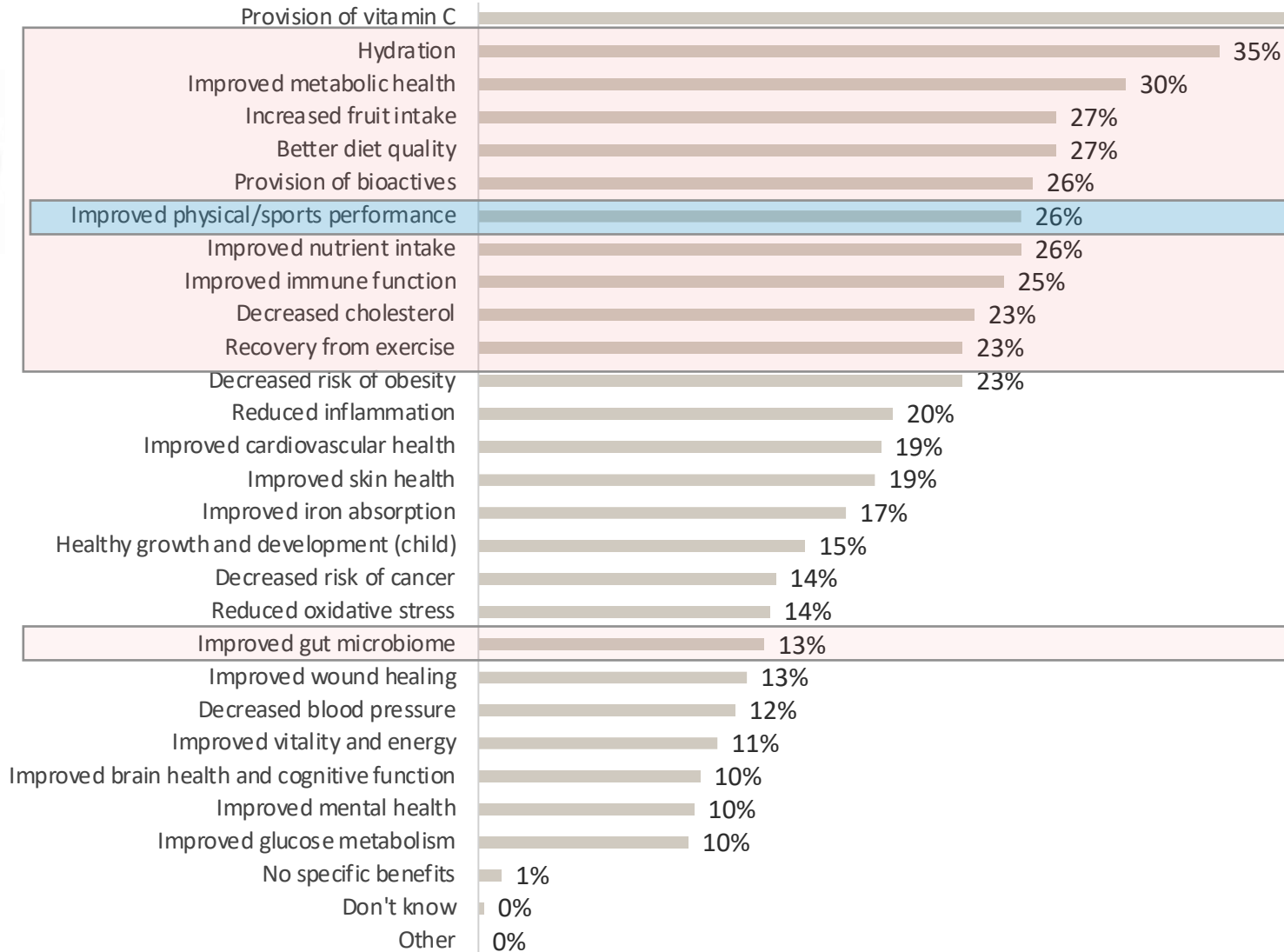
Bold = Key bioactive properties of citrus fruits.

n = 364

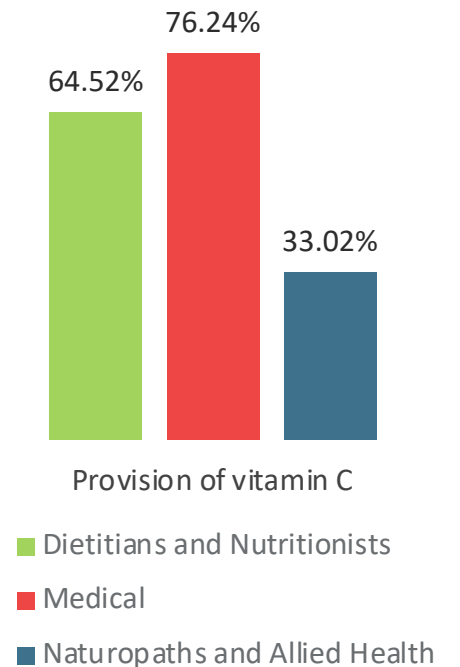
Vitamin C common key benefit, followed by hydration, improved metabolic health, nutrients/bioactive provision, decreased cholesterol & immune function. Little know about gut health benefits. Improved sport performance considered key benefit for 20%.



Q. In your opinion, what are the benefits of Australian citrus **FRUIT** in the diet?

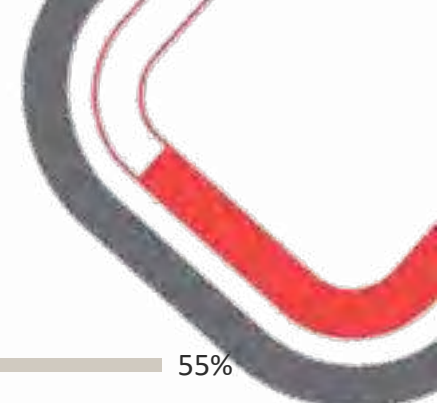


Dietitians/Nutritionists and Medical professions were most likely to associated citrus with provision of vitamin C.

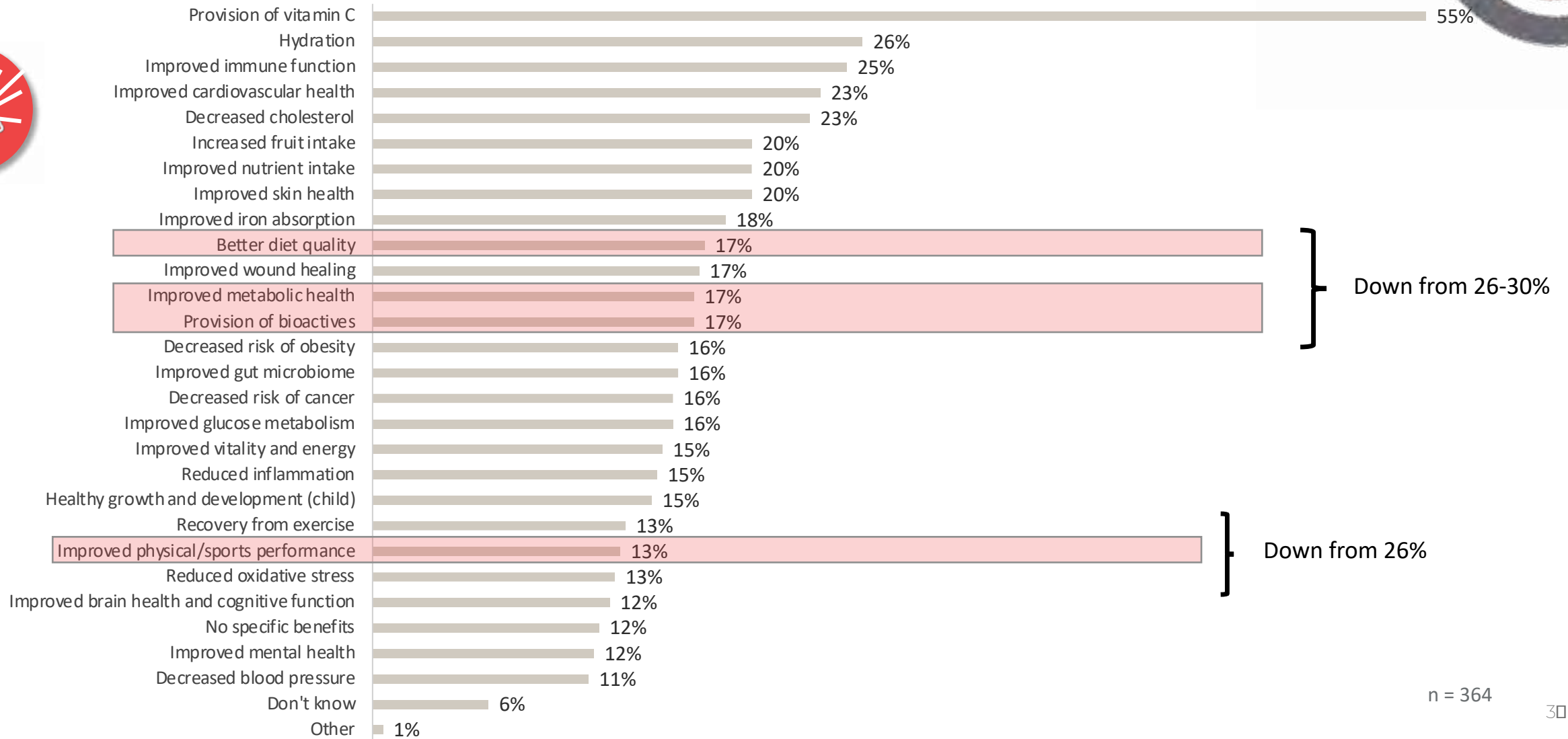


n = 364

When asked about juice, while vitamin C, immune and decreased cholesterol benefits remain, all other benefits drop.



Q. In your opinion, what are the benefits of Australian 100% citrus juice in the diet?

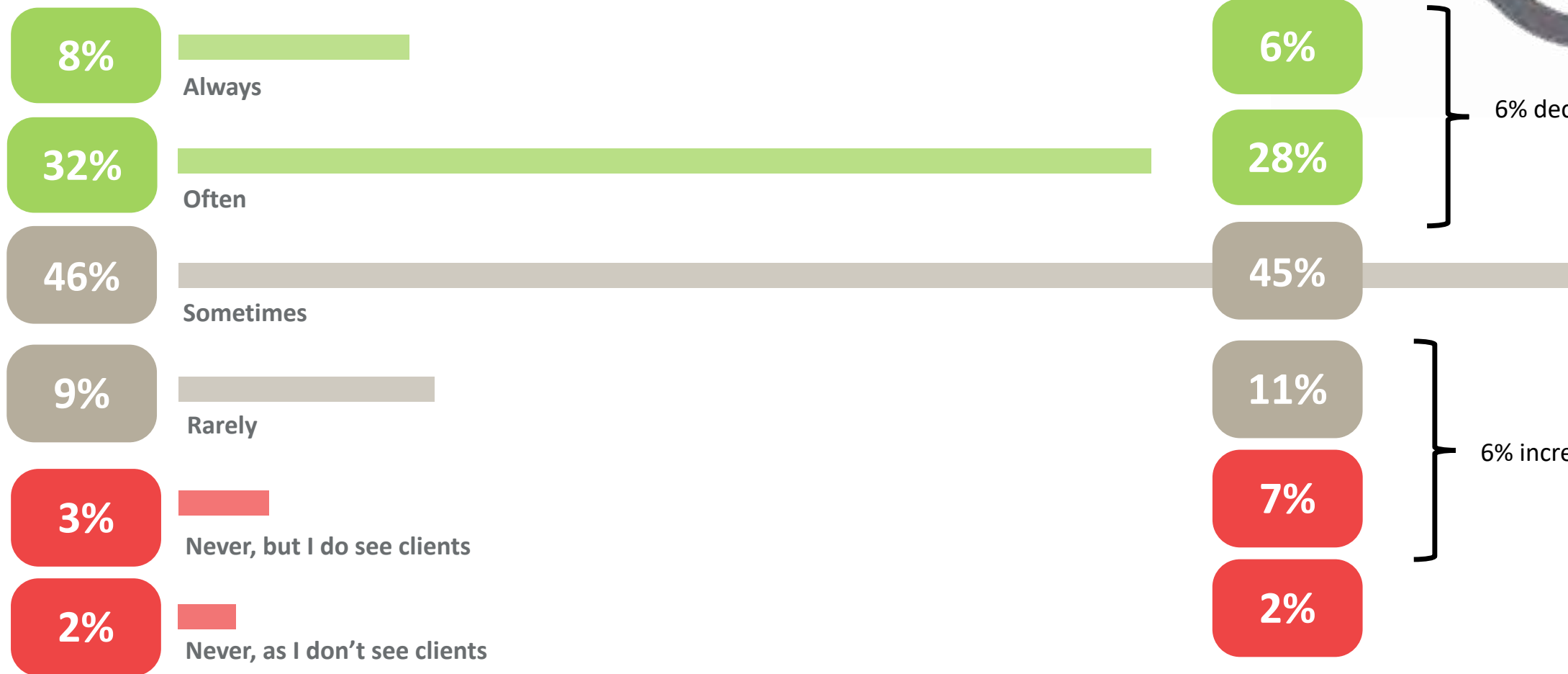


n = 364

Most recommend citrus to clients sometimes with those recommending often or always, dropping 6% when asked about juice.

Q. Which statement best describes how often you specifically recommend citrus fruit to your clients or patients?

Q. Fruit Juice?



n = 364

□ grapefruit or mi□ of citrus fruits were most li□ely to be recommended by HCPs to their clients.

Q. Which statement best describes your recommendation of citrus?

30%

I recommend mainly grapefruit

23%

I recommend a mix of citrus fruits

22%

I recommend mainly lemons and/or limes

15%

I recommend mainly mandarins

10%

I recommend mainly oranges



Cardiovascular, metabolic and immune benefits Key driver recommendation with unfamiliarity with nutrition health benefits, cost and acidity barriers



Drivers

- ✓ Citrus fruit nutritional properties, cardiovascular, metabolic & immune health benefits,
- ✓ Juice Provision of Vitamin C, hydration and immune benefits. Top in HCP considering juice for cardiovascular and metabolic benefits.
- ✓ Culinary properties and improved iron absorption also important driver of recommendation.



Barriers

- × Citrus fruit unfamiliarity with benefits, cost and being bad for the teeth
- × Juice unfamiliarity with benefits, perception too high in sugar and too acidic, or not considered a healthy addition to the diet



HCP want more resources & educated on nutrition and health benefits beyond C along with culinary and practical usage information.



- ✓ The majority (82%) of respondents were either unaware of resources or do not use them
- ✓ For those using resources, Australian Citrus and farmers most common source
- ✓ Request for more info to help clients understand the value of citrus fruit in their daily diet along with storage and usage



I also believe if more information of the overall health benefits of citrus fruits such as the benefit to immunity and inflammation properties for example are listed rather than just a good source of vitamin C may entice individuals to consume more in their daily diets



I don't believe there is much out there on citrus fruits in particular so would love some more information and resources! They are sometimes seen as the boring winter fruits so would be great to inspire some people with their health benefits.



Wider KO□ landscape

Dietary guidelines tend to focus on the higher sugar and lower fibre in 100% juice vs. fruit



Not recommended



100% beverages that are sources of sugar including 100% fruit juice to be avoided

- Canada dietary guidelines

Only occasionally



100m

1 a 100m

200m

Juice should only be drunk occasionally as it is acidic and has less fibre and other nutrients than the whole fruit provides

- Australian dietary guidelines

Recommends



1 p to 100m

100% beverages that are calorie free or that contribute beneficial nutrients such as fat free and low fat milk and 100% juice should be the primary beverages consumed

- US dietary guidelines

Large discrepancy in opinion between public health, media dietitians and academia regarding fruit juice



Not recommended

Public health groups and media writers and dietitians

Fruit juice is not a health option
whole fruit is best

- ✓ High in free sugars and calories (equivalent to 2 serves of fruit)
- ✓ Low in fibre and satiety
- ✓ Acidity and dental health
- ✓ Processing

Not occasionally

Health organisations, School Canteens

It is fine to have sometimes

- ✓ While fresh fruit is better, it is OK to have fruit juice in moderation.
- ✓ Reduce serve size or add some water to dilute sugars.

Recommends

Academics

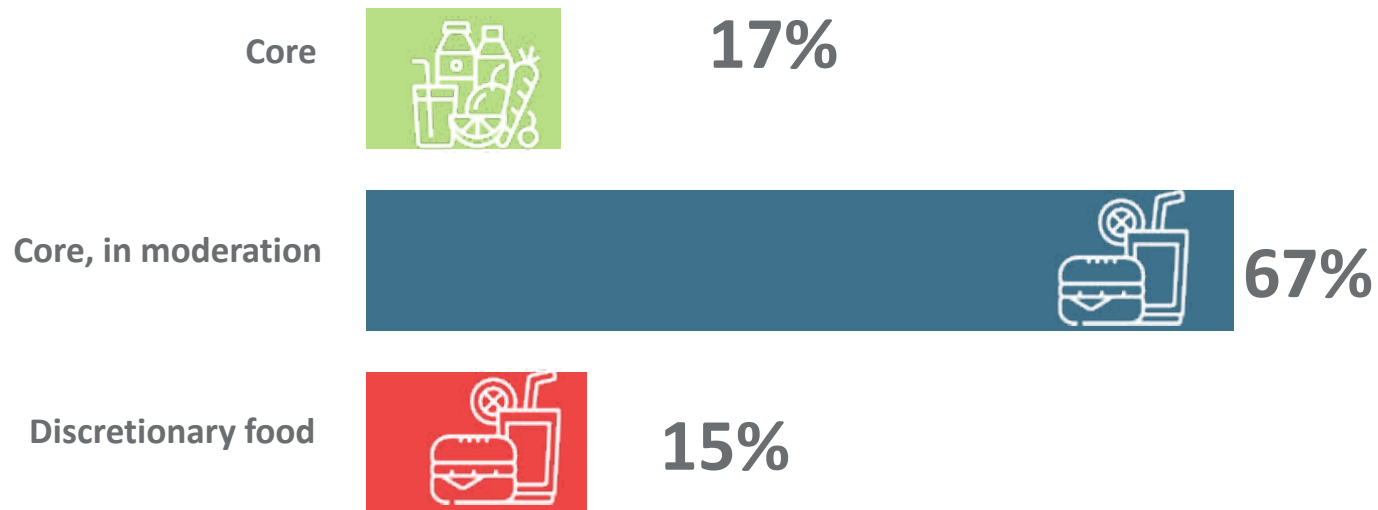
Fruit juice should be viewed as a health food

- ✓ Nutrient density.
- ✓ Simple way to increase beneficial plant chemicals.
- ✓ Affordability for economically disadvantaged groups.
- ✓ Claims that fruit juice is harmful lack scientific merit.

Overall, 100% juice better than sugar-sweetened beverages as source of nutrients, but not as good as whole fruit and water due to loss of fibre, high sugar leading to sugar spikes.



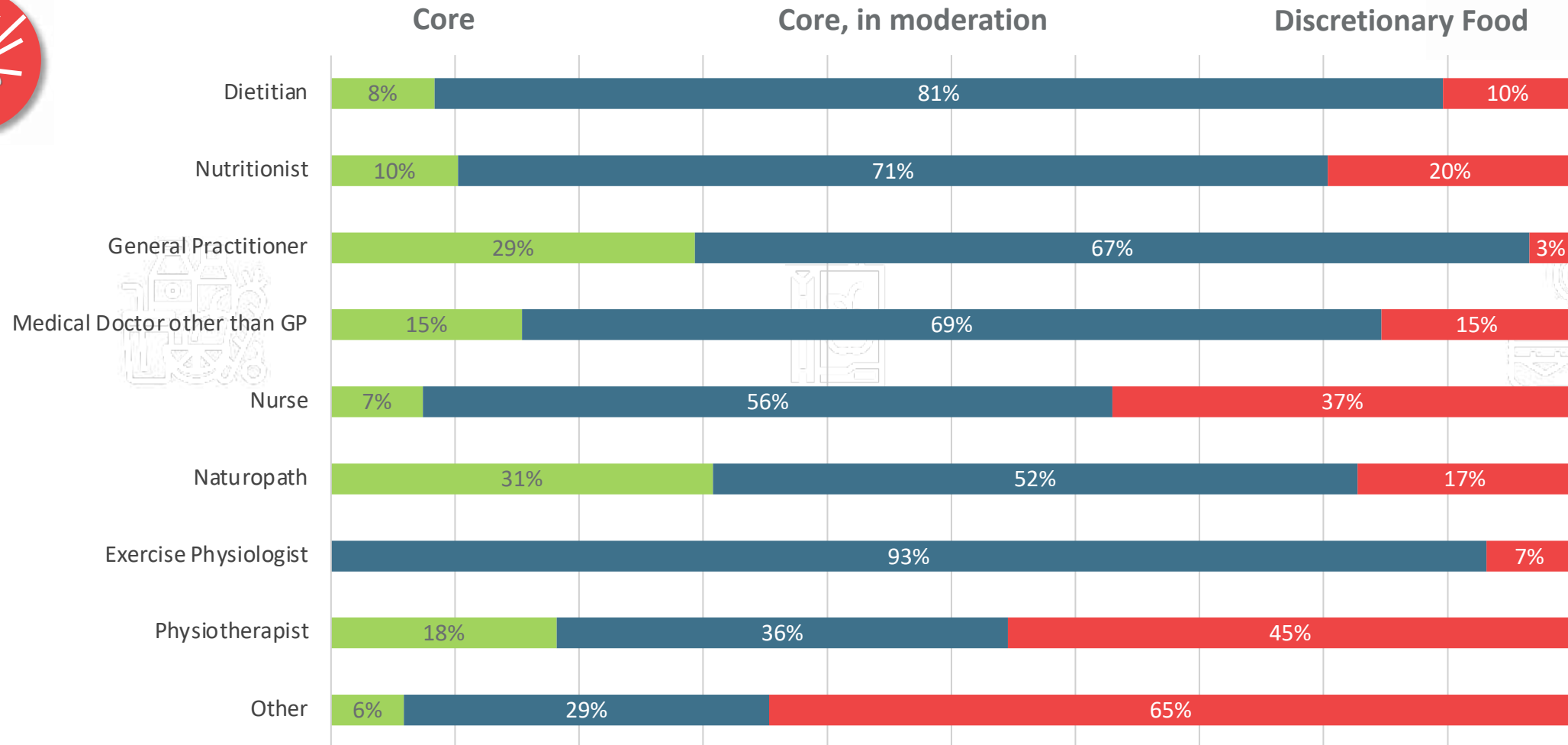
Q. Should 100% citrus **juice** be a core or discretionary beverage within the dietary guidelines?



“Better to eat the whole fruit, but better to drink juice than coke.”

Dietitians and GPs were two of the three groups least likely to consider that 100% citrus juice should be included as a discretionary choice in the Australian dietary guidelines.

Q. Should 100% citrus **juice** be a core or discretionary beverage within the dietary guidelines? (by profession)



n = 364

Citrus promotion globally focused on vitamin C & sustainability

Rich source of vitamin C



“Throughout the month of July, Bee Sweet’s marketing team will tailor its social media content to promote the **benefits of vitamin C**, as well as the different ways consumers can supplement their **immune system** with citrus fruits, according to a press release.”

<https://www.beesweetcitrus.com>

Citrus agriculture sustainability is unique

Anecoop launches an ambitious campaign to promote citrus consumption in Spain

Anecoop has recently launched an ambitious promotional campaign in Spain to promote the consumption of citrus fruits, emphasizing their healthy qualities, as well as their strategic importance for the agri-food sector, as Spain is one of the world's leading producers, with around 7 million tons per year. The cooperative markets around 350,000 tons of oranges, mandarins, lemons and grapefruit every year under its Bouquet brand.



“For years, we have seen other fruits and products in the spotlight of communication campaigns targeted to consumers. As big citrus producers, we believe that it is necessary to make an effort to promote citrus consumption. Our producers and the entire sector deserve it,” says Nacho Juárez, head of citrus sales at Anecoop.

“For many years now, the promotion of citrus consumption has been

“Spain to promote the consumption of citrus fruits, emphasizing their **healthy qualities**, as well as their **strategic importance for the agri-food sector**, as Spain is one of the world's leading producers, with around 7 million tons per year.”



Feedback discussion

PRG Minutes

- NRAUS & PRG member introduction to project overview and topline overview of key insights coming from landscaping NRAUS undertaking as part NutritioniQ solution strategy process.
- **Science substantiation:** From science perspective NRAUS raised concerns from the brief landscaping scope that there is some science gaps in the Sensational Citrus science report plus some areas where science translation has been overstated. The report is also missing methodology which raises concerns with the confidence in messaging. NRAUS to discuss separately with HORT. Alan highlighted an area that may be good to review is around satiety and specifically the satiety index data for citrus.
- **Messaging:** PRG group felt key to drive messages that bring renewed invigoration back to citrus – relevant areas that are topical and on point from what was presented include other nutrients in citrus – folate, potassium, fibre as well as bioactives, prebiotic benefit, sustainability and satiety.
- **Regulatory considerations:** Alan cautioned around regulatory space and the pressure of public health on FSANZ to enact ‘added sugar’ labelling. There is high chance juice will have to list added sugars on label.
- **Public health as target audience:** Bobbie and Alan both raised the fact that public health are biggest barriers to uptake of the the juice science. It is noted that many of the public health professionals are not trained in science. Suggested key to consider public health as key target audience as part of the educational approach if there is to be any real positive change in negative perceptions of juice.



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Thank you

CT00006: Citrus Industry Health & Nutrition Education Program

PRG Meeting 2

11th July 2023



Agenda

1. Introductions
2. Project recap & status
3. Current outputs update
 - Citrus Australia HCP Webpage
 - Factsheets
 - DA Oral presentation
4. Upcoming outputs
5. Feedback/Discussion





Project recap □ overview

The project: CT00006

Supports the **Strategic Investment Plan** of the Citrus Fund to increase domestic consumption of fresh Australian Citrus.

Key project outcomes:

- Increase HCP awareness of **nutrition & health benefits** of citrus
- Increase HCP who can accurately **identify the nutrition & health benefits**
- Increase in HCPs who are **'confident' or 'extremely confident'** in discussing the health benefits of citrus
- Increase in HCPs who are **'confident' or 'extremely confident'** in correcting misinformation



Messaging: The 'What'

The problem

How to get healthcare professionals to recommend and support consumption of citrus fruits and its juices?

Objectives

1. Awareness & identification of citrus fruits nutrition & health benefits.
2. Increasing confidence in discussing health benefits of citrus fruit.

1. Awareness & identification of citrus juice nutrition & health benefits
2. Increase confidence in correcting misinformation on citrus juice.

Primary messaging

1. Citrus as Medicine (Citrus fruit)

- “More to Cee in Citrus”
- Outstanding matrix of nutrients & bioactives
- Bioactive superfood, highest in flavanones
- Supports immunity, CVD, brain health
 - Leverage vit C credentials
 - Make citrus top of mind again
 - Citrus types

2. Juicy Myths (Citrus juices)

- “More to See than Sugar”
- Umbrella review science
- Leverage the goodness of citrus fruits
- Bioactive profile & mechanisms
 - Myth-busting
 - Citrus juice types

Secondary messaging

3. Engage & inspire with culinary cues, practical tips & refreshing recipes

4. Leverage sustainability facts: Nature's perfect package



HCP audience segmentation: The 'WHO'

	PROS	CONS	ASSESSMENT	RECOMMENDATION
Dietitians Registered nutritionists	<ul style="list-style-type: none"> Trusted experts in nutrition. Influencers of wider HCP landscape, including public health policy (very relevant for juice). 	<ul style="list-style-type: none"> Moderate - Low reach consumer. Focused on nutrients and little knowledge of bioactives. 	<ul style="list-style-type: none"> Key group to develop as advocates to ensure successful project outcomes and interested in how food can support their client's health. 	<ul style="list-style-type: none"> Primary group to target and develop as advocates. Target for both citrus fruit & juice campaigns with multiple and repeated touchpoints
GPs	<ul style="list-style-type: none"> High trust and reach Neutral-positive to juice 	<ul style="list-style-type: none"> Very little time for nutrition & can be hard to reach Current science not strong enough to be solution to their problems 	<ul style="list-style-type: none"> Unlikely to see significant shift in recommendation behaviour – lower ROI 	<ul style="list-style-type: none"> Do not target
Practice Nurses	<ul style="list-style-type: none"> High trust and reach More time & discuss nutrition Easier to reach than GPs 	<ul style="list-style-type: none"> Low nutrition knowledge, Group most likely to be negative to juice. 	<ul style="list-style-type: none"> High reach and trusted consumer influencer that is receptive to nutrition education. Providing health promotion advice. 	<ul style="list-style-type: none"> Primary group to target Target for both citrus fruit & juice campaigns with simpler messaging
Naturopaths Nutritionists (non-degree qualified)	<ul style="list-style-type: none"> High trust and primary provider for 5% population Key advocates as food as medicine and Juice not significant issue 	<ul style="list-style-type: none"> Poor food composition knowledge – lack of awareness citrus good source C and not making food as medicine link with citrus. 	<ul style="list-style-type: none"> Targeting will ensure coverage of all primary providers to consumers. 	<ul style="list-style-type: none"> Secondary group to target. Target for Citrus fruit only
Personal trainers	<ul style="list-style-type: none"> High reach and trust 	<ul style="list-style-type: none"> Focused only on weight management/sport where citrus has little credibility and likely will not solve their problems. Negative perceptions juice and likely to be key detractors to consumers on juice 	<ul style="list-style-type: none"> High reach and trusted consumer influencer. Most likely not talking fruit but will be actively recommending avoidance juice for weight. 	<ul style="list-style-type: none"> Secondary group to target Target for Citrus juice only
Key HCP influencers	<ul style="list-style-type: none"> High trust and reach. Key influencers younger demographic group and HCP community. Key to building coalition of supporters to drown out detractors 	<ul style="list-style-type: none"> Farm tours and related activations expensive to engage 	<ul style="list-style-type: none"> ROI not justified to actively target with farm tour but one-on-one KOL engagement more viable. This however will be already taking place concurrently as part of ABCL juice project 	<ul style="list-style-type: none"> Target via personalised invites to 'Citrus as medicine' webinar and follow up with social pack. Link into ABCL project KOL engagement on juice.



Audience & Timings

Campaign Focus

Citrus as Medicine

Juicy Myths

Unique Audience Segments

1. Nutrition & Dietetics Community

2. Medical Profession

3. Holistic Wellness

1. Nutrition & Dietetics Community

2. Medical Profession

4. Fitness Industry

Audience subset – Key Area of Practice

Dietitian influencers & in Private Practice, Academia & Food Comms

Practice Nurses

Naturopaths
Nutritionists

Dietitians in Private Practice, Academia & Food Comms

Practice Nurses

Personal Trainers

Timings

March - December 2023

November 2023 - July 2024



Key deliverables and inter-connections

Educational events:

Conferences & Webinars to Seed juice Science to Academia & Educate clinicians on benefits citrus & its juices



Dietitian Australia Conference
July 2023 Umbrella review Abstract
2024: Juice focus trade display



Webinar Nov 2023 Dietitians, Naturopaths, Practice Nurses



Nutrition Society Australia Conference
2024: Present Juice SLR



Webinar March & April 2024: Dietitians, Practice Nurses & Fitness professionals

Drive attendees to hub & database

Web-page:

Citrus Digital Hub – Nutrition & Health Section as central information repository

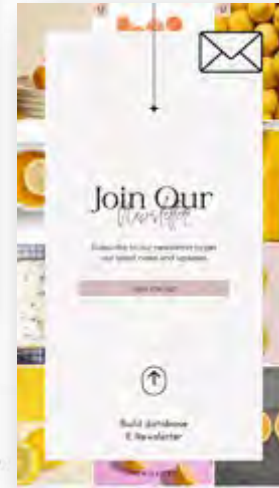


Resources:

- 2 x **Infographics** – Citrus as medicine, Juicy myths
- 3 x **HCP Factsheets**: Immunity, CVD, Gut health
- 1 x **Consumer Factsheet**: Citrus as medicine
- **Video** (2min) – Juice scientific review
- **Webinar recordings**: Citrus as Medicine, Juicy Myths
- **Social media pack** Static tiles, recipe stop motion reel

4+ x **EDMs** to owned Citrus HCP database

Educate, disseminate resources, drive to citrus hub



Build Database of subscribers



Digital Outreach Campaign to drive awareness hub/resources/ events & database acquisition



HCP Influencers

Personalised outreach to NRAUS Tier 1 KOLs with invite to 'Citrus Medicine' Webinar & follow up with Citrus social media & infographic kit

[Link up with ABCL juice KOL engagement project]

Year 1

- Strategy/ Collateral Development
- Education commence

Year 2

- Dietitians
- Practice Nurses
- Naturopaths
- Fitness professionals

- ✓ Baseline ASR evaluation
- ✓ Nutrition iQ Solution

✓ Australian Citrus Nutrition/Health Webpage

- ✓ 4 x Factsheets
- Juice UR Oral presentation (DA conference)

WE ARE
HERE

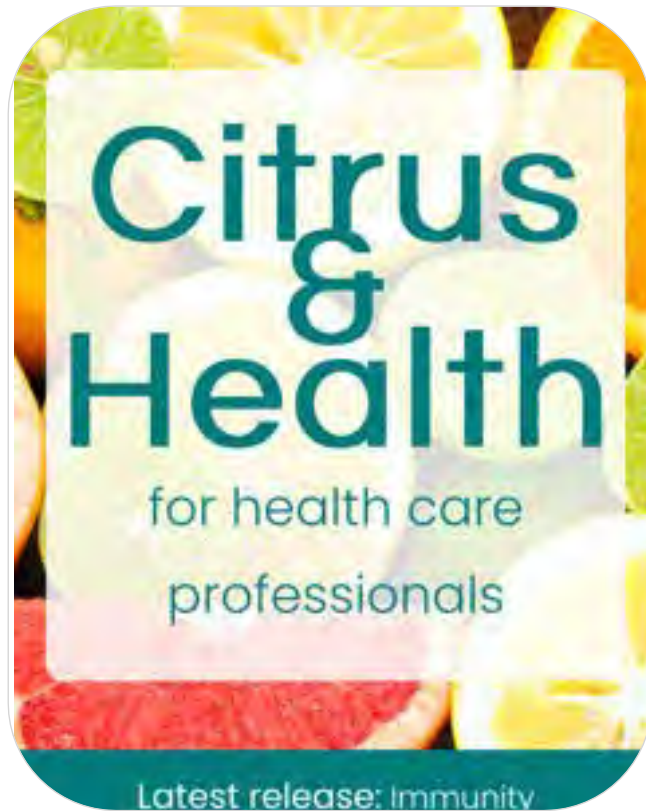
-
- NRAUS hosted webinar Citrus fruit - Juice UR abstract/oral (NSA conference)
- Citrus fruit infographic
-
- Citrus 100% juice video
- NRAUS hosted Webinar (100%) Juice
- AUSActive Webinar (100%) Juice
- Digital Media Reach Campaign





Current outputs update

Citrus Australia HCP Webpage



Citrus Australia HCP Webpage: Development of new healthcare professional web-page which will house resources. These will be added sequentially as they are developed.

Status: New webpage live with immunity factsheet available to download

Next steps:

Brain health Factsheet– World Brain Day July 22nd

CV health Factsheet – World Heart Day Sept 29th

Factsheets



4 x 2 Page factsheets: 3 x HCP and 1 x Client friendly factsheets.

- Immunity, Brain Health, Heart Health, Client friendly Citrus & health
- Latest evidence based summary of benefits for Citrus fruits in immunity, brain health and heart health

Status: Completed

Next steps:

- Will be added to website on the 'relevant day'
- To be communicated to HCP database via EDM, distributed at webinars and conference.



Oral presentation □ A Conference



July 2023 DA Conference (Melbourne)

- Umbrella review: 100% juice and health
- Abstract accepted for oral presentation
- Purpose is to share key results with dietitians and update them on the balance of evidence

Next steps: To be presented by Tim Cassettari on Monday 24th July.



□ pcoming Outputs

Deliverables for upcoming milestone



Citrus fruits as medicine infographic (Sept 2023): 1-page infographic with key messages of More to C in Citrus and therapeutic benefits to be leveraged as social tiles.

Poster/Oral presentation Juice Umbrella Review Nutrition Society Australia Conference (Nov 2023): To support collation of supporters for planned future juice comms by communicating scientific findings on juice.

NRAUS-hosted Webinar (November 2023): Targeting Dietitians, Practice Nurses & Naturopaths. Citrus as medicine - Communicate the therapeutic value and potential of citrus fruits.

Digital channel outreach activation: Resources & hub awareness to be disseminated via HCP channels in Oct/November with social media advertising.

Citrus Webinar



Topic: “*Citrus as medicine - How can we maximise the therapeutic value of citrus?*”

Aim: Communicate the therapeutic value and potential of citrus

Target audience: Dietitians, Nutritionists, Practice Nurses, Naturopaths

Presented by: TBC

Presentation key messages:

- **More to C in Citrus**
- All citrus fruits contain: Flavonoids, essential micronutrients and fibre.
- Citrus fruits are one of the richest sources of flavonoids. Some flavonoids, such as hesperidin and naringenin, are specific to citrus fruits.
- It is this unique, whole food package that is thought to benefit heart, brain and immune health.
- A zero waste food, all parts of the fruit provide these important health benefits.

When: November 2023

Activation Channel Plan

ACTIVATION CHANNEL	WHAT	HOW	WHEN (TIMING)
CITRUS HCP DATABASE	<ol style="list-style-type: none"> Citrus & Immunity Citrus & Brain health Citrus & Heart health Citrus & Med Webinar invite Citrus & Med Post webinar key messages + Consumer factsheet Juice Webinar invite Juice post webinar key messages & wrap up 	NRAUS Managed Mailchimp	15 June 2023 22 July 2023 29 Sept 2023 16 Oct 2023 27 Nov 2023 19 Feb 2023 1 April 2023
SOCIAL MEDIA Advertising	<ul style="list-style-type: none"> Citrus Medicine Resources (lead generation): Video reel of resources Citrus Medicine Webinar Juice Resources (Lead generation: UR Video) Juice Webinar 	NRAUS/Citrus Aust Paid ad	<ul style="list-style-type: none"> Sept (more names for webinar) 16 Oct 2023 (4 wks) TBC – Feb 2023 19th Feb 2023 (4 wks)
KOL DATABASE	<ul style="list-style-type: none"> Social tile pack & recipes Citrus Webinar invite UR article Juice Webinar invite 	Direct Email/DM in Social	
WEBSITE	<ul style="list-style-type: none"> All resources Subscribe email – welcome email with recipe pack 	Citrus Australia HCP Web-page	<ul style="list-style-type: none"> From June 2023
NRAUS Social Media Posts	<ul style="list-style-type: none"> Social Posts on NRAUS owned platform of project assets 		



Activation Channel Plan: HCP Channels

ACTIVATION CHANNEL	WHAT	HOW	WHEN (TIMING)
DIETITIANS	<ul style="list-style-type: none"> Citrus Medicine Resource: Infographic – Image clicks through to factsheet on website. Citrus Juice Resource: Infographic / UR 	<ul style="list-style-type: none"> DC (Dietitians) EDM – eNews post within Sunday update (100 words, image and weblink) 	<ul style="list-style-type: none"> Sept 29 2023 Feb 2024
PRACTICE NURSES	<ul style="list-style-type: none"> Citrus Medicine Resource: Hero Infographic Citrus & medicine webinar invite Citrus Juice Resource: Infographic Juice webinar invite 	<ul style="list-style-type: none"> APNA (Nurses) EDM – 60 word plus pic click through 	<ul style="list-style-type: none"> Sept 2023 Oct 2023 TBC Feb 2024
NATUROPATHS	<ul style="list-style-type: none"> Citrus Medicine Resource/s: Infographic Citrus & Medicine webinar invite 	<ul style="list-style-type: none"> ANTA EDM Event Listing ANTA website Event Listing NHAA website 	<ul style="list-style-type: none"> TBC Oct 2023
FITNESS PROFESSIONALS	<ul style="list-style-type: none"> Citrus Juice resource: infographic 	<ul style="list-style-type: none"> AUSActive EDM 	<ul style="list-style-type: none"> Feb 2024 TBC
NSA	<ul style="list-style-type: none"> Webinars (Resources) 	<ul style="list-style-type: none"> Members only area placement & placement in newsletter 	<ul style="list-style-type: none"> Sept 2023





Feedback discussion

POG Minutes

- Positive feedback provided by Nathan on the overall project direction and outputs to date and from Bobbie on the factsheets.
- Bobbie reminded that juice topic will be emotive area and will need some good speakers to present when we do this focused webinar.
- Jacqui suggested in presentations that QR codes are woven into the presentation with CTA as easy way to get people to engage.
- Discussion on upcoming webinar with lots of good ideas to consider including:
 - **Provenance story** – paddock to plate, incorporating connection with growers, possibility of some KOL taking tour, immersive experience that can be woven into the story
 - **Financial angle** - Nutrient:Cost ratio – positive story which is relevant in the current financial pressures Australia experiencing.
 - **Life-stage** – specifically kids and early stage, ‘Start right, stay right’. Most focus on older age groups, can we look at younger age group?
 - **Sports** – Immunity hot topic and particularly in sport, can we look to advertise in SDA.
 - **Glycemic Index** – fruit and juice have low GI which is important education point – relevant when talking to juice.





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Thank you

PROJECT EETI 3

FOR PROJECT CT21006 CITRUS

January 2024



Agenda

1. Project recap & status
2. Current outputs update
 - Citrus Fruits Infographic
 - Webinar
 - NSA Conference presentation
3. Upcoming outputs
4. Feedback/Discussion





PROJECT RECAP & STATUS



THE PROJECT: CT2100☒

Supports the **Strategic Investment Plan** of the Citrus Fund to increase domestic consumption of fresh Australian Citrus.

End of project outcomes:

Increase HCP

- Awareness and ability to accurately identify the nutrition & health benefits of citrus
- Confidence in discussing the health benefits and correcting misinformation of citrus

Where are we at?

Year 1

Strategy
Collateral
development

Year 2

Communication
Education

✓Baseline research

✓Australian Citrus Health
Webpage

✓4 x Factsheets

✓DA Conference
presentation

WE
ARE
HERE

✓Citrus fruit infographic

✓Webinar (Citrus)

✓NSA presentation

- Citrus 100% juice video

- Webinar (Juice)

-AUSActive Webinar (Juice)

- Digital Reach Campaign



Messaging: The What

The problem

How to get healthcare professionals to recommend and support consumption of citrus fruits and its juices?

Objectives

1. Awareness & identification of citrus fruits nutrition & health benefits.
2. Increasing confidence in discussing health benefits of citrus fruit.

1. Awareness & identification of citrus juice nutrition & health benefits
2. Increase confidence in correcting misinformation on citrus juice.

Primary messaging

1 Citrus as Medicine (Citrus Fruit)

- More to C in Citrus
- Make citrus top of mind again
- Leverage vit C credentials
- Outstanding matrix of nutrients & bioactives
- Bioactive superfood highest in flavanones
- Supports immunity & CVD & brain health

2 Juicy Myths (Citrus Juices)

- More to See than Sugar
- Umbrella review science
- Leverage the goodness of citrus fruits
- Bioactive profile & mechanisms
- Myth-busting

Secondary messaging

3 Engage & inspire with culinary cues & practical tips & refreshing recipes

4 Leverage sustainability facts & nature & perfect package



Audience & Timings

Campaign Focus	Citrus as Medicine			Juicy Myths		
Primary Audience Segments	1. Nutrition & Dietetics Community	2. Medical Profession	3. Holistic Wellness	1. Nutrition & Dietetics Community	2. Medical Profession	4. Fitness Industry
Audience subset / Key Area of Practice	Dietitian influencers & in Private Practice, Academia & Food Comms	Practice Nurses	Naturopaths Nutritionists	Dietitians in Private Practice, Academia & Food Comms	Practice Nurses	Personal Trainers
Timings	March - December 2023			November 2023 - July 2024		



Key deliverables: and interconnections

Educational events:
Conferences & **Webinars** to **Seed Juice Science to Academia** & **Educate clinicians on benefits citrus & its uses**



Dietitian Australia Conference
 July 2023 Umbrella review
 Abstract
 2024: Juice focus trade display



Webinar Nov 2023
 Dietitians, Naturopaths,



Nutrition Society Australia
 Conference
 2024: Present Juice SLR



eb-page:
Citrus Digital Hub & **nutrition & Health Section**
 as central information repository

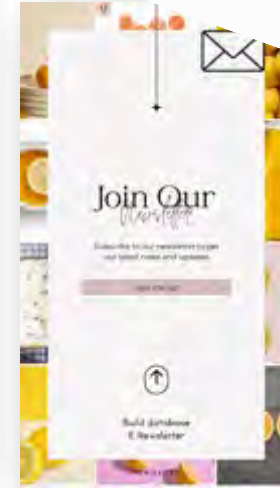


Drive attendees to hub & database

Resources:

- 2 x **Inographics** – Citrus as medicine, Juicy myths
- 3 x **HCP Factsheets** – Immunity, CVD, Gut health
- 1 x **Consumer Factsheet** – Citrus as medicine
- **Video** (2min)
- **Webinar recordings** – Citrus as Medicine, Juicy Myths
- **Social media pack** – Static tiles, recipe stop motion reel

Digital Outreach Campaign
 to drive a **citrus awareness hub/resources/events** & **database acquisition**



Build Database of subscribers



HCP Influencers



4+ x EDMs to build Citrus HCP database

Educate, disseminate resources, drive to citrus hub



CURRENT OUTPUTS



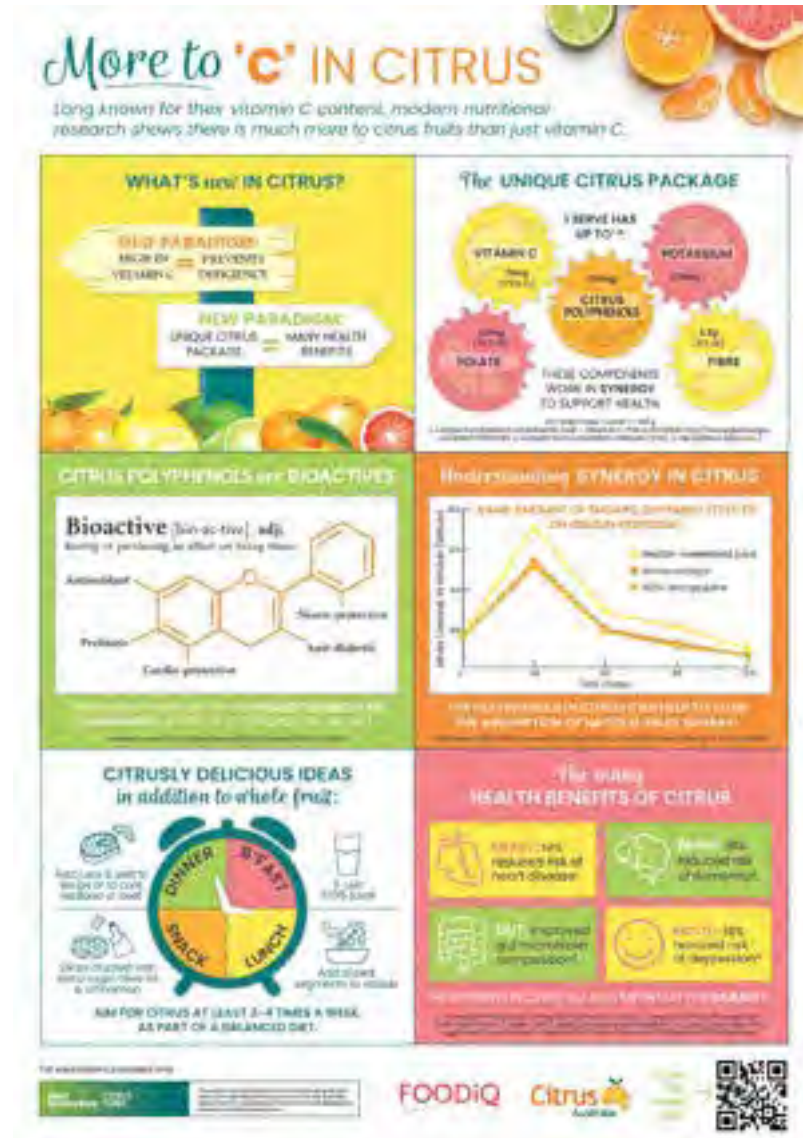
Infographic & social tiles

Status: Completed

- ✓ Uploaded on 'Citrus Hub'
- ✓ Distributed at webinar & HCP database via EDM

Next steps:

- Communicated via digital activation campaign planned in February.
- Distribute at upcoming FOODiQ Global webinar & DA conference



Webinar



381 registered
(KPI >200)

102 attended live
(KPI >100)

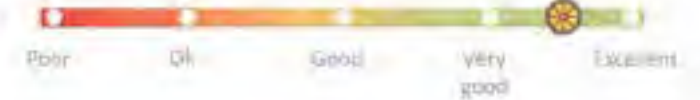
65% completed
evaluation
(KPI >80%)

100% learnt something new (KPI >80%)



97% found event
'Excellent' or 'very good'
(KPI >90%)

4.59/5



100% found information
presented 'useful'
(KPI >90%)

4.08/5



98% found event
'extremely engaging' or
'very engaging'

4.43/5



What was done well?

43% respondents in open answers said, 'All of it', 'Everything'

Presenters/Content/Slides

"Made the info usable as a practitioner/ therapist."

"Presentations and speaking were clear and concise."

"very vibrant slides and information was easily understood."

"Latest research evidence"

Format/Timing/Organisation

"Well put together, flowed beautifully, packed full of valuable information."

"I loved the kahoot quiz, very interactive and you learn more by being questioned on information."

"Time of the day, clear and concise programme and presentations"

"The amount of content covered in the 1-hour timeframe."

What drove engagement scores?

New information

“A lot of new information presented.”

“Learnt new things about citrus.”

“I learnt a lot of new things that I wasn't aware of.”

“Interesting topic showcasing forgotten fruits!”

“Learnt a whole lot. Realized how much I didn't know about citrus.”

“Combination of latest evidence and clinically useful information”

Format/presentations

“Authoritative, referenced information, engaging speakers and issues.”

“Fantastic webinar - very informative, the speakers are knowledgeable and well-articulated and the information fun! “

“Very relevant information, practical and appropriate levels of scientific evidence”

“Well researched and presented.”

“It felt short and sharp but at the same time I learned lots.”

“It was laid out really well and information was super knowledgeable.”

Presenters

“Very enthusiastic and well-regarded presenters”

“Host and presenters were engaging in what they had to say and the delivery of the information .”

“Two great presenters and interesting presentations. Good to have key messages and scientific references included in the slides.”

“Speakers new what they were talking about and their passion for the topic was evident and inspiring.”

“Dr Emma's presentation super engaging and offering new ways to look at things.”

Kahoot/Quiz

“Best one yet. The broad spectrum overview with the exciting kahoot.”

“Opportunity to ask questions and 8 quiz questions to check our knowledge kept it interesting”

“Apart from the information, the kahoot game was fun. Beats a good old poll.”.

“Loved the Kahoot quiz in the middle! ”

“Loved the break between speakers by using the Kahoot! quiz. Great way to get everyone involved and getting their brains working!”

“I loved the kahoot part. It made me focus more.”

What were the most valuable learnings?

Food synergy

“The whole food benefits, more than vitamin c and fibre etc.

“The explanations of how to frame superfoods to take back the term and use it for good. I'm going to do that.”

“The value of citrus from a whole food's perspective”

“That citrus is a whole food and the importance of incorporating it into our diet.

“I learned that food is medicine.”

New 'News' on citrus

“To make citrus part of my diet and to talk about it with others.”

“Citruses aren't just high in vitamin C.”

“The angle of not just vitamin c but a matrix of nutrients

“Never knew how and what the amazing citrus fruit really is!!!!.”

“All about citrus foods that I didn't realise was important or valuable.

“How important citrus is to our health, and not to discount it.”

Benefits of citrus

“Citrus also positively effects neurological and cardiovascular health.”

“The overall health benefits that the fruit can provide“

“Explaining how beneficial citrus fruits are in terms of health benefits.”

“Composition of micronutrients and how they benefit individual health outcomes.”

“Reinforcing knowledge e.g. potassium in citrus aiding decrease of blood pressure, increasing cognition, fibre is 50:50 soluble: insoluble..”

Practical tips

“Practical ways of offering help to clients.”

“Loved the simple calls to action to back up the complex information.”

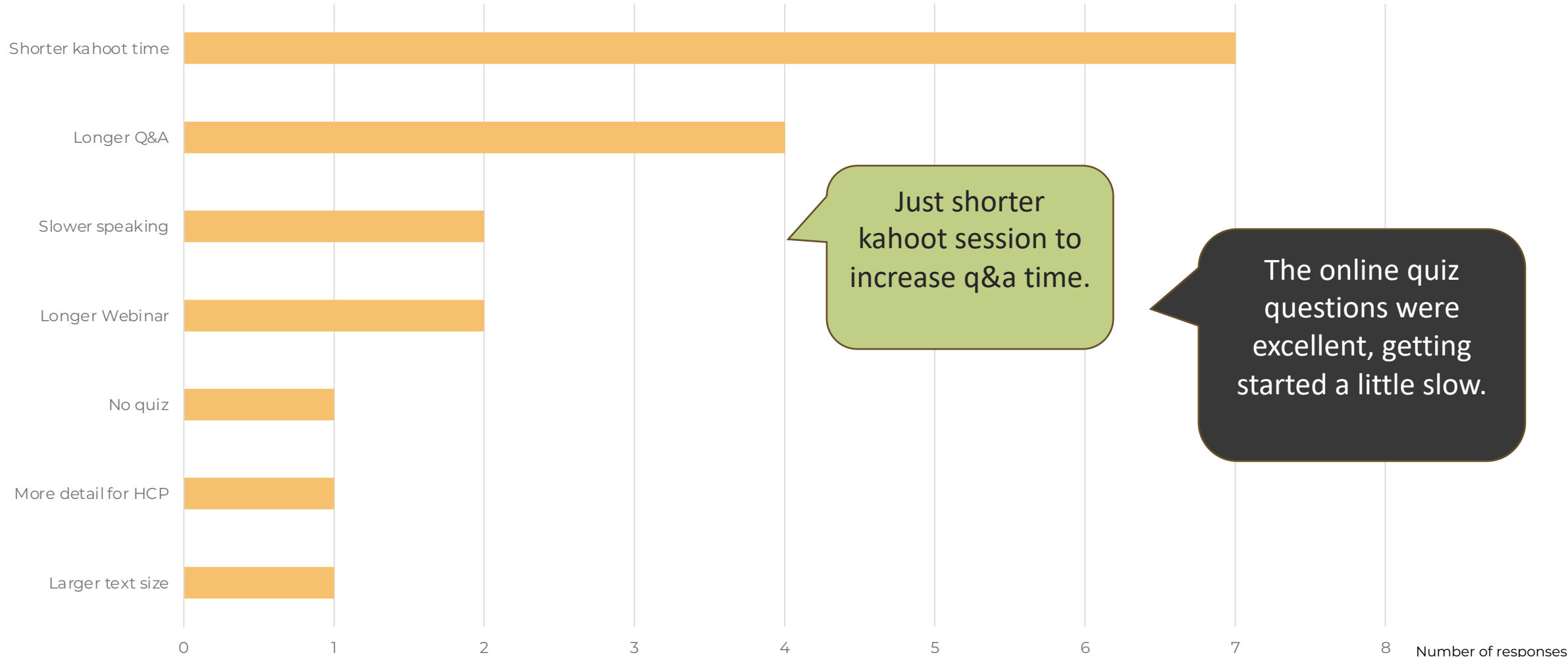
“Discussing how to communicate this information to patients and motivate them to eat citrus foods.”

“Potential uses for the various citrus fruits ”

“Slide on citrus being a unique package - great visual for clinic as well as info.”

What could be improved ?

Overall attendees were happy with the webinar with the **main recommendation to shorten the quiz time**



Nutrition Society Australia Conference

Status: Completed (28th Nov – 1st Dec 2023)

- Oral presentation accepted and delivered
- 120-150 people in attendance.

Positive feedback:

- ✓ Quality of the presentation
- ✓ Importance of the work
- ✓ Call to action to re-think the position of juice in general nutrition recommendations.



Citrus Hub

The screenshot shows the 'Citrus & Health' section of the Citrus Australia website. At the top, there is a navigation bar with the Citrus Australia logo and buttons for 'My Cart' and 'My Profile'. Below the navigation is a large banner image of citrus slices with the text 'Citrus & Health for health care professionals'. A secondary navigation bar lists various topics: Immunity, Brain Health, Heart Health, Client-friendly fact sheet, Recipes, Infographic & Social media files, and Webinar. Below this is a search bar with the text 'Stay updated on citrus science, evidence-based resources, and new recipes'. The main content area features a section titled 'More to C in Citrus' with a sub-header 'Citrus Flute (orange, mandarin, lemons, limes and grapefruit) have a natural boost in nutrients, so called vitamin C'. To the right of this text is a photograph of a woman smiling and holding two orange slices up to her eyes. The overall design is clean and professional, using a color palette of greens, oranges, and whites.



UPCOMING OUTPUTS



Digital activation

Aim: Drive awareness of resources and citrus hub on 'More to C in Citrus' Campaign

Status: Activity planned Feb 2024

- HP Channel advertising - Dietitian Connection (DC), Australian Practice Nurse Association (APNA), Australian Natural Therapist Association (ANTA)
- 4 week paid and organic social media campaign targeting HP
- HP KOL influencers paid posts – driving experiences of hub with followers.



Juice activations

Video animation: April 2024

Juice Infographic: April 2024

FOODiQ hosted webinar: May 2024

➤ **Target:** Dietitians, Practice nurses

AUSActive webinar: May 2024

➤ **Target:** Fitness professionals

Digital Activation Outreach: June 2024

➤ **Target:** All HCPs

Dietitian Australia Conference: August 2024

➤ **Target:** Dietitians

Juicy Myths

- “More to **See** than **Sugar**”
- Umbrella review science
- Leverage the goodness of citrus fruits
 - Bioactive profile & mechanisms
 - Myth-busting
 - Citrus juice types



Video examples

Australian Berries
**Nourish the gut,
feed the brain**



© 2014 Australian Berry Growers Association



Webinars

FOODiX Global Juice Webinar

- Engage a variety of HCPs on Juice messaging
- Reinforce citrus messaging from previous webinar

AusActive Webinar:

- Engage fitness professionals on juice and citrus messaging in a directed context



Considerations

Potential Delay publication Umbrella Review 100% Juice

CT2100

- Reviewer comments received and addressed, and manuscript resubmitted.
- Activations timings being needed to be pushed back if manuscript delayed in being accepted for publication..



FEEDBACK & DISCUSSION



Minutes

- Members supportive of strategic approach to messaging for the juice phase.
- While being 'mythbusting' in essence, comms will be in a positive, credible tone and not defensive. It will be landing a new impactful and credible story for juice that will lead HCP to rethink their knowledge and biases.
- While sugar is not a key focus or message, we will not shy away from it. It will be an opportunity to provide the context of the sugar in 100% juice in terms of the company it naturally keeps and it's ability to drive intake of it (and other foods) via its delicious enjoyable taste.
- Olivia noted to ensure that there is still new news in fibre in citrus, particularly the soluble fibre story.
- Alan noted that definition for added sugars changes by FSANZ in November 2023, and inability for juice to make no added sugar claim.
- Members agreed that shorter animation/videos best than longer 2 minute type. Aim for 2 x 30 second videos.



THANK YOU!

-  @foodiqglobal
-  foodiqglobal
-  foodiqglobal
-  info@foodiq.global
-  www.foodiq.global

FOODiQ
global



CT21006: PRG Meeting 4

PROJECT REVIEW

September 2024



Agenda

1. Project overview
2. Project review
3. Impact
4. Key learnings
5. Recommendations
6. Discussion



PROJECT Overview



THE PROJECT: CT21006

Supports the **Strategic Investment Plan** of the Citrus Fund to increase domestic consumption of **Australian Citrus**.

End of project outcomes:

1. Increase HP awareness of nutrition & health benefits of citrus and its juices.
2. Increase HP who can accurately identify the nutrition & health benefits of citrus and its juices.
3. Increase in HPs confidence in discussing the health benefits of citrus.
4. Increase in HPs confidence in correcting misinformation on citrus and 100% citrus juice.

THE PROJECT: CT21006

Intermediate outcomes:

1. Creation of Citrus HCP database.
2. Development of robust strategic project plan.
3. Baseline understanding of HCP current perceptions and attitudes to citrus & health.
4. Hort Innovation's and Citrus Australia digital platforms updated with the most contemporary research and resources.
5. HCP dedicated webpage created for Citrus Australia in year 1 and maintained throughout the remainder of the project.
6. $\geq 50\%$ HCPs aware of resource availability on citrus HCP dedicated webpage.
7. $\geq 50\%$ HCPs utilising or intending to utilise resources.
8. $\geq 80\%$ HCPs who use resources reporting that they find them useful.
9. Industry kept up to date on project.

iQ³ Strategic Plan Project Start



Messaging: The ‘What’

The problem

How to get healthcare professionals to recommend and support consumption of citrus fruits and its juices?

Objectives

1. Awareness & identification of citrus fruits nutrition & health benefits.
2. Increasing confidence in discussing health benefits of citrus fruit.

1. Awareness & identification of citrus juice nutrition & health benefits
2. Increase confidence in correcting misinformation on citrus juice.

Primary messaging

1. Citrus as Medicine (Citrus fruit)

- “More to C in Citrus”
- Make citrus top of mind again
- Leverage vit C credentials
- Outstanding matrix of nutrients & bioactives
- Bioactive superfood, highest in flavanones
- Supports immunity, CVD, brain health

2. Juicy Myths (Citrus juices)

- “More to See than Sugar”
- Umbrella review science
- Leverage the goodness of citrus fruits
- Bioactive profile & mechanisms
 - Myth-busting

Secondary messaging

3. Engage & inspire with culinary cues, practical tips & refreshing recipes

4. Leverage sustainability facts: Nature’s perfect package



Audience & Timings

Campaign Focus	Citrus as Medicine			Juicy Myths		
Unique Audience Segments	1. Nutrition & Dietetics Community	2. Medical Profession	3. Holistic Wellness	1. Nutrition & Dietetics Community	2. Medical Profession	4. Fitness Industry
Audience subset – Key Area of Practice	Dietitian influencers & in Private Practice, Academia & Food Comms	Practice Nurses	Naturopaths Nutritionists	Dietitians in Private Practice, Academia & Food Comms	Practice Nurses	Personal Trainers
Timings	March - December 2023			November 2023 - July 2024		



Where are we at?

Year 1

Strategy
Collateral development

Year 2

Communication
Education

- ✓ Baseline research
- ✓ iQ³ Strategy
-
- ✓ Australian Citrus Health Webpage
- ✓ 4 x Factsheets
- ✓ DA Conference presentation

- ✓ Citrus fruit infographic
- ✓ Webinar (Citrus)
- ✓ NSA presentation
-
- ✓ Juice infographic
- ✓ Citrus 100% juice videos
- ✓ Webinar (Juice)
- ✓ AUSactive Webinar (Juice)
- ✓ Digital Reach Campaign



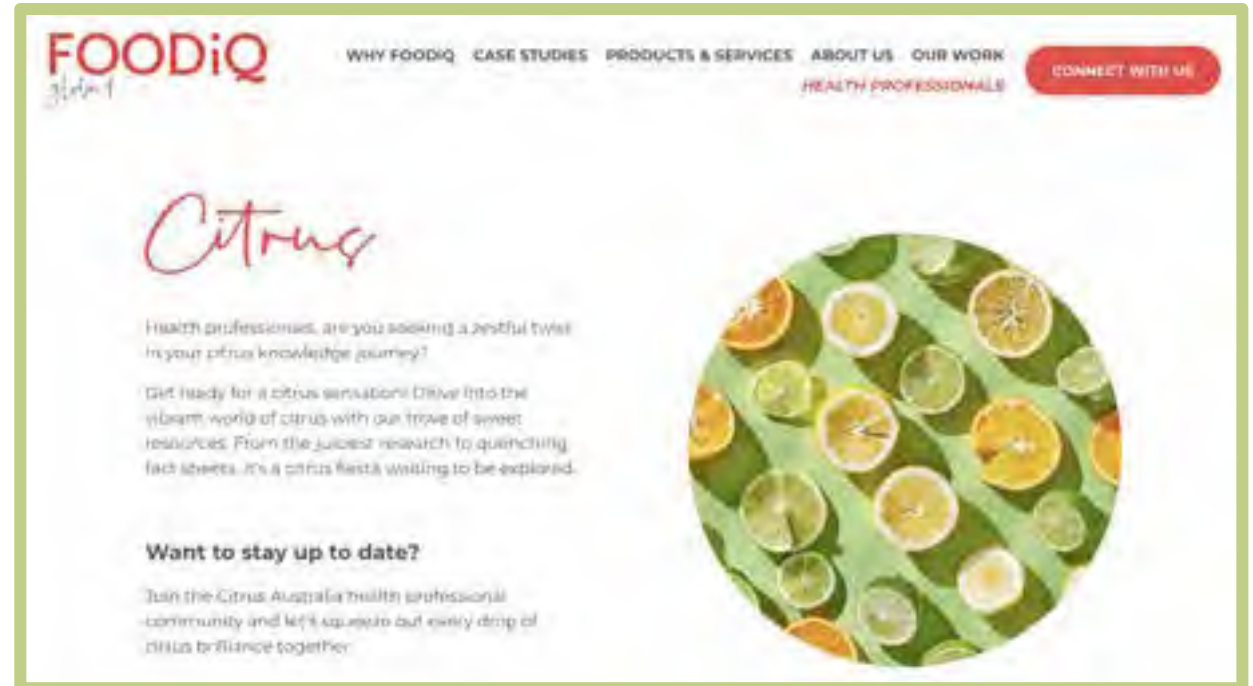


PROJECT

Deliverables



Citrus HP Hub Resource Repository



Science support (CT21004) and ABCL Outputs leveraged in juice comms



Umbrella Review

Research on the health effects

Role: Evidence base to support juice myth-busting comms in year 2



Infographic & FAQ

Support materials for publication

Role: Easy to digest translation of the publication to communicate key take-aways



White paper

Expert consideration 100% juice modern dietary ADG

Role: Advocacy & credibility for key messages



Factsheets and Webinars to educate on latest science



Factsheets on Citrus & brain health, immunity and heart health.



Webinar: Is Citrus the forgotten affordable superfood?



Webinar: Is it time for a refresh on juice?



Webinar: Unravelling the juice myth.



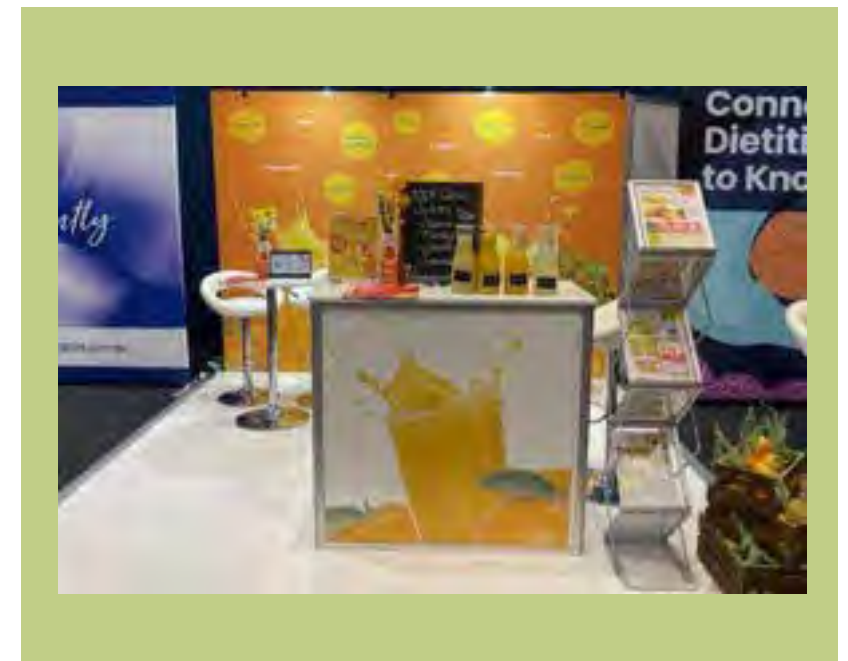
Conferences to disseminate the science & educate



DA 2023: Oral presentation on Umbrella Review



NSA 2023: Oral presentation on Umbrella Review



DA 2024: Trade display to develop juice ambassadors

Videos to communicate key messages



**100% Juice & Health
Research summary**



**What people say vs
What the science says**



**What's in a glass of juice?
Turning fruit into juice**

Client friendly comms

Citrus Fruits

MORE THAN JUST VITAMIN C

What's INSIDE citrus fruits?
All citrus fruits contain health promoting bioactive compounds, essential nutrients, and fiber!

It is this unique, whole fruit package that delivers health benefits, as part of a balanced diet.

ESSENTIAL NUTRIENTS
Citrus fruits are rich in Vitamin C, potassium, and fiber.

PHYTOCHEMICALS
A collection of natural plant compounds that have health benefits. They're also called "phytonutrients".

BIOMIMETIC
Natural compounds that are mimicked by the body, usually through diet and lifestyle choices. Some of these compounds are responsible for the health benefits of citrus fruits.

3 REASONS to eat more CITRUS

IMMUNITY	JOINT HEALTH	BRAIN HEALTH
<p>Supports and/or enhances immune system function to support the functioning of the immune system.</p> <p>Supports skin health to reduce skin issues of the immune system.</p> <p>Supports bone health to reduce the risk of osteoporosis.</p>	<p>Reduces inflammation and pain, allowing the body to repair the joint and cartilage.</p> <p>Supports bone health to reduce the risk of osteoporosis.</p> <p>Supports bone health to reduce the risk of osteoporosis.</p>	<p>Reduces inflammation and oxidative stress to support brain health.</p> <p>Supports brain health to reduce the risk of cognitive decline.</p> <p>Supports brain health to reduce the risk of cognitive decline.</p>

Client factsheet

More to 'c' IN CITRUS

Long known for their vitamin C content, modern nutritional research shows there is much more to citrus than just vitamin C.

WHAT'S INSIDE CITRUS?
VITAMIN C, FIBER, POTASSIUM, FLAVONOIDS, PHENOLIC COMPOUNDS, AND OTHER BIOMIMETIC COMPOUNDS.

THE UNIQUE CITRUS PACKAGE
VITAMIN C, FIBER, POTASSIUM, FLAVONOIDS, PHENOLIC COMPOUNDS, AND OTHER BIOMIMETIC COMPOUNDS.

BIOMIMETIC
Natural compounds that are mimicked by the body, usually through diet and lifestyle choices. Some of these compounds are responsible for the health benefits of citrus fruits.

Metabolizing SYNERGY IN CITRUS
The synergistic effect of the various compounds in citrus fruits is what makes them so effective.

CITRUSLY DELICIOUS IDEAS
In addition to whole fruit:

The many HEALTH BENEFITS OF CITRUS

ADD TO CITRUS AT LEAST 3 TIMES A WEEK AS PART OF A BALANCED DIET.

Infographics

100% CITRUS JUICE: More to see than sugars

Supports immunity and helps you see best to help support the body's natural ability to fight off disease.

THE EVOLVING SCIENCE
100% citrus juice has HEALTH BENEFITS.

WHAT'S INSIDE 100% CITRUS JUICE?
VITAMIN C, FIBER, POTASSIUM, FLAVONOIDS, PHENOLIC COMPOUNDS, AND OTHER BIOMIMETIC COMPOUNDS.

100% CITRUS JUICE IS COMMONLY MISUNDERSTOOD
100% citrus juice is not just a source of sugar. It is a source of many health benefits.

HOW TO CHOOSE 100% CITRUS JUICE
Look for 100% citrus juice with no added sugars.

Digital activation – Channel comms

Dietitian Connection

FREE citrus factsheets, recipes & more!

Citrus fruits have a famous place in nutrition theory due to their high vitamin C content. Opening up to nearly 100 different varieties of citrus fruits that is a lot more to think about than vitamin C.

The most common citrus offers a unique nutrient package that delivers benefits to brain health, cognition, immunity and heart health. Utilise your knowledge and stay at the forefront with a talk of evidence-based research by you and your clients on the ultimate 'Tangerine Superfood' at the Citrus & Health Hub.

Supporting your practice

ACCESS CITRUS HERE >

Australian Practice Nurses Association

Free webinar: Is citrus the affordable superfood?

Elevate your health and nutrition knowledge with this informative webinar! Join experts Professor Linda Teasell and Dr. Emma Beckett in exploring the wonders of citrus fruits, food synergy, and detoxifiers. Learn about two of the hottest topics in nutrition.

Want to help your patients with healthy eating?

Citrus fruits are well known for vitamin C, but there's more to the story. Citrus has a range of benefits from immunity to brain and cardiovascular health. Stay informed with evidence-backed resources at the Citrus & Health Hub.

Access free resources and latest research on the affordable and accessible 'Tangerine Superfood'!

Register here (Free)

Access here

Australian Natural Therapists Association

It's your choice... Naturally

ANTA eNews

ANTA eNews #1 | Citrus for Health: Immunity, Brain Health

ANTA eNews #100 | February 2024

Citrus fruits are abundant with key vitamins for boosted immunity, a strong antioxidant you might not expect to see, and the good they are for health. The science of citrus has come a long way from your grandma's orange.

AUSactive

It's your choice... Naturally

Are you confused over the role of 100% juice for health?

The position of 100% juice in healthy eating guidelines has been controversial, but latest scientific evidence says we need to look past the sugar content to understand the health benefits.

Science update: How healthy is 100% juice?

100% CITRUS JUICE: How healthy is it?

Globally, the position of 100% juice in dietary guidelines varies greatly. In this **Scientific & Practical Webinar** with Dr. Arvind Padayathie, Nicole Senior and Tim Cassellan, facilitated by Dr. Emma Beckett from FOODIQ global, you'll learn the latest science from a recent umbrella review on 100% juice and health effects. **Watch the webinar recording on the Citrus Health Evidence Hub**, where you can also explore client resources, recipes and fact sheets like this 100% Citrus Juice. More to see than sugar infographic.

WATCH THE RECORDING HERE >

Supported by First Innovation Citrus Group

THE EVOLVING SCIENCE on 100% citrus juice

"Having seen an abundance of 100% juice use and exposure by the general population, evidence 'hasn't kept up'."

Time for a REFRESH on 100% juice?

Latest research concludes that recommendations to avoid 100% juice are not supported by the current available evidence. It highlights we need to look beyond the sugar content to understand the health effects of 100% juice.

Unravelling the juice myth!

Are you confused over the role of 100% juice for health?

Watch the webinar here

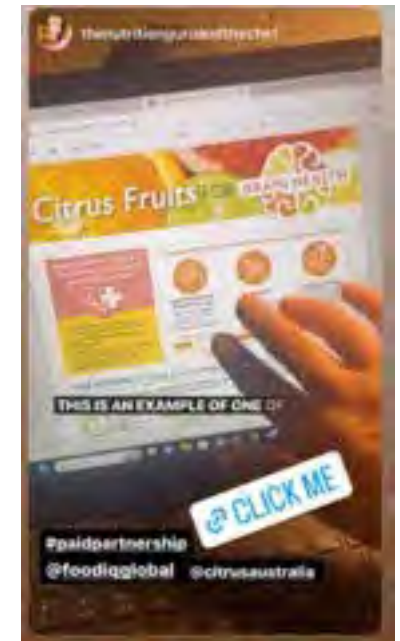
Digital activation – social media



Digital activation – social media



Digital activation – KOL Influencer



Key deliverables: and inter-connections

Educational events:

Conferences & Webinars to Seed juice Science to Academia & Educate clinicians on benefits citrus & its juices



Dietitian Australia Conference
July 2023 Umbrella review Abstract
2024: Juice focus trade display



Webinar Nov 2023 Dietitians, Naturopaths, Practice Nurses



Nutrition Society Australia Conference
2024: Present Juice SLR



Drive attendees to hub & database

Web-page:

Citrus Digital Hub – Nutrition & Health Section as central information repository



Resources:

- 2 x **Infographics** – Citrus as medicine, Juicy myths
- 3 x **HCP Factsheets**: Immunity, CVD, Gut health
- 1 x **Consumer Factsheet**: Citrus as medicine
- **Video** (2min)
- **Webinar recordings**: Citrus as Medicine, Juicy Myths
- **Social media pack** Static tiles, recipe stop motion reel

Educate, disseminate resources, drive to citrus hub

Digital Outreach Campaign to drive awareness hub/resources/ events & database acquisition



Build Database of subscribers



HCP Influencers



4+ x **EDMs** to owned Citrus HCP database



FOODiQ
global

IMPACT



Current HCP database more than double planned



Educational Activities - Summary

	Audience	Event 'Excellent or Very good' Overall	Event Useful	Event Engaging	Informative	Learnt something new
FOODiQ Webinar (Citrus Fruit)	381 [^] (102 live) 310 views	100%*	100%*	97%	100%	NA
FOODiQ Webinar (Citrus Juice)	368 [^] (105 live) 345 views	89%*	94%*	97%	100%	100%
AUSactive Webinar	135 [^] (75 live) 67 views	89%*	95%*	98%	100%	100%
Dietitian Australia Conference						

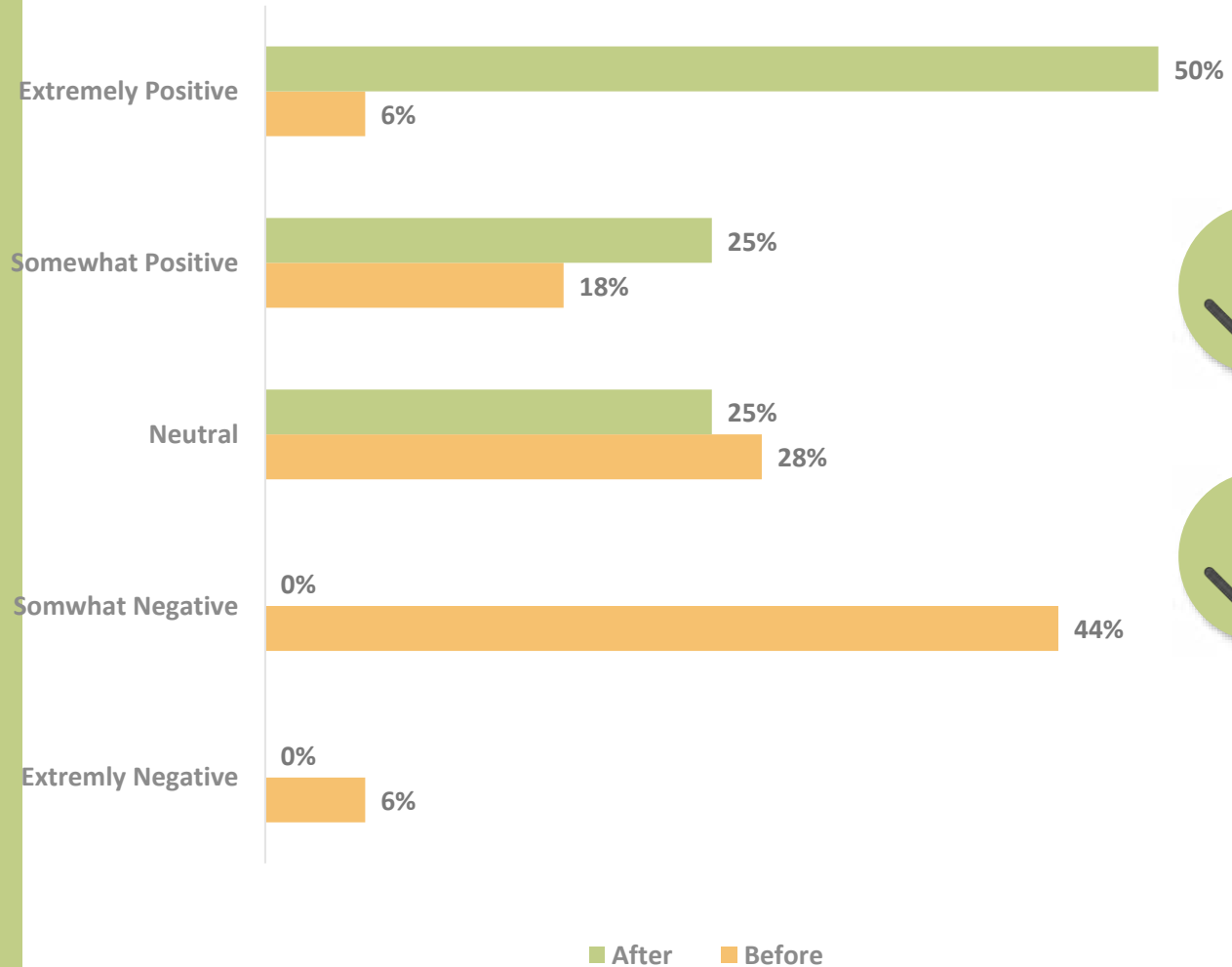
[^]KPI = 200 register * Target = >90%



Positive shifts in attitudes

“Brilliant - great overview & challenged my thinking with latest evidence.”

“Reframed my opinion on juices and how they can be a part of a balanced diet.”



50% negative before vs. 0% after webinar.



10-fold increase in those 'extremely positive' (5% vs. 50%)

Opinion of 100% juice before and after webinar



In person discussions with **key stakeholders**



- Exhibition at the 2024 Dietitians Australia conference, Brisbane.
- 585 delegates & 350 resources handed out.
- 6+ hours of 1:1 conversations on 100% juice benefits, including Chair of the ADG Expert Committee.



Thought leadership getting traction



Gift Awakessien · 3rd+ ·

Nutrition Educator | Clinical Nutritionist (CEO Edwellness) Weig...
11mo · 🌐

Follow

Finally, we can end this debate credibly. All facts checked. Well done [Tim Cassettari](#), the outcome of this study made me so happy. One thing we need to learn as Nutrition professionals is to avoid using the word "avoid" when it comes to food. Good and Bad is embedded in everything though not in equal percentages and this is why moderation is key.



Joanna Becker- Hawkins · 2nd

(She/Her) · 2nd

Scientific & Regulatory Affairs Senior S...

1mo · 🌐

I think this is a great bit of research and reminds us to keep challenging the status quo.



Robyn Hodge

(She/Her) · 1st

Senior Food Regulatory Manager

1y · 🌐

Thanks Tim - I'm off to get a glass of juice ...



Kirsten Smith

(She/Her) · 3rd+

Business Support Specialist, St...

1y · 🌐

Not only is nutrition no exception to our default of simple systems thinking, but it is rife with it! After 6 years studying human nutrition and food science, I realised that it would take a lifetime to come close to understanding the complexities of how food is used by our bodies (and then that understanding would be turned on its head by new research!). Thanks for such a thought-provoking post!



Dr Sanya (Jenny) (She/Her) · 2nd

Career Hospital Doctor | Public Health p...

1mo · 🌐

Well said! There have been lot many misconceptions about drinking juice and here you go! Well researched information has been projected.



Solid social media results

	Impressions	Reach	Total clicks	Av CTR%	Sign up database
Social media (HP) Fruit	53,888	25,745	1531	2.8%	10
Social Media (HP) Juice myth-bust	162,000	60,852	1618	3.3%	30
	Video play	Watches 50%	Watches 100%		
Animation	84,650	77,669	54,753		





Channel results – 120K emails sent

	Audience	Open rate %	Reach	Total clicks	CTR %	
DC– Citrus Hub	11,937	40%	4789	103	2%	Below average
DC Juice Myth-bust	12,223	46%	5624	587	10.4%	Above average
ANTA– Citrus Hub	7000	28%	1931	208	10.8%	Average
APNA- webinar	29,619	31%	9184	140	1.5%	Average
APNA- Citrus hub	29,631	30%	8746	162	1.9%	Average
APNA- juice myth-bust	20,255	29%	8489	353	4.1%	Above average
AUSActive EDM – Juice myth-bust	10,000	49%	4900	111	2.3%	Average
		Total Reach	43,663	1664		

KPI: >80,000 emails delivered to HCPs, >25% open rate

DC = Dietitian Connection ANTA = Australian Natural Therapist Association. APNA = Australian Practice Nurse Association. CTR = click through rate

Juice EDMs topped the open rate targets

	Topic	Date sent	Open rate
EDM 1*	FOODiQ DB Recruit	20 th January 2023	46.7%
EDM 2*	Immunity Factsheet	28 th June 2023	23%
EDM 3	Brain health factsheet	22 nd July 2023	17%
EDM 4	Heart health Factsheet	29 th September 2023	19%
EDM 5*	Webinar 1 recruit	8 th November 2023	20%
EDM 6	Webinar recording	8 th November 2023	58%
EDM 7	Webinar 2 recruit/Juice paper	29 th May 2024	35%
EDM 8	Webinar recording	7 th June 2024	64%
EDM 9	Juice resources/animations	6 th August 2024	71%
EDM 10	ASR	23 August 2024	70%

*EDM sent to FOODiQ database. Open Rate Target = >25%





Audience Sentiment Survey

Project end

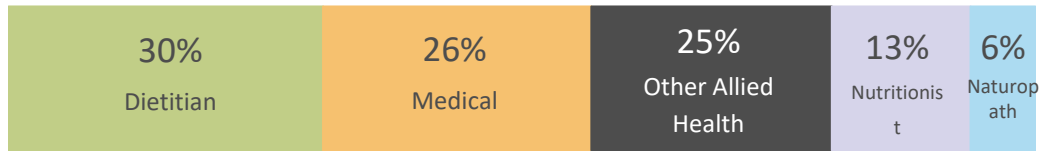


Survey statistics

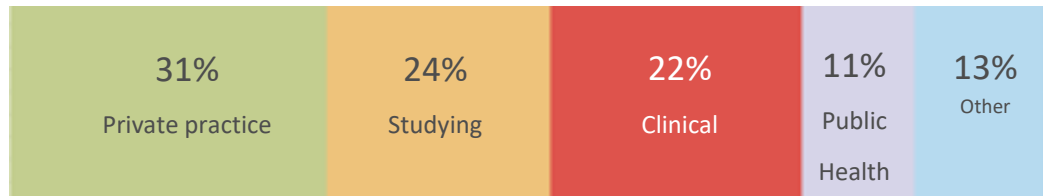
615 click throughs → 227 eligible HP responses



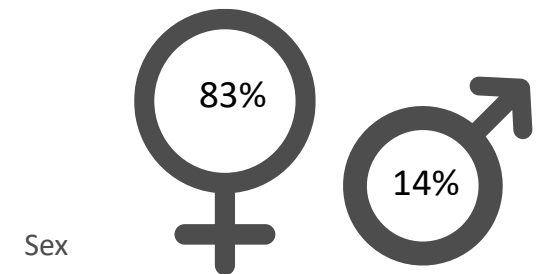
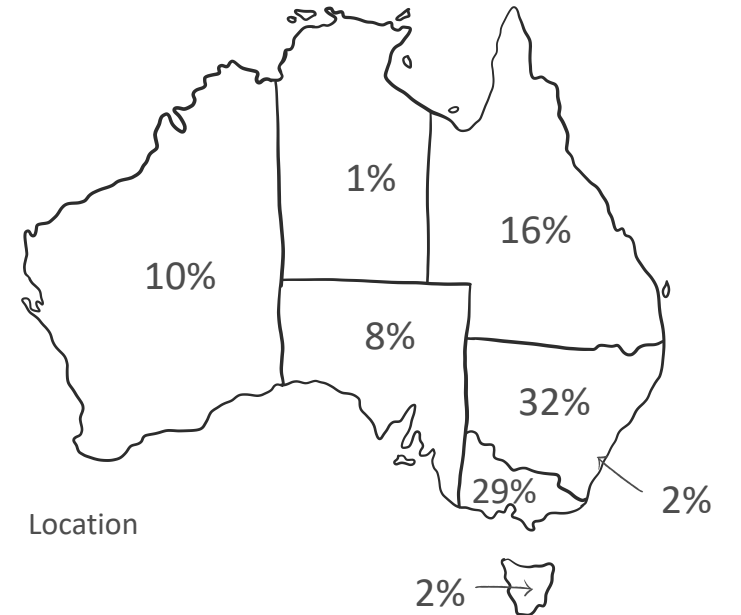
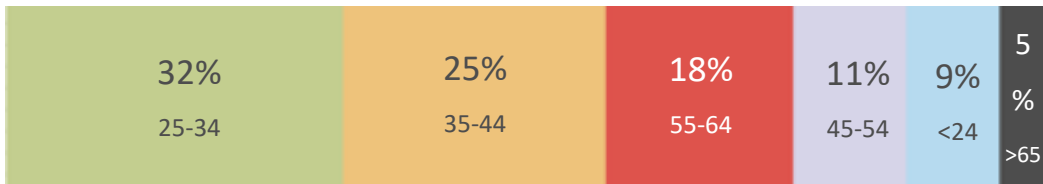
Profession



Practice area



Age



Resource access & usefulness



23% of participants had accessed the Citrus Hub resources.

Target: 50%



96% of participants that accessed the FOODiQ Citrus Hub resources found them useful. Target: 80%

- 34% very useful and I would like more
- 28% very useful
- 20% useful
- 13% somewhat useful



of those who accessed resources would like more.



What do health professionals think of the resources?



I have printed a couple out for display in our clinic waiting room as a break from the bleak purely 'get this done now' type messages.

I find it to be very informative and helpful, as well as educational.

Simple, Clear and precise, well researched, scientific & evidence based.

Well presented, engaging, provides a concise way to discuss with clients.

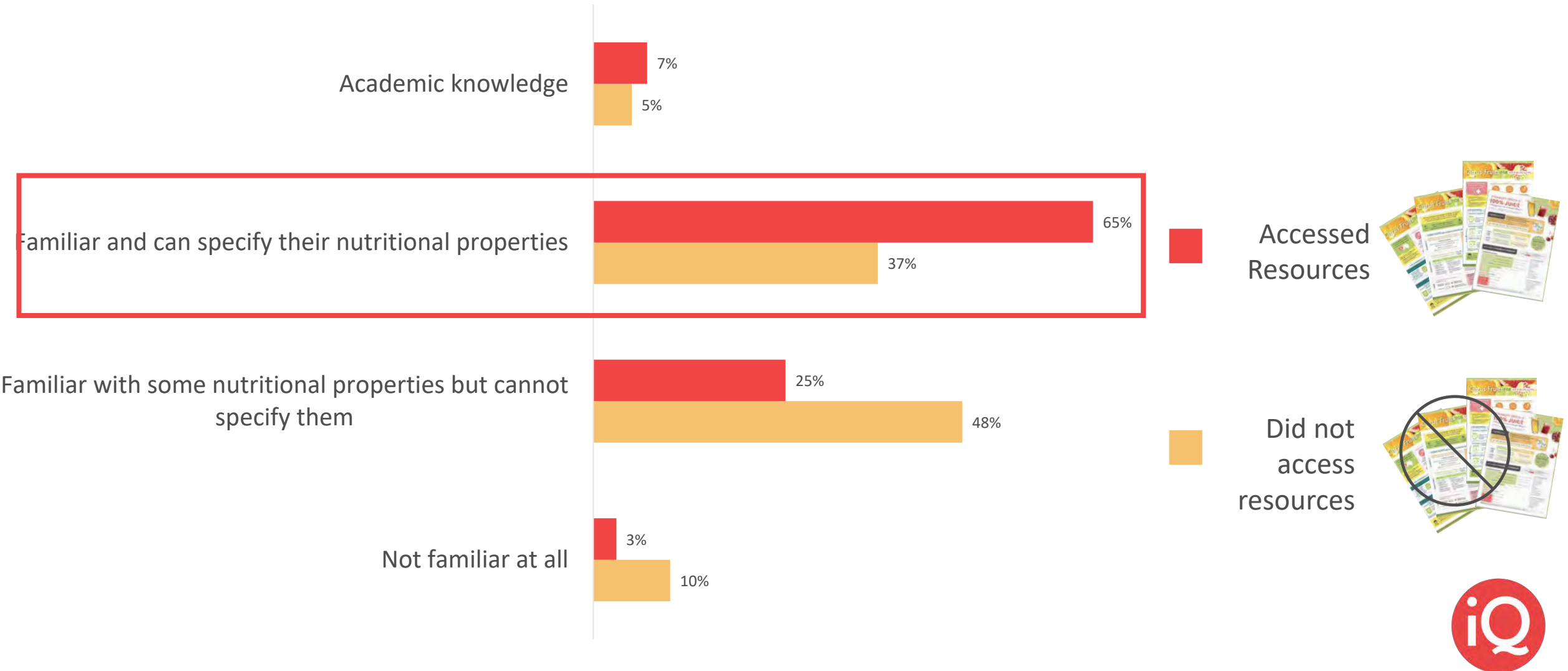
Great information and great design.



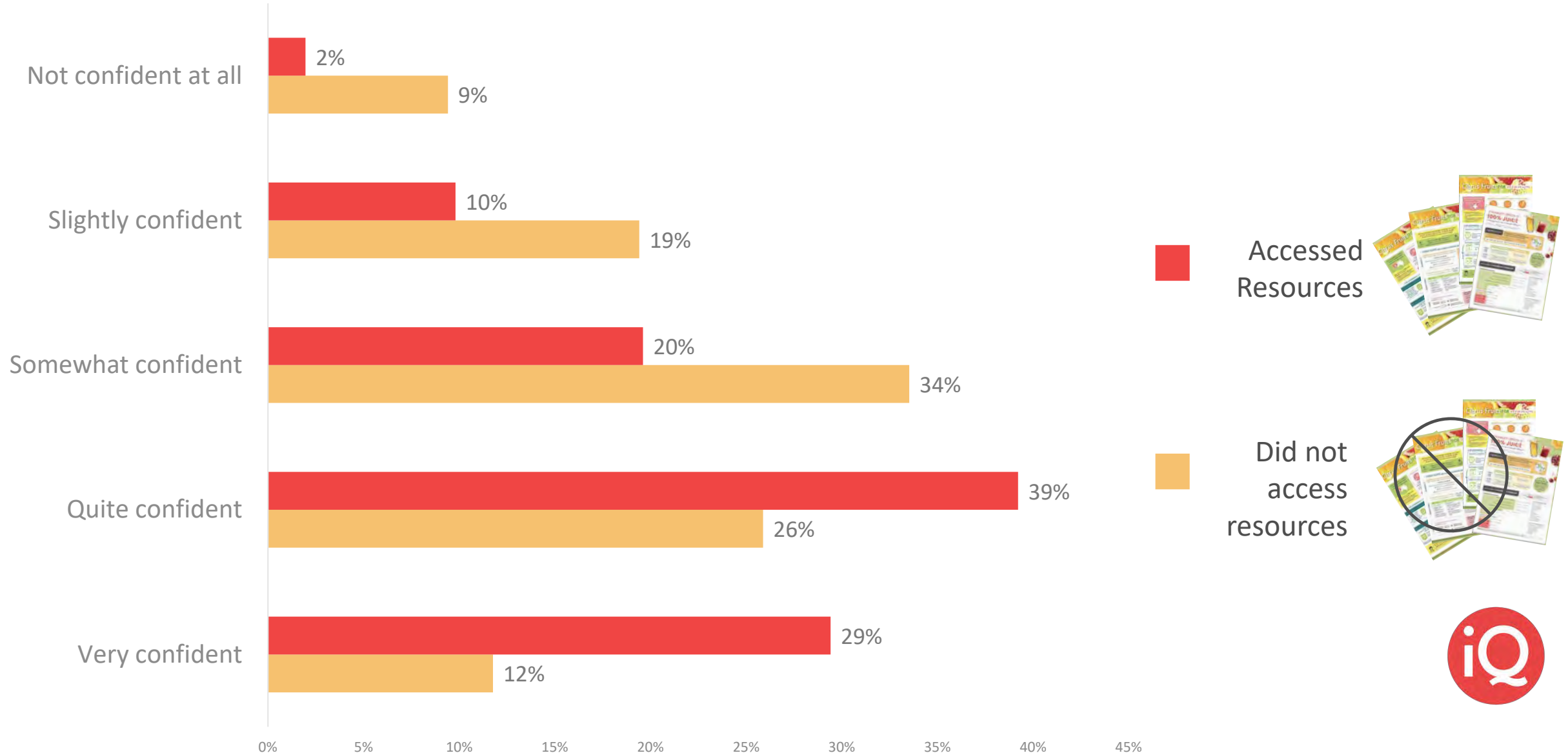
Results Citrus fruit



Increased awareness in nutrition benefits

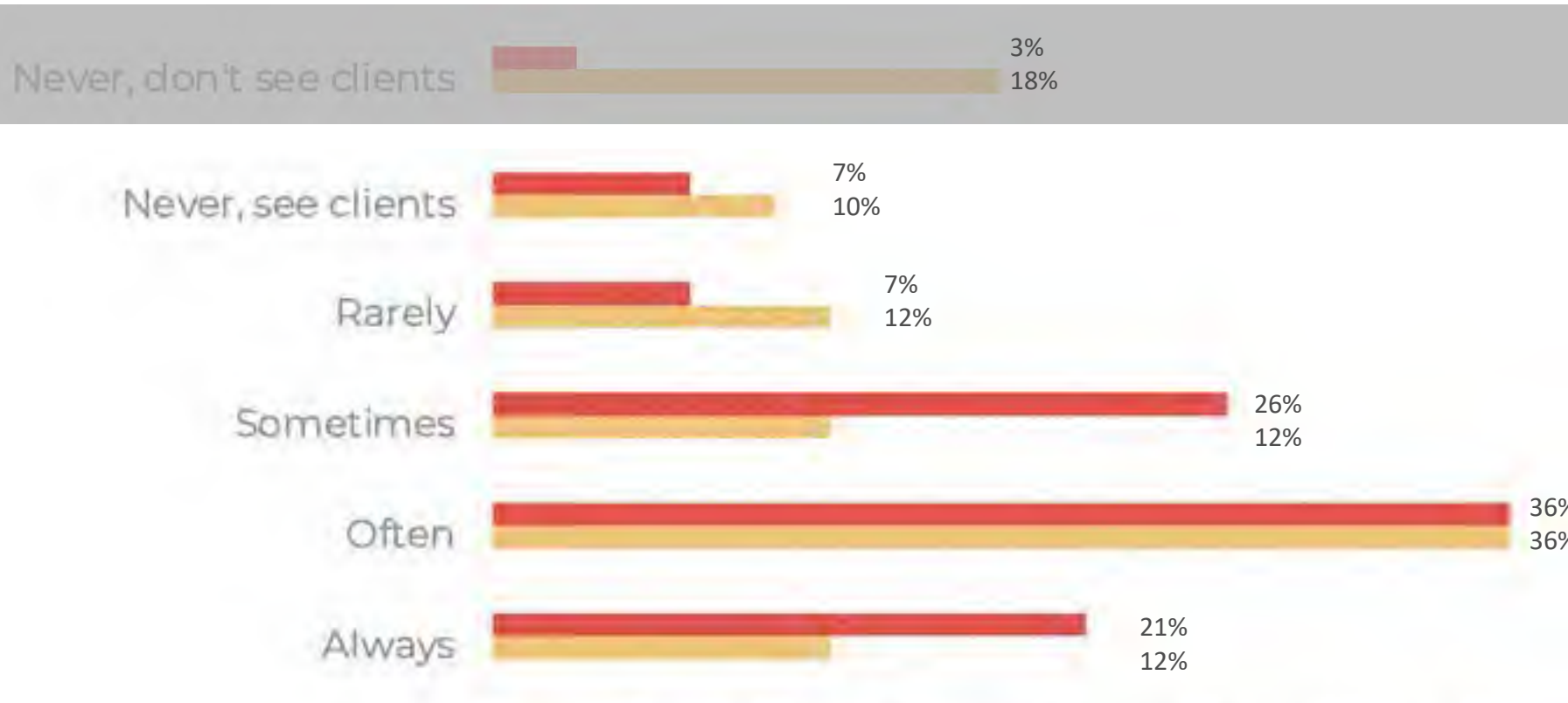


Increased confidence in discussing citrus nutrition and health benefits.



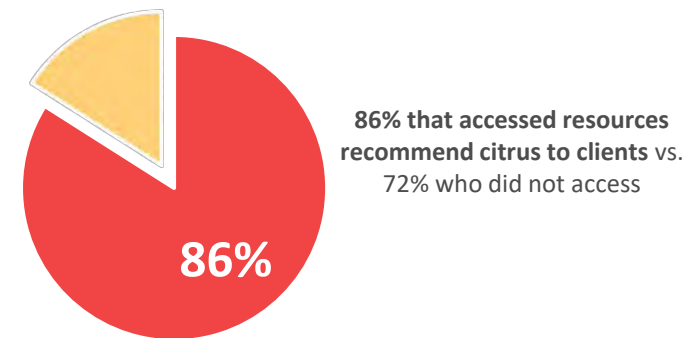
More likely to recommend citrus

Which statement **best describes** how often you **specifically recommend citrus** to your clients or patients?



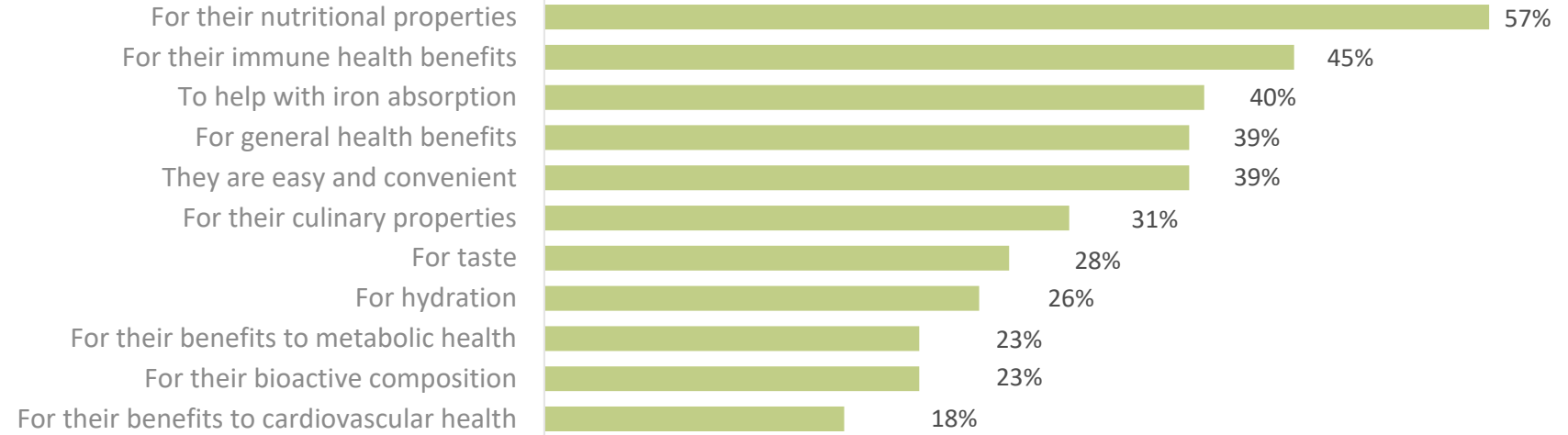
Accessed Resources

Did not access resources

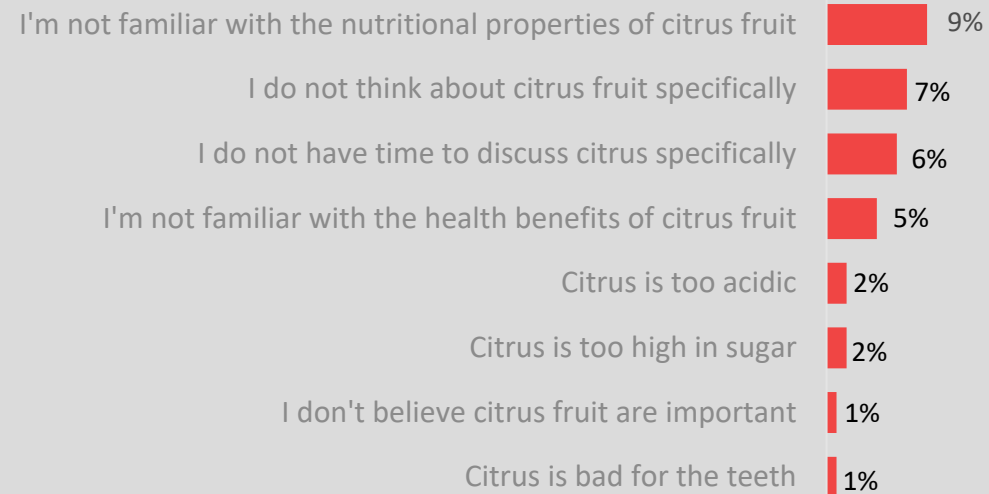




DRIVERS FOR RECOMMENDING CITRUS



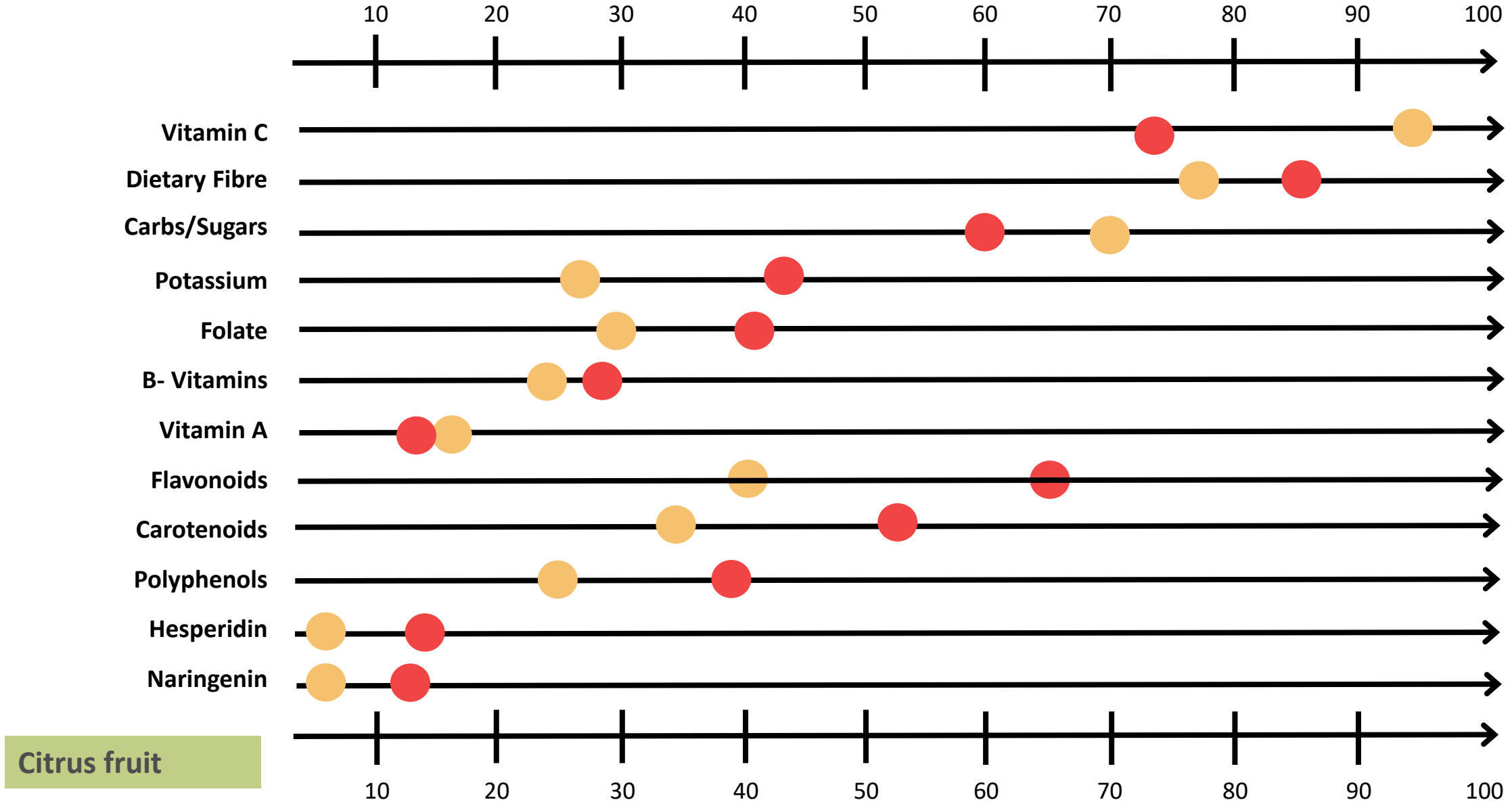
BARRIERS TO RECOMMENDING CITRUS



% of total respondents

Nutrient knowledge **increased**

● Didn't access ● Accessed



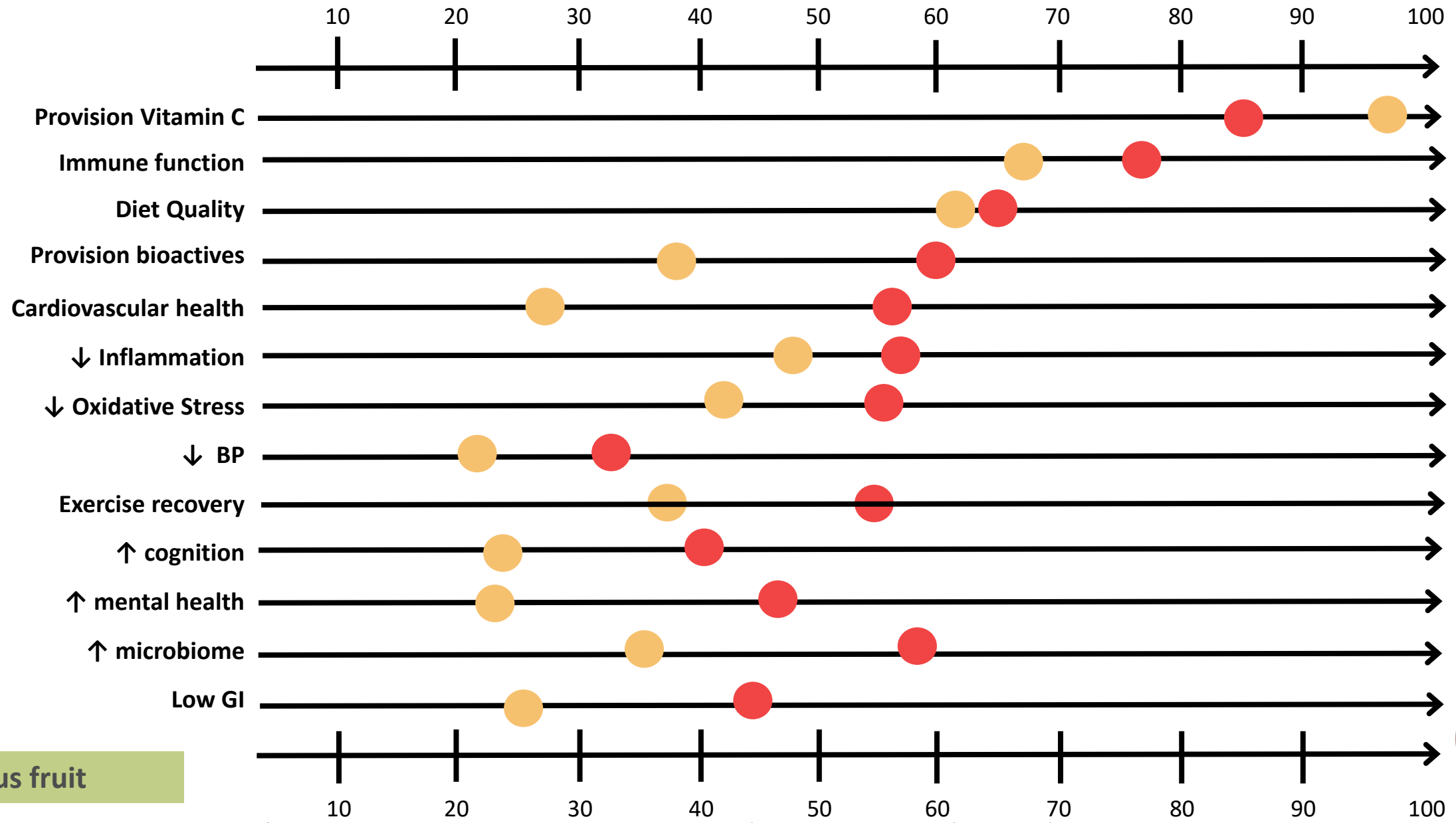
Citrus fruit



% of respondents at baseline and project end (Accessed vs Didn't access)

Health knowledge **increased**

● Didn't access ● Accessed



Citrus fruit



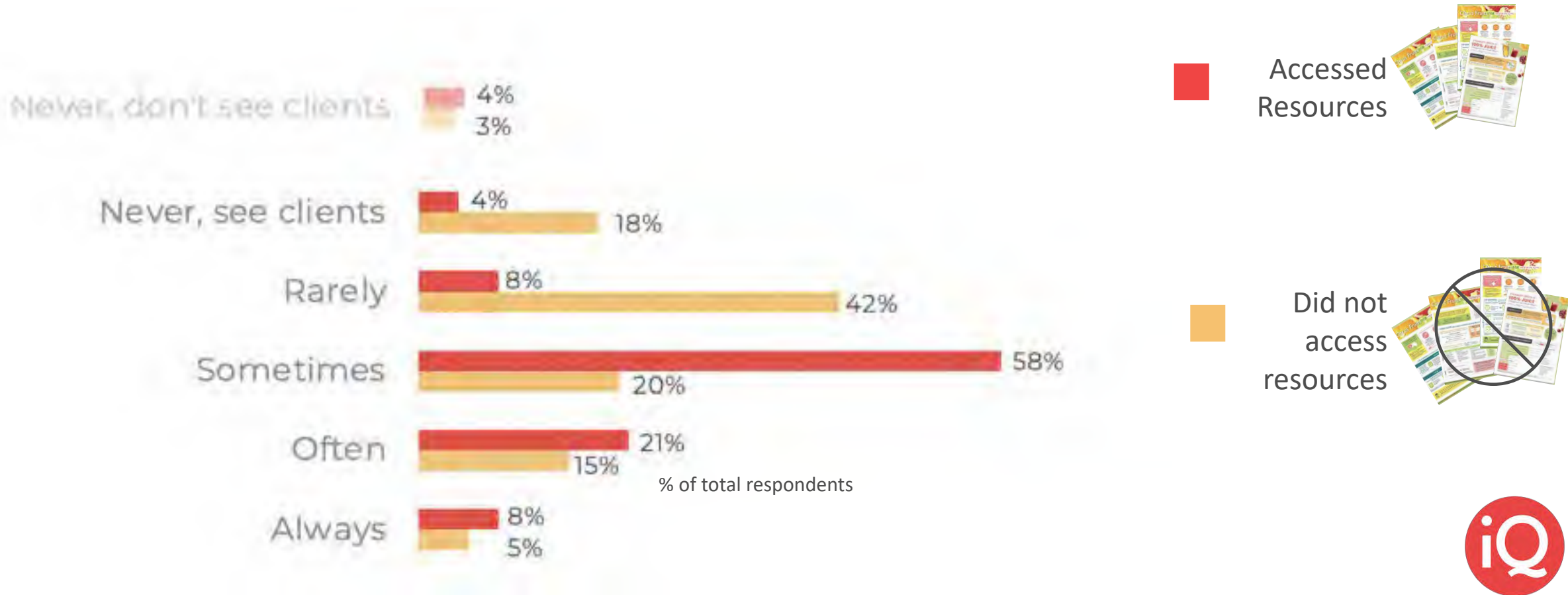
% of respondents at baseline and project end (Accessed vs Didn't access)

Results Citrus juice

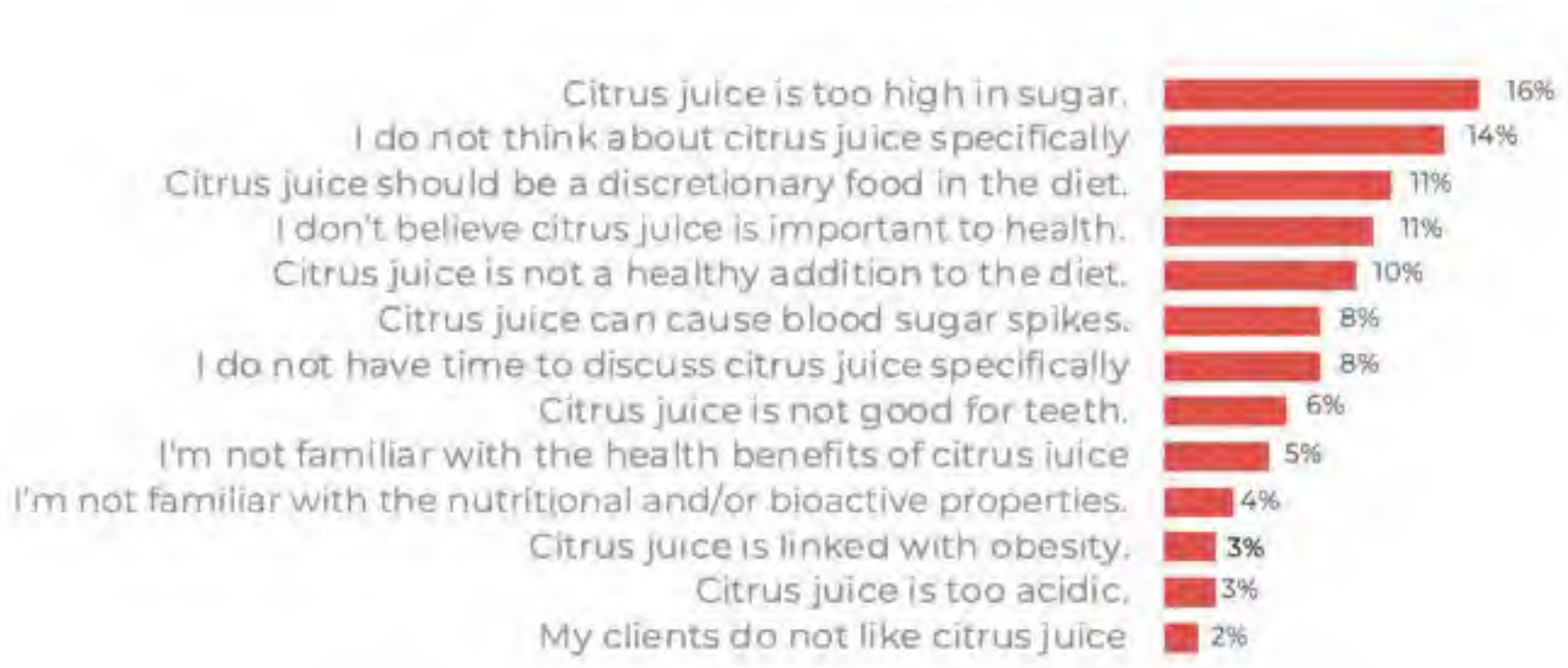


Over **two times** more likely to recommend juice.

Which statement **best describes** how often you **specifically recommend citrus juice** to your clients or patients?



Perceived **high sugar** content is **the top barrier** to recommendation.

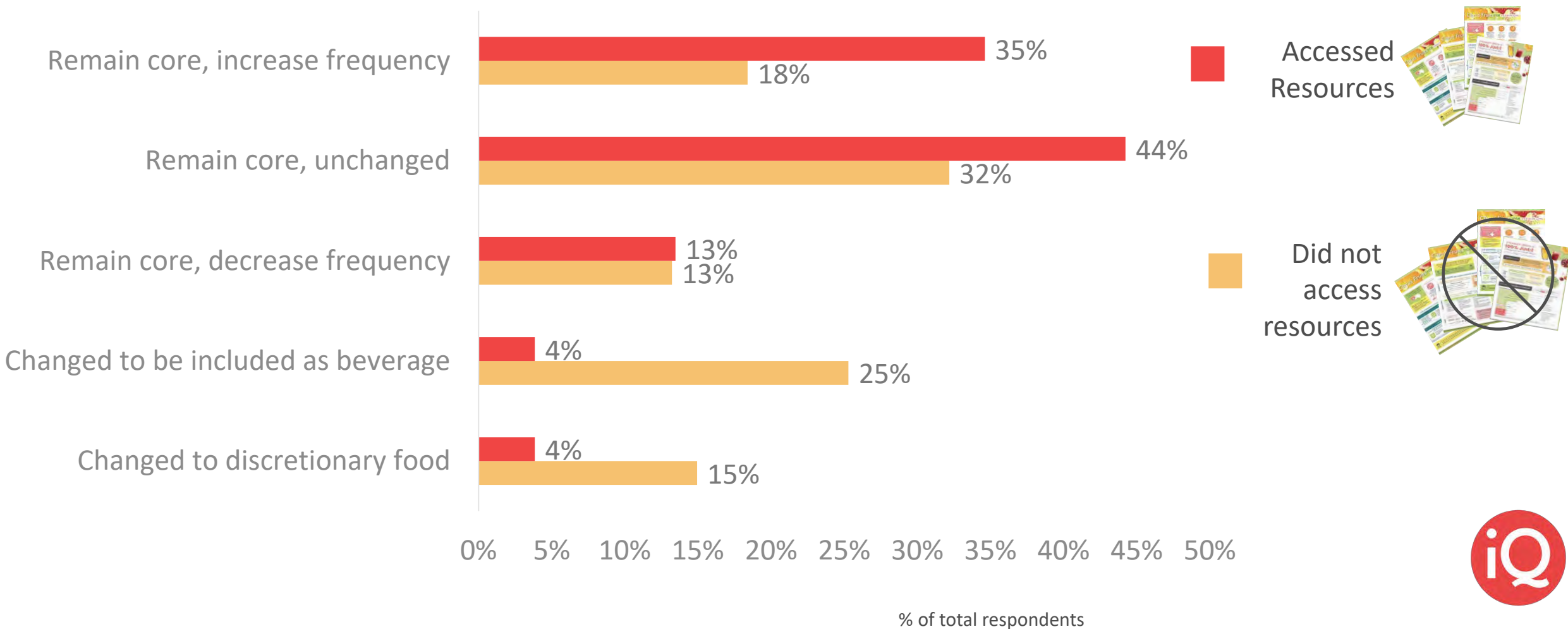


BARRIERS TO RECOMMENDING CITRUS JUICE



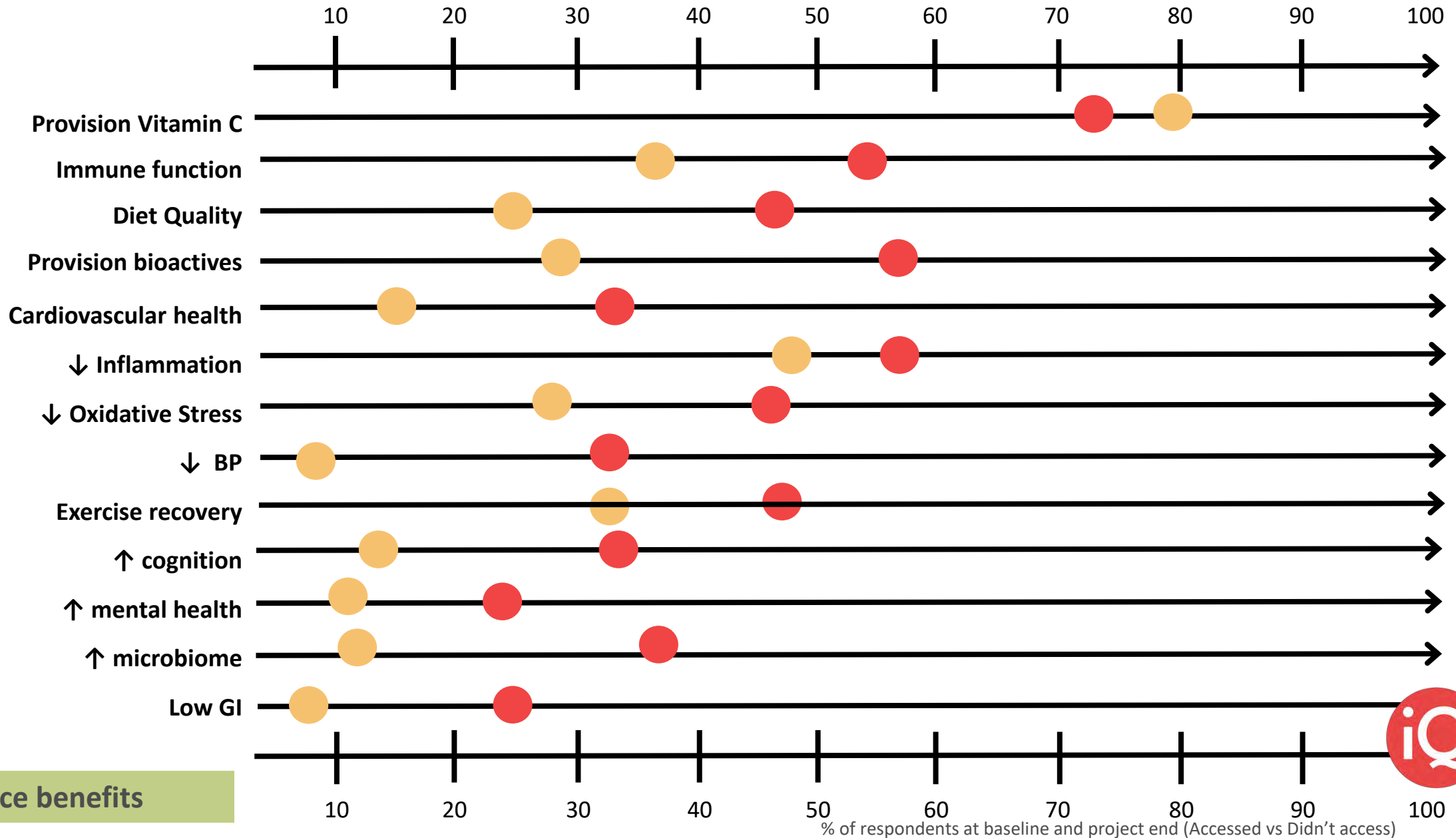
Sentiment improved towards the position of juice

Where do you think 100% juice should fit in the revised Australian Dietary Guidelines?



Health knowledge **increased**

● Didn't access ● Accessed

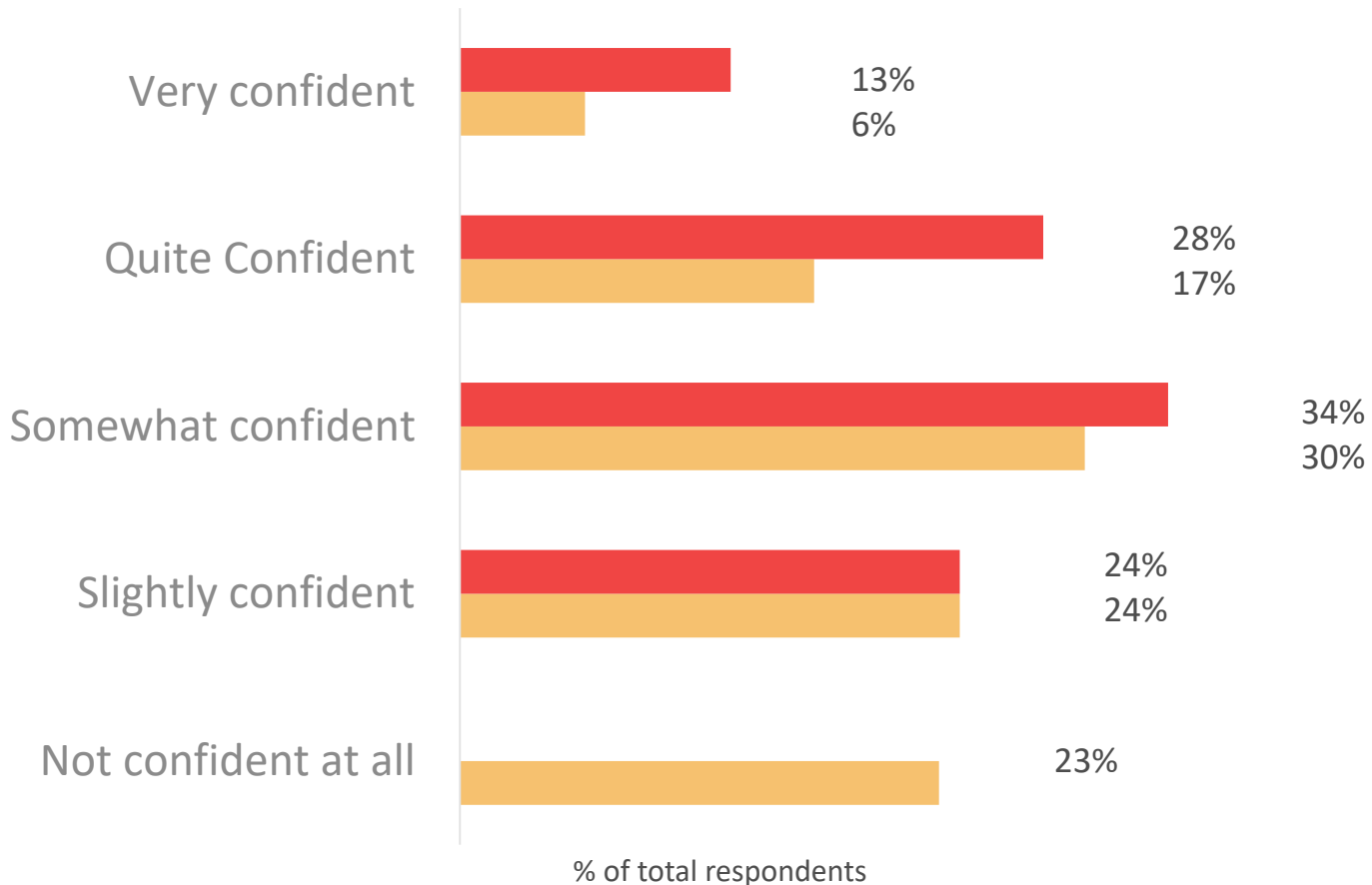


Citrus juice benefits



% of respondents at baseline and project end (Accessed vs Didn't access)

Greater Confidence in correcting misinformation about citrus fruit and juice



Accessed Resources



Did not access resources



1 in 4 *not* accessed resources had no confidence vs. 0% who had.



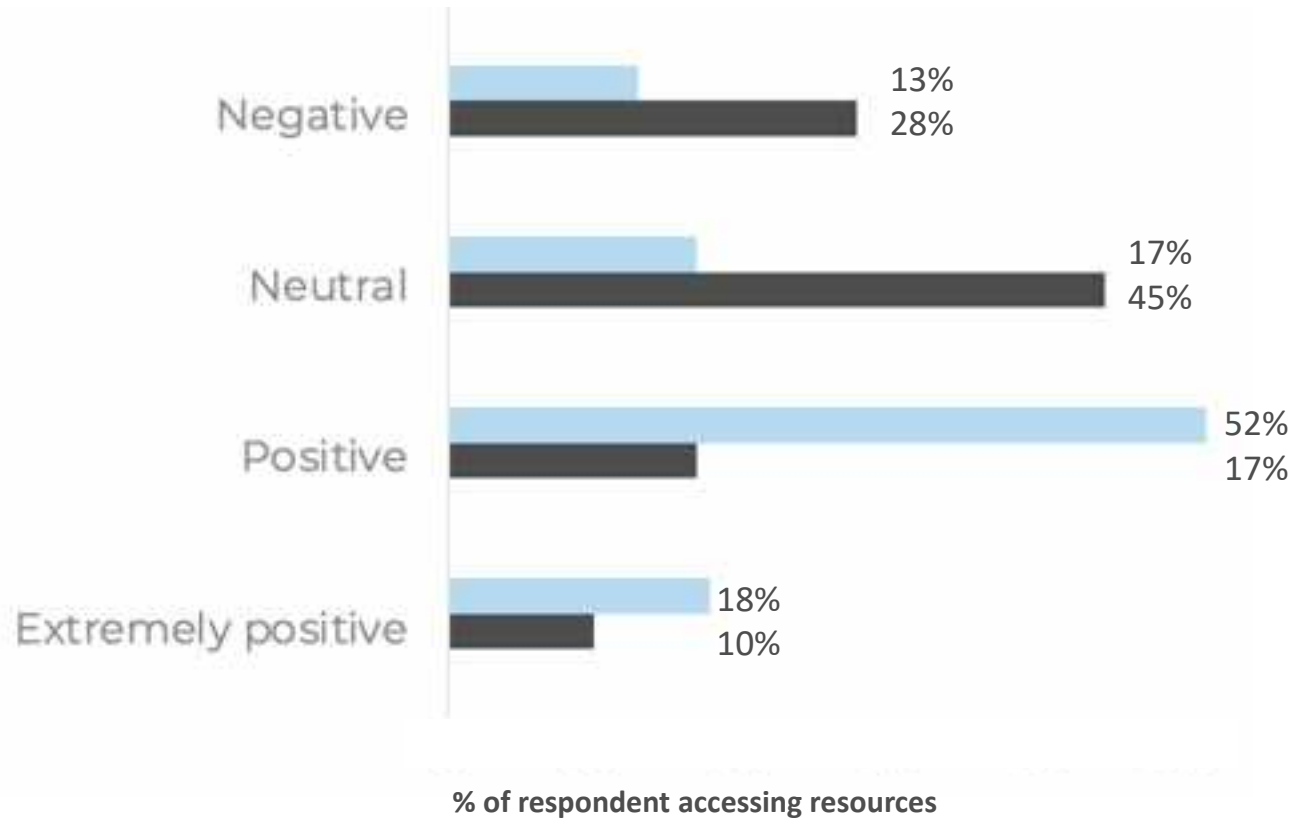
Nearly twice as likely to feel 'very or quite confident' if accessed resources.



There is still over half (58%) who accessed resources, who lacked high confidence



Juice positive sentiment increased



■ After accessing

■ Before accessing



70% had +ve sentiments about juice after vs. 27% before

What else would HP like to see?



Updates in the science ongoing.



Practical tips for selection and label reading for juice.



Varied formats of resources.



Specific information about types of juices.



I'd love to have updates with the most recent studies in the future



Practical advice on the different types of juices and how to pick the right type for health benefits.



Nice big poster versions of the fact sheets would be great for the GP clinic.



Would like to know more about pulp vs. non pulp, filtered vs not filtered, cloudy vs. clear.

Key **LEARNINGS**



What are project strengths/insights?



Strategy/Messaging

- ✓ Aligned, robust, focused strategy that overall achieved positive impact.
- ✓ HP knowledge on the key project education messages increased the most, supporting that focused messaging strategy had intended outcome.
- ✓ New 'news' on juice was the key driver of engagement with comms.



Science/Research

- ✓ Comprehensive highest-level review on juice and health provided credibility and 'cut through' to get attention to messaging and started to change the prevailing negative paradigm.



Education/Comms

- ✓ A complementary portfolio of resources (creative & content) was created.
- ✓ Strong interconnected thought-provoking webinars that had positive impact.
- ✓ Resources were powerful for changing knowledge, recommendation and confidence, particularly for juice.
- ✓ Solid engaged database established – double initial KPI.

What are the project limitations?



Strategy/Messaging

- ✓ Citrus fruit was not as provocative enough – juice had more science and new ‘news’.
- ✓ Positive shift in attitude & confidence but lacked a singular memorable message that stuck.
- ✓ Citrus juice is more an industry term vs. a consumer term?
- ✓ Sustainability messaging of juice.
- ✓ Project is one of many ‘silo’ projects that does not exist within a long-term strategic nutrition & health blueprint – limits potential efficiency & impact.



Science/Research

- ✓ Current research talked to health effect of juice – gap in how that science can best be translated to improve health outcomes.



Education/Comms

- ✓ No specific resource detailing practical juice selection guidance/consumption – what types, how much, how to support dental health.





Project RECOMMENDATIONS



Addressing citrus Challenges



Citrus Fruit

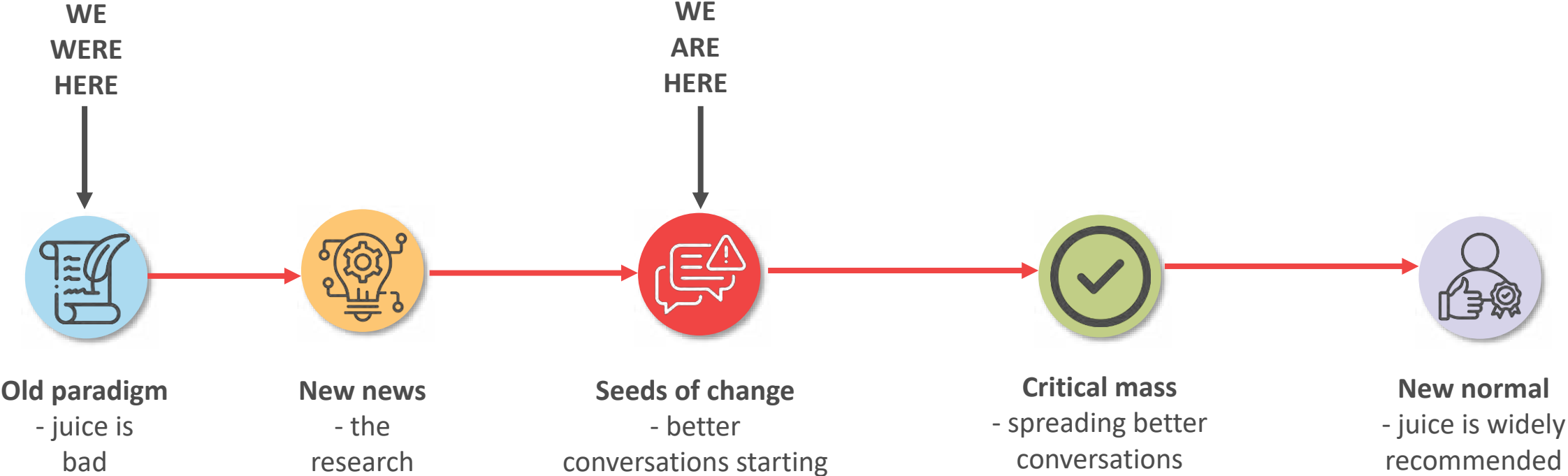
- ✓ Perceived familiarity: seen as common and unexciting
- ✓ Current campaign: Started to move the dial that there is 'More to citrus than vitamin C – but needs refinement



100% Citrus Juice

- ✓ Perception challenges: Deep rooted negative biases
- ✓ Progress made but more momentum needed: Initial efforts have improved but needs ongoing focus to achieve critical change views.

The journey



History tells us it is a **long** journey

Old paradigm

1968

- eggs are
bad, limit



Key ingredients for success:

- ✓ **Long-term** vision & strategic plan
- ✓ **Consistent & repeated** messaging
 - ✓ Build & maintain **credibility**
- ✓ Drive credible & independent **thought leadership**
- ✓ Leverage **influencers & ambassadors**

New normal

2014

- Eggs can be enjoyed



Key opportunity: Nutrition & Health **Strategic** **Blueprint**

Where we are

End of a successful finite 2-year strategy that was centred on HP education

BUT..

- ✓ Gains likely lost without ongoing consistent, repetitive education and communication.
- ✓ Opportunity to engage a larger and broader segment of health professionals still exists.
- ✓ Opportunity for greater efficiency and impact in alignment nutrition & health initiatives across important key stakeholders (government, consumers, health professionals).

Where next?

Refinement & rescoping of strategic plan that clearly outlines the 'end-game' vision, messaging pipeline, key audiences/channels, strategic pillars, and tactics for how to win:

- ✓ Extended to a longer-term lens (e.g. 10 years) with short, medium, long-term horizons.
- ✓ Separate plans for citrus fruit and juice, while ensuring synergy
- ✓ Consideration of focus on 'All citrus' or hero 'orange' particularly for juice
- ✓ Expanded to target other HPs like GPs and consumers and inclusive of advocacy strategies.
- ✓ Continues to build & maintain credibility & thought leadership

What are the Opportunities?



Sustain engagement with 'always on' digital presence

- ✓ Maintain Visibility: Keep citrus top of mind through a vibrant and consistent ongoing digital outreach/hub.
- ✓ Foster Connection: Engage users continuously with compelling content.



Create a signature citrus message

- ✓ Build a long-term messaging pipeline
- ✓ Own a Unique Territory: Develop a powerful, singular message around a standout benefit (e.g., brain health, unique bioactives).
- ✓ Enhance narrative: Build on existing efforts by amplifying the broader impact of citrus, integrating food science, culinary nutrition, and sustainability.



Drive critical mass for juice acceptance

- ✓ Continue to drive reach of message longterm & strategic messaging pipeline
- ✓ Development of practical recommendations and guidance on juice consumption (type, serve size, frequency).
- ✓ Educate on juice processing and impact on nutrients.

What are the Opportunities?



Expand influence

- ✓ Broaden Reach: Extend communications to healthcare professionals (GPs) and activate consumer engagement through innovative campaigns
- ✓ Build Partnerships: Collaborate with influencers and experts to amplify the message



Invest and leverage science insights to support comms

- ✓ National nutrition survey intake of bioactives contribution from citrus fruits and juices.
- ✓ Secondary Health survey data to determine association of juice and total fruit intake and association with diet quality measures.
- ✓ Research on best way to translate the juice science to support public health outcomes.



Champion Advocacy and Guidelines

- ✓ HSR / free sugars
- ✓ Dietary guidelines.
- ✓ Juice.

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Minutes



Minutes

- Project overview, learnings and recommendations presented with positive feedback from all stakeholders on the project.
- Olivia - Big learning in for the long haul. How do we continue with the momentum and encourage people to want to get on board and keep up? She considered there may be opportunity to show people are changing their minds in communications. People don't like to be outliers; they don't want to be left behind.
- Jacqui – Provided insight of where projects like this go next. She advised she is working on multi-industry healthy horticulture program to do similar across more than one produce. Jutta to follow up for further information.
- Jacqui also advised that the current Macquarie University bioactives project may be able to be leveraged in further support of work on Citrus
- Bobbi – Acknowledged the great work, and highlighted that it would be great to be able to leverage/connect the outputs/comms in this project with wider stakeholder groups such as retailers and activations in store and growers. This was discussed in recommendations of the merit of a higher level nutrition and health strategic blueprint for the industry to better align and leverage projects across stakeholder groups for a greater impact.
- Nathan – Acknowledged great work that has been done across both CT21004 and CT21006 which he views as extremely beneficial for industry. Industry will be reflecting on these findings and looking at what citrus will do next, whether something independent or part of the Healthy Horticulture project.



THANK YOU!

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APPENDIX 17



CT00006

Citrus Products

Prepared for:

Citrus Australia
Jul 2000

Prepared by:

Nutrition Research Australia Pty Ltd

Hitting the refresh button on citrus messaging

New research conducted by Nutrition Research Australia (NRAUS) has found that, on balance, citrus fruit and juices benefit health. This has important implications for public health policy and communications.

NRAUS is the delivery partner for two active levy-funded projects focused on the nutrition and health properties of citrus fruits and their juices.

The first (CT21004) is conducting new science on 100 per cent citrus juices.

The second (CT21006) is educating healthcare professionals on both citrus fruits and their juices.

There's more to 'C' in Citrus

In what was described as the first clinical study in nutrition, citrus fruits were shown to reverse signs of scurvy in sailors. It was later discovered that this was due to the rich vitamin C content in citrus fruits.

Since that initial study over 250 years ago, other important health benefits for both citrus fruits and juices have been observed. These include better brain function, improved heart health, and healthier gut bacteria.

Research has also found that these benefits are due to much more than just the vitamin C content. For instance, all citrus fruits – including their juices – offer a minimally processed 'nutrition package', which includes many essential nutrients (such as vitamin C, folate, potassium), a low glycemic index, and bioactive compounds, such as polyphenols.

These polyphenols deserve a mention. They not only contribute to the vibrant colours, flavours, and smell of citrus fruits, but also their health properties. Some of them, such as hesperidin and naringenin, are also not commonly found in other foods.

Break out box:

Polyphenols in citrus fruits are thought to:

- Feed the good gut bacteria in the lower parts of the digestive system.
- Increase blood flow to the brain.
- Have anti-inflammatory and antioxidant effects, and
- Reduce the absorption and uptake of dietary sugars

Discrepancy between science and perception

In our recent research conducted with healthcare professionals, very few were able to correctly identify the nutrition and health properties of citrus fruits and their juices, beyond the vitamin C content.

The nutritional value of citrus juices is also under scrutiny. For instance, the Health Star Rating for 100 per cent fruit juice has recently been downgraded due to its sugars content. In current healthy eating guidelines, the maximum weekly allowance for 100 per cent fruit juice is less than that for common alcoholic drinks.



Prominent public health groups are now arguing for fruit juices to be reclassified in dietary guidelines as discretionary foods, alongside sugar-sweetened beverages.

Where to from here?

The CT21004 project (Scientific Review for Classification of Unsweetened Citrus Juice in the Australian Dietary Guidelines) is building the science on 100 per cent fruit juice.

One limitation with the current research on 100 per cent juice is the more are many different studies reporting across many different health outcomes. This makes it difficult for policy makers to compile evidence appropriately into dietary advice.

To solve for this, NRAUS conducted a review on the health effects of 100 per cent juice. This review constitutes one of the highest levels of evidence and was conducted according to the rigorous National Health & Medical Research Council (NHMRC) standards for the development of dietary guidelines.

Despite their sugar content, the review found that 100 per cent juices: improve markers of heart health; lower markers of inflammation; do not increase body weight, impair liver function, or worsen common markers of metabolic health, even at high doses; and have limited evidence of harm.

Break out quote box:

“The balance of evidence continues to support the inclusion of 100% juice in dietary guidelines”.

The paper is currently in the publication process and can be used by the industry for communications and advocacy, such as to help protect 100 per cent juices in dietary guidelines, which are due to be updated in 2025.

NRAUS also carried out an additional literature scope to understand the other nutritional properties of 100 per cent juice. Key findings were that 100 per fruit juice: has a comparable micronutrient profile to whole fruits; is one of the richest sources of polyphenols in the diet; and has a higher nutrient-to-cost ratio of any food. This means that per dollar, no other food provides a better nutrition profile than fruit juice.

Break out quote box:

“Fruit juices had the highest nutrient-to-cost ratio of any food or beverage category, with a far higher nutrient-cost ratio than fresh fruit”.

The CT21006 project (Citrus Industry Health and Nutrition Education Program) is educating healthcare professionals on both citrus fruits and their juices.

Given the discrepancy between science and perception, there is an urgent need to educate health professionals and key stakeholders on the value of citrus fruits and their juices.



This project is in its early stages and has two separate focuses.

The first is to make citrus fruits top of mind for specific health concerns by recognising there is more to citrus than just vitamin C.

The second is to provide reassurances around the safety and benefits of 100 per cent citrus juices by recognising there is more to citrus juices than sugars.

The project includes a range of activities, including the development and promotion of fact sheets, infographics, recipe booklet, webinars, animations, conference stalls, digital and social media activations, and a webpage.

The first outputs have just been completed. These include four healthcare professional (HCP) factsheets, a recipe booklet and a new HCP webpage on the Citrus Australia website, which will be the central hub for all resources that will be developed as part of the project. Three factsheets summarise the key health benefits for citrus, which include immunity, brain health and heart health. The fourth is a client-friendly resource that HCPs can use to educate their clients.

There is still much to be done, and we look forward to working diligently with the citrus industry to complete both projects over the next 12 months. The expected outcomes from these projects will have significant benefit to not only the industry, but the health of all Australians.

This article was written by Tim Cassettari and Jutta Wright, Accredited Dietitians, Nutrition Research Australia.

The CT21004 and CT21006 have been funded by Hort Innovation, using the citrus research and development levy and contributions from the Australian Government.





CT2100 & CT2100: Citrus News Article

Prepared for:

Hort Innovation

Prepared by:

FOODiQ Global

September 2024



FOODiQ is the delivery partner for two active levy-funded projects focused on the nutrition and health properties of citrus fruits and their juices.

The first (CT21004) was conducting new science on 100 per cent juices, including citrus juices. The second (CT21006) was educating healthcare professionals on the nutrition and health benefits of both citrus fruits and their juices. Both are in their closing stages and this article provides a summary of what has taken place in both projects over the past twelve months.

An introduction to the potential benefits of citrus fruits and their juices

Twenty-five years ago, a group of nutrition researchers from Harvard University were interested in how fruits and vegetables may affect our risk of stroke. To answer this question, they mined the data from two of the world's largest nutrition studies: the Nurses Health Study, and the Health Professionals Follow-up Study.

Examining these data, what they found at first was not surprising: among middle-aged adults, the more fruits or vegetables they had, the less likely they were to have a stroke over the next eight- to 14-years. Doing some fancy calculations, the researchers worked out that for every additional serve of fruit or vegetables eaten, the corresponding risk of stroke was reduced by 6 per cent.

But it was what they found next that surprised them. One fruit type stood out amongst the rest and had a greater protective association than any other: citrus fruits. Just one additional serve per day of citrus was associated with a 19 per cent reduced risk of stroke. And even more surprising, citrus juices had a greater protective association, with one serving of citrus juices associated with a 25 per cent reduced risk of stroke.

As time has passed, research has shown that these findings were not unique to cardiovascular health. Around 15 years ago, a group of researchers from Finland observed that citrus fruits had one of the greatest associations with cognitive performance in older adults of all fruits. And five years ago, it was found that older men who regularly consumed orange juice had a whopping 47 per cent lower risk of poor cognitive function, an early-warning sign of dementia.

Fun Fact

Citrus fruits and juices are much more than just vitamin C. They are an affordable and accessible way to consume a wide range of micronutrients and unique bioactives.

The gap between science and perception

Researchers now agree that citrus fruits and their juices provide a unique nutritional package that provides powerful benefits for a range of health outcomes. Much more than just vitamin C, they are also rich in bioactives, including hesperidin, naringenin and naringin, that are not found in other foods.

But when we asked over 200 health professionals for their opinion about citrus fruits and their juices, we uncovered a discrepancy between their current understanding of citrus fruits and their juices compared to this science. Few were able to identify the unique health benefits or nutritional properties of citrus fruits and their juices. What's more, sugar content was top of mind when thinking about citrus juices, despite research showing that citrus juices do not lead to weight gain.

Did You Know?

Most health professionals surveyed were unaware of the role of citrus fruits for improving health outcomes, including its unique effects on cardiovascular and brain health.

These perceptions are perhaps not surprising given the current health environment, where many public health leaders have pushed for fruit juices, including 100 per cent citrus juices, to be classified as discretionary foods, alongside sugar-sweetened beverages, in the upcoming Australian Dietary Guidelines review.

100% orange juice is much more than just natural fruit sugars

Sharing the science of citrus fruits

To close the gap between science and perception, the first phase of CT21006 was focused on citrus fruits and how they are much more than vitamin C. Three research summaries were created, highlighting the unique role that citrus fruits have in supporting cardiovascular, brain, and immune health. This was complemented with a client-friendly resource and recipe booklet, to aid health professionals to share this science with their clients and encourage the regular consumption of citrus fruits.

A health professional webinar, *Is Citrus the Forgotten Affordable Superfood?*, was also hosted by FOODiQ Global in November 2023. Featuring Professor Linda Tapsell and Dr Emma Beckett, it highlighted these specific benefits of citrus fruits, and how this was due to their complex nutritional profile, beyond just vitamin C. Other advantages of citrus fruits, including their affordability and accessibility, were also explored. Over 380 people registered for the event, and 97 per cent rated it 'excellent' or 'very good' and 100 per cent reported that they learnt something new.

An online Health Hub was created to house all the collaterals created across the two projects, which sits on the Citrus Australia website. An infographic and social media tiles on the science of citrus fruits was also produced and shared online as part of a four-week paid digital media activation strategy to promote the science and direct health professionals to this hub.

Research published

The authoritative umbrella review that examines the health effects of 100 per cent juice and health, as part of CT21004, was published in April 2024 in the

prestigious journal *Nutrition Reviews*. This paper found that, like whole fruits, 100 per cent juices improve markers of heart health, lower inflammation, and do not increase body weight, impair liver function, or worsen common markers of metabolic health. The paper will be a key input into the Australian Dietary Guidelines review, which has been delayed and now scheduled for 2026.

Fun Fact

The highest quality evidence currently available shows that 100% juice, without added sugars, improves markers of heart health and does not increase body weight.

Caption for image of paper abstract: The umbrella review on 100% Juices and health

Tackling misconceptions on citrus Juices

Since the publication of the umbrella review paper, the second phase of CT21006 has commenced, which included a flurry of activities to leverage the science and share a more positive story on 100 per cent citrus juices.

A second FOODiQ hosted webinar, *Is it time for a fresh perspective on 100% juice*, saw four nutrition experts discuss the latest science on 100 per cent juices, as well as key considerations for translating this science into dietary guidelines. Over 350 people registered for the webinar and there was a remarkable shift in those who attended: the proportion who were negative about juice dropped from 50 per cent to zero, and the proportion who were extremely positive about juice increased ten-fold, from 5 per cent to 50 per cent. A webinar on the science of juice was also done with fitness professionals, *Unravelling the 100% Juice Myth*, presented by nutrition researcher Tim Cassettari. One-hundred and thirty-five people registered and 77 per cent of attendees were positive about juice post-webinar, with 0 per cent negative.

Webinar feedback

“It has completely changed my thoughts on juices.” – attendee at the FOODiQ hosted webinar on 100% juice

Three short animations, one on the umbrella review paper, one on juice myths, and one on the making of 100 per cent citrus juices, were also produced, alongside an infographic and social media tiles. Together, this formed part of a digital activation strategy to reach health professionals across the country.

Finally, an Australian Citrus exhibition stand was organised at the 2024 Dietitians Conference in Brisbane, where information and resources on 100 per cent citrus juice was provided to delegates. The stand was a popular attraction at the conference and enabled important conversations on the latest juice science, including with leaders in the public health policy. There were 550 delegates in total and 350 resources were distributed across the three days.

DA exhibition stand **The Australian Citrus stand at the 2024 Dietitians Australia Conference**

A changing perception among key opinion leaders

The project successfully met all intermediate and end-of project outcomes, with educational events receiving high ratings for information, usefulness, and engagement. Over the past year the project has amassed a sizeable HP database of nearly 1200 engaged subscribers. In only 12 months of actual targeted education and communication, the project enhanced HP awareness and knowledge about the nutritional benefits of citrus and its juices. It also increased confidence in discussing these benefits and correcting misinformation. HPs impacted by the project were 1.2 times more likely to recommend citrus fruit and twice as likely to endorse citrus juices compared to those not involved. The project made significant strides in shifting perceptions of citrus juice from predominantly negative (28%) or neutral (45%) prior to the project to overwhelmingly positive (70% respondents post project).

What's next

Looking ahead, with CT210006 now complete, it's clear that while the project has made significant strides in shifting perceptions, further strategic efforts are needed. To build on the successes achieved so far, the team recommends developing and refining a long-term nutrition and health strategic blueprint. This framework will enhance decision-making for future initiatives, ensuring they are well-aligned and impactful.

For CT21004, FOODiQ will continue to offer expert guidance on the Dietary Guidelines review, providing recommendations to advance this work and strengthen the recognition of citrus fruits and their juices in improving the health of Australians.

This article was written by Tim Cassettari and Jutta Wright, Accredited Dietitians, FOODiQ Global.

CT21004 and CT21006 have been funded by Hort Innovation, using the citrus research and development levy and contributions from the Australian Government.

APPENDIX 18



Time to hit the refresh button on citrus messaging

Dr Flavia Fayet-Moore
CEO Nutrition Research Australia (NRAUS)





Changemakers in global human health
and nutrition, backed by science



Why does citrus
matter?

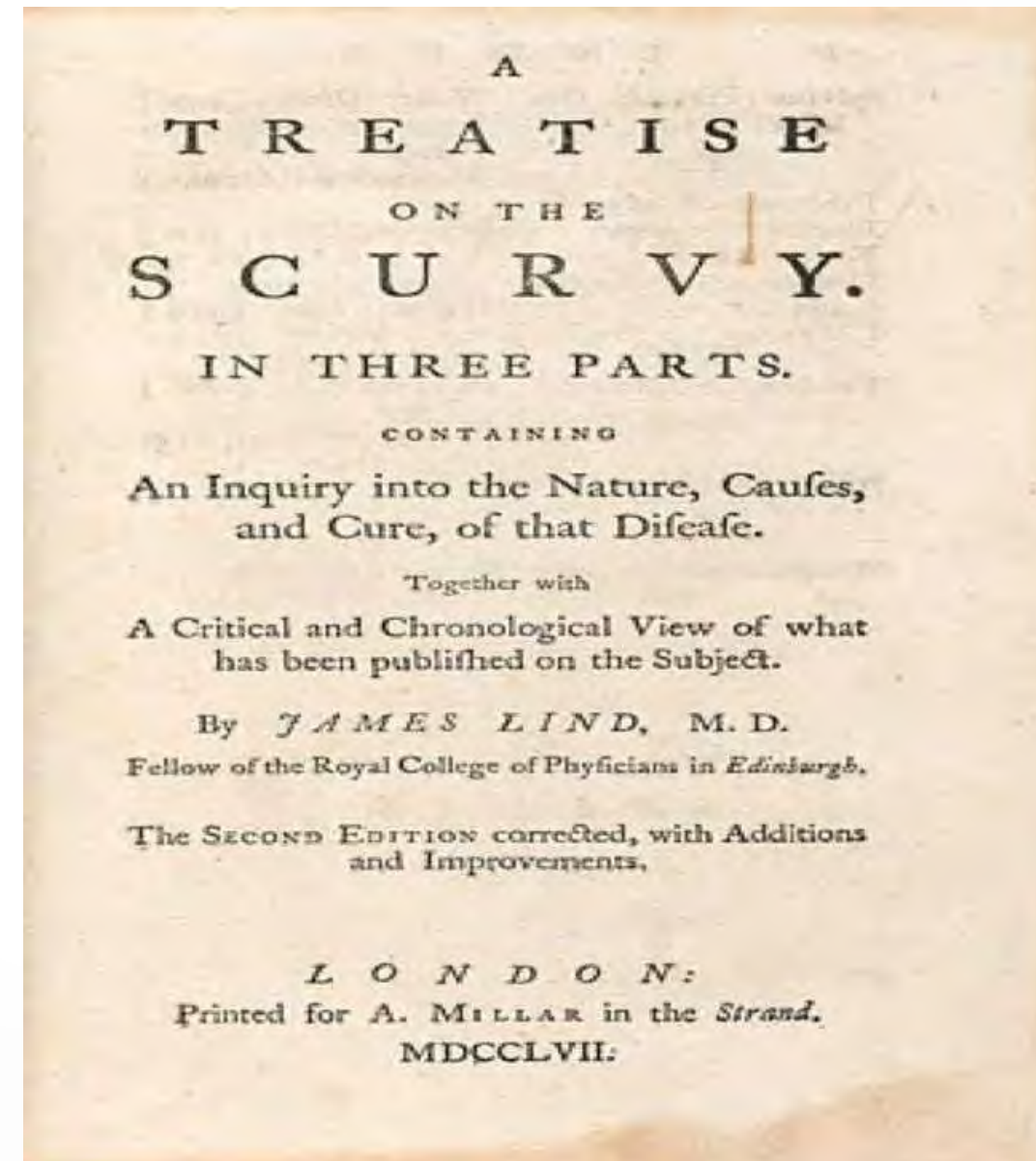




James Lind

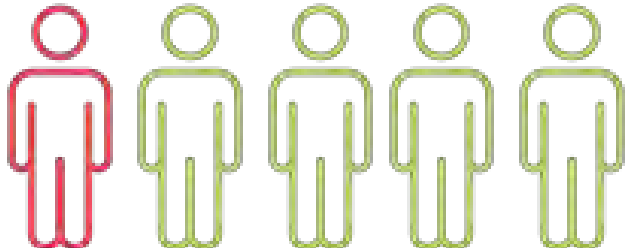
Medical Officer

British Royal Navy

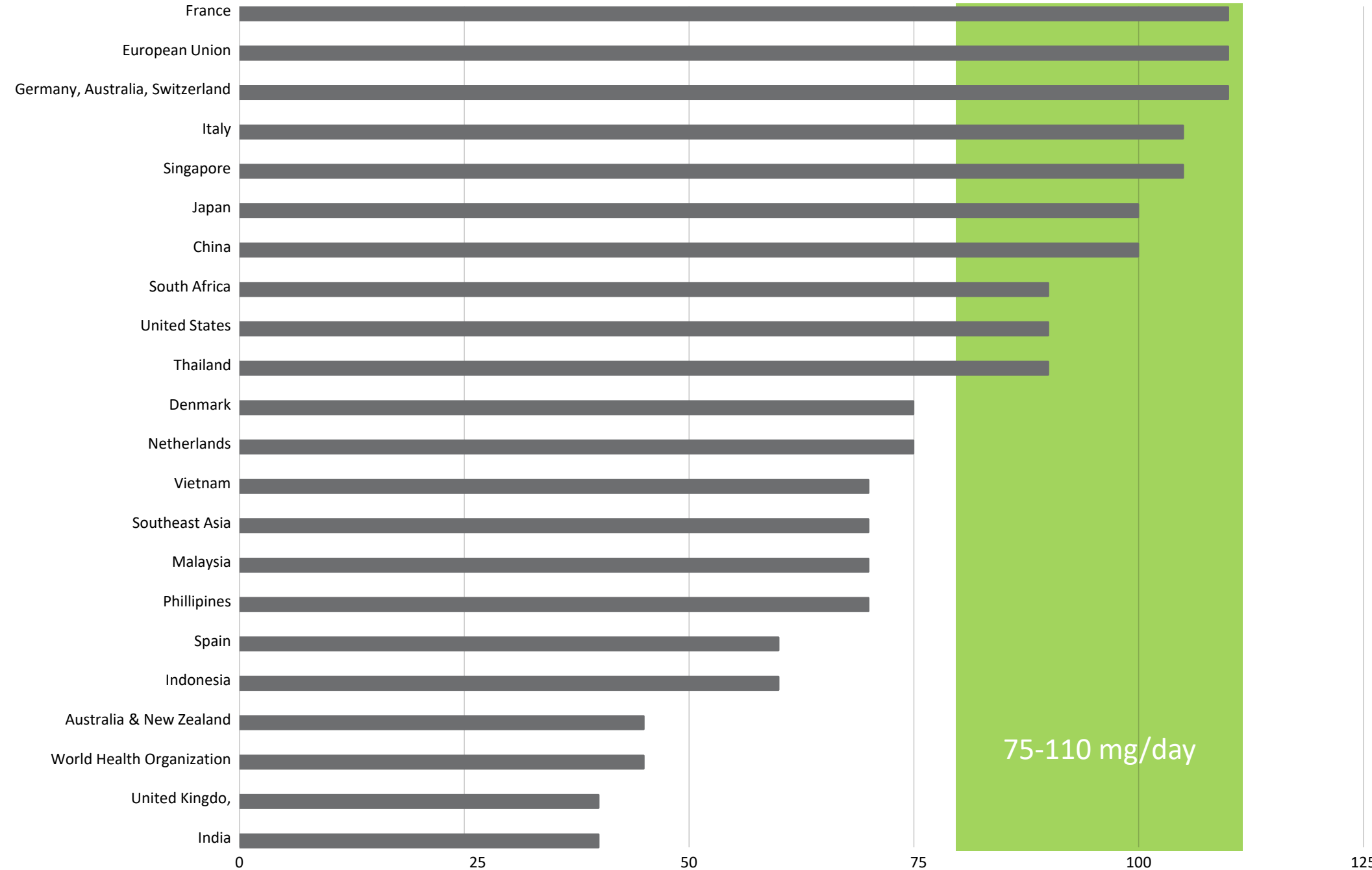


Vitamin C deficiency a problem and current AUS recommendations need to **double**

1 in 5 deficient in AUS



Ravindran et al, 2018



75-110 mg/day

Hojoel & Hojoel, 2021



What's in citrus?

N **u** **t** **r** **i** **e** **n** **t** **B** **i** **o** **a** **c** **t** **i** **v** **e**
S **S**

Beta-carotene

Naringenin

Narirutin

Hesperidin

Furanocoumarins - grapefruit

β -cryptoxanthin - mandarins

Vitamin
C

Vitamin B1

Fibre

Folate

Potassium

Low glycemic index

There's more to 'C' in citrus: the role of bioactives



Hesperidin slows the absorption of the natural sugars

-Byrd-Bredbenner et al.,
2017



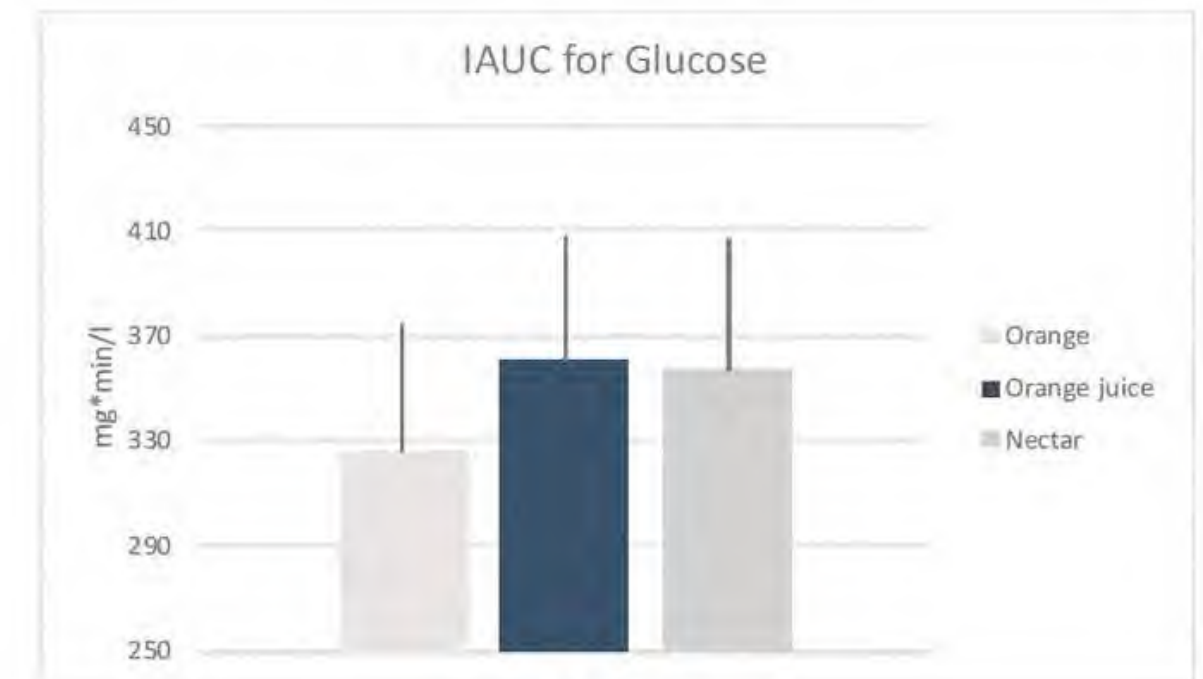
Citrus is equivalent to a C supplement, but more useful to the body?

-Carr & Vissers et al, 2013



Juice or whole orange- same effect on blood glucose

-Papadreu et al, 2019



$P = 0.544.$
(a)

Why might 100% juice be helpful?



Nutrient intakes

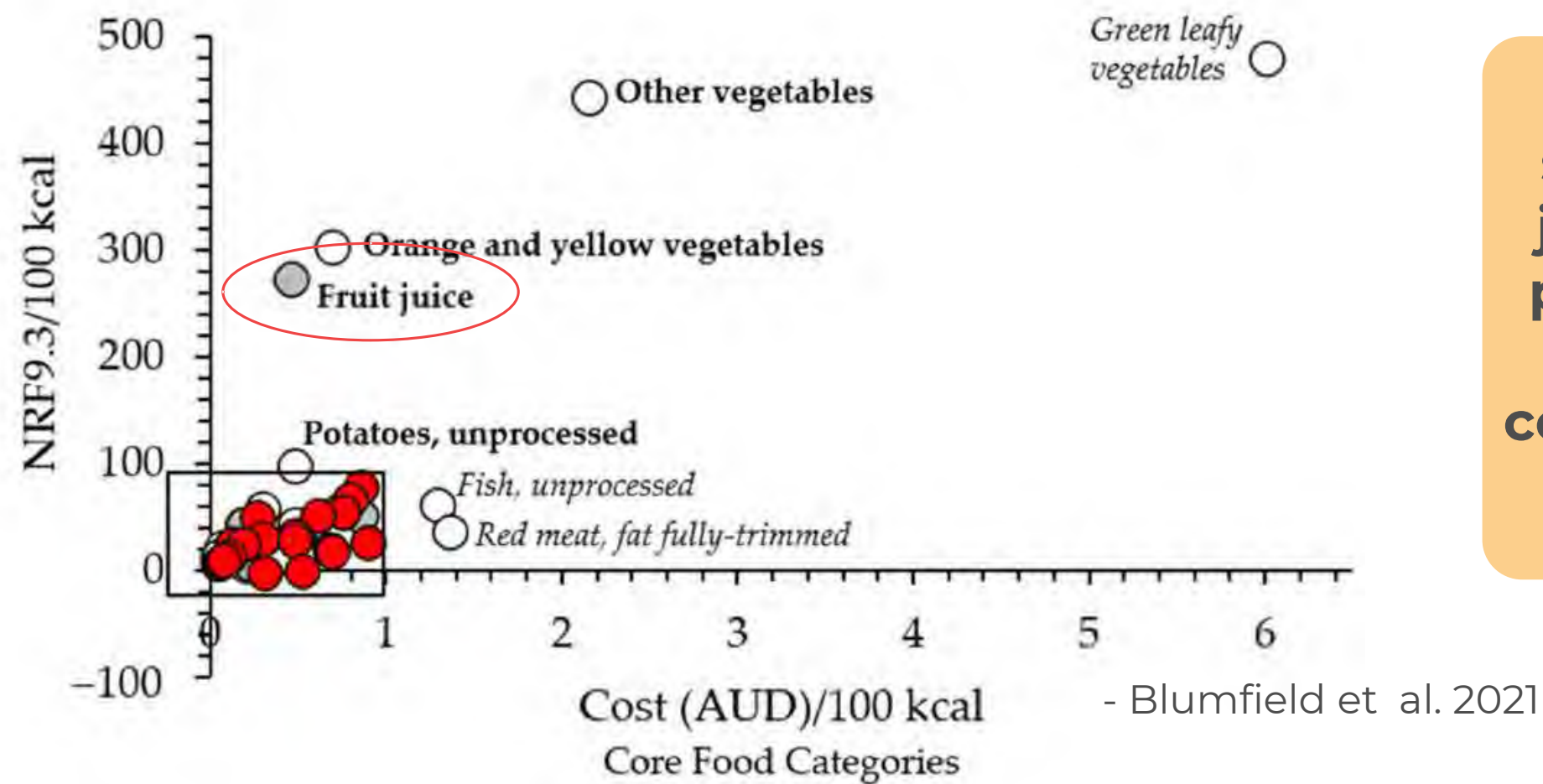


**Rich source
of bioactives**



Prebiotic effect

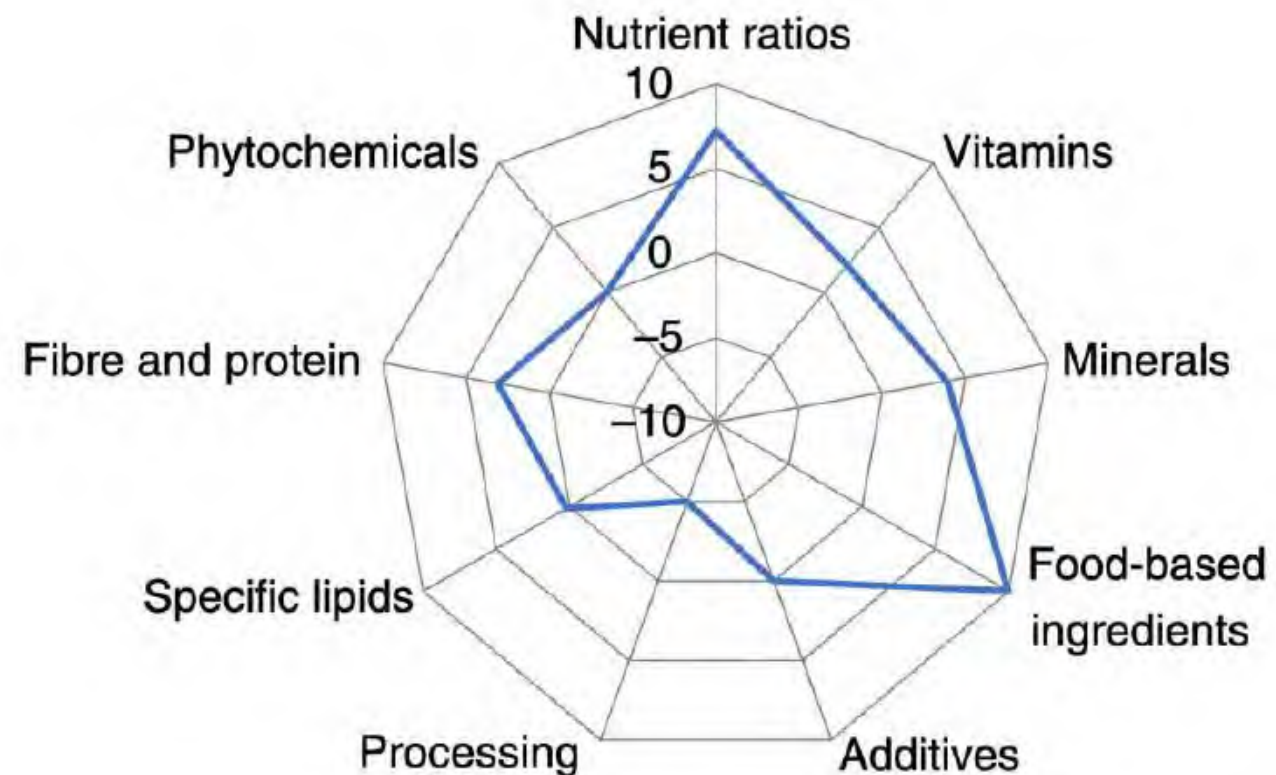
100% juice: the most nutrition for the lowest cost



“The preponderance of evidence supports the position that 100% fruit juice delivers essential nutrients and phytochemicals, provides year-round access to a variety of fruits, and is a cost-effective way to help people meet fruit recommendations”.
- Clemens et al. 2015

100% juice considered healthful

The Food Compass



100% juice scored lower than fresh fruit but higher than most other foods and beverages

Encouraged (≥ 70)

Orange: 100
Celery juice: 100
Tomato juice: 100
Carrot juice: 84
Banana: 83
Orange juice: 73

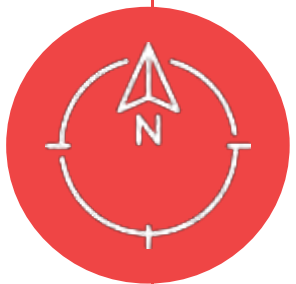
In moderation (31-69)

Brown rice: 63
Apple juice: 55
Milk whole: 49

Minimised (≤ 30)

Vitamin water: 9
Soft drink: 1

- Mozaffarian 2021



Yet, there is a discrepancy in opinion between academia + public health on 100% juice

Recommends

Academics

“Pure juice should be viewed as a health food”

- Nutrient dense, low cost
- Easy nutrition + bioactives
- Backed by science

Only occasionally

Health organisations,
School Canteens

“It is fine to have... sometimes”

- Whole fruit is best
- Juice is sometimes
- Watch out for amount

Not recommended

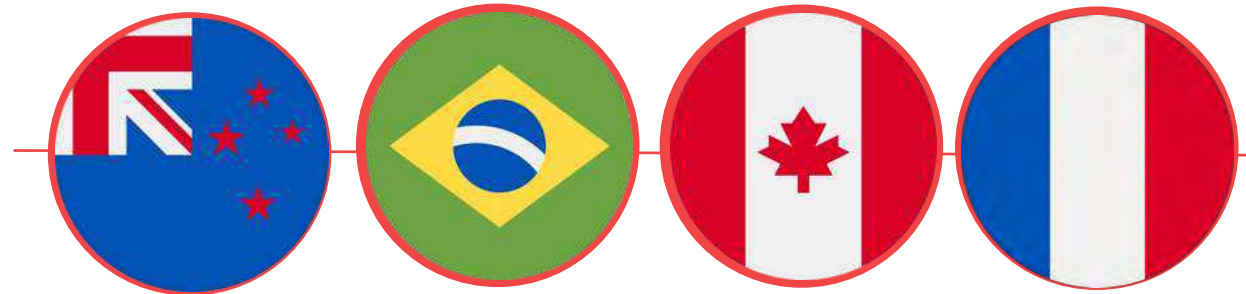
Public health groups and
media Drs and dietitians

“Fruit juice is not a healthy option- whole fruit is best”

- “Equivalent to 5 serves of fruit”
- Low in fibre
- Sugary drink
- Bad for dental health
- Processed food

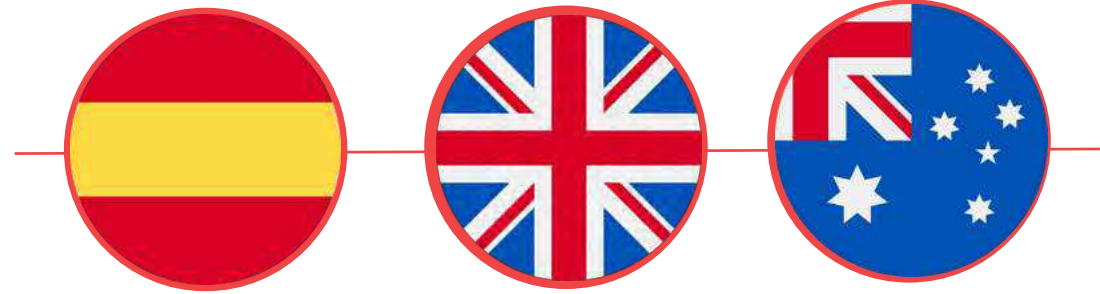
Dietary Guidelines are increasingly recommending against 100% juice

Not recommended



“All beverages that are sources of sugar, including 100% fruit juice, to be avoided”.
- Canadian

Only occasionally



150mL Max 150mL 125mL

“Juice should only be drunk occasionally as it is acidic and...has less fibre and other nutrients than the whole fruit provides”.
- Australian

Recommends



Up to 300mL

“Beverages that are calorie-free or that contribute beneficial nutrients, such as fat-free and low-fat milk and 100% juice, should be the primary beverages consumed”.
- American

Health Star Rating now judges 100% juice based on **sugars**



**“The popularity of fruit juices warrants serious attention; their very high levels of free sugar does not make them the ‘healthy’ choice that Australia and New Zealand’s front of pack interpretive labelling scheme (health star ratings) has implied”
Miller et al, 2020**

Jane Martin
@janemartinopc

This discussion has brought to light that fruit juice is not a healthy option, whole fruit is best.

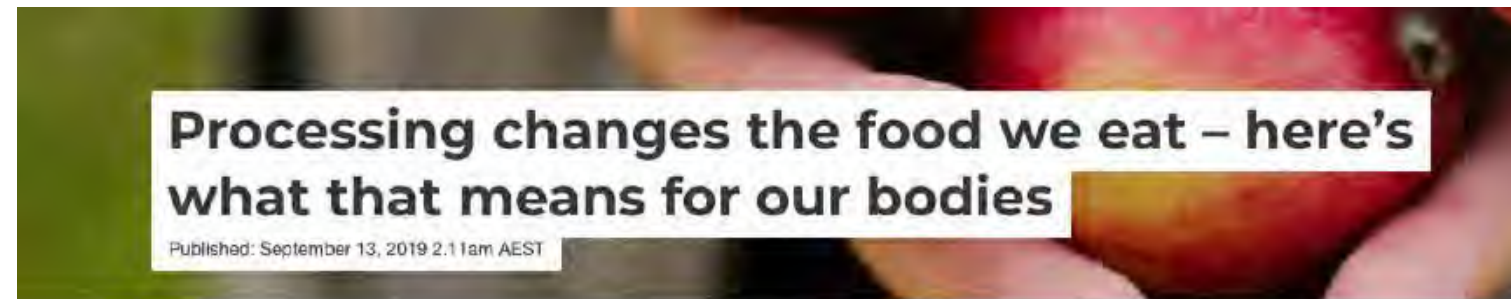
New health star rating system ranks fruit juice below diet cola in shift to sugar-based grading

7NEWS Sydney
@7NewsSydney

Fruit juice has lost its 5 star health rating because of its high sugar content, deeming it worse than diet soft drinks. Farmers have slammed the decision, saying it'll rip hundreds of millions of dollars from the industry.
youtu.be/NnbR6ynMF4Q #7NEWS



Hot areas for HCPs are gut health, bioactives & the whole food matrix



- Email
- Twitter
- Facebook
- LinkedIn
- Print

To understand how healthy a food is, we generally look at its components – carbohydrates, fats and proteins, or the vitamins, minerals and other substances it may contain. But this purely “nutritional” vision overlooks one property that’s a key part of a food’s health potential – its structure.

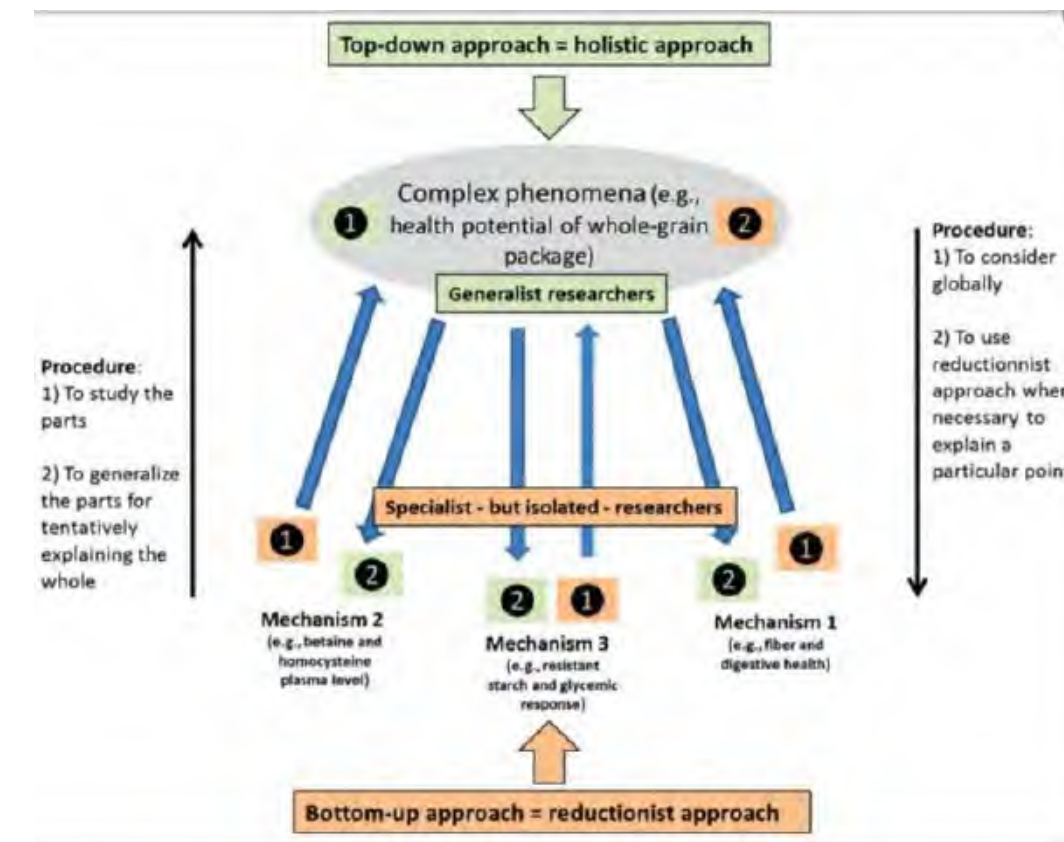
For example, serving a child a breakfast cereal made up of whole wheat or rice may seem like a good idea, but research shows that processing can significantly impact its nutritive qualities. Extrusion-cooking or puffing can transform wheat and rice into primarily a source of sugars that the child’s body rapidly absorbs, and many of the nutritive values of the original grains are lost.

The “matrix” of a food

Why we need dietary recommendations for bioactives

Posted on 11 November 2022

In this blog, Gunter Kuhnle explains more about the first dietary recommendation for a type of plant compound that is not a vitamin – flavan-3-ols – found in tea, berries, apples, grapes and cocoa.



Nutritional science is supporting a greater appreciation for the whole food matrix, non-nutrients/bioactives
‘The whole greater than sum of the parts’



Where to from here?

01. 100% juice science

02. Educate healthcare professionals

Hort
Innovation
the strategic levy investment

CITRUS
FUND

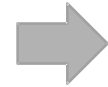
This project has been funded by Hort Innovation using the citrus research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au



01. Collate & publish the scientific evidence to support the case that 100% (citrus) juice remain a core food in the Australian Dietary Guidelines



Scientific
publication on the
balance of
evidence on
health



Collate supporting
evidence & facts

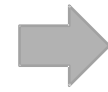


Technical support

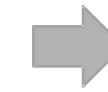
02. Educate health professionals on the health and culinary benefits of Australian citrus



HCP Database &
Sentiment Survey
NUTRITIONiQ
Strategy



Australian Citrus
Website
Collateral
development



Education
campaign

01. 100% juice science



There is no recent high quality review on 100% (citrus) juice and health outcomes



Low quality review



Singular health outcomes



Based on old science

The balance of the evidence on 100% juice

B e n e f i t

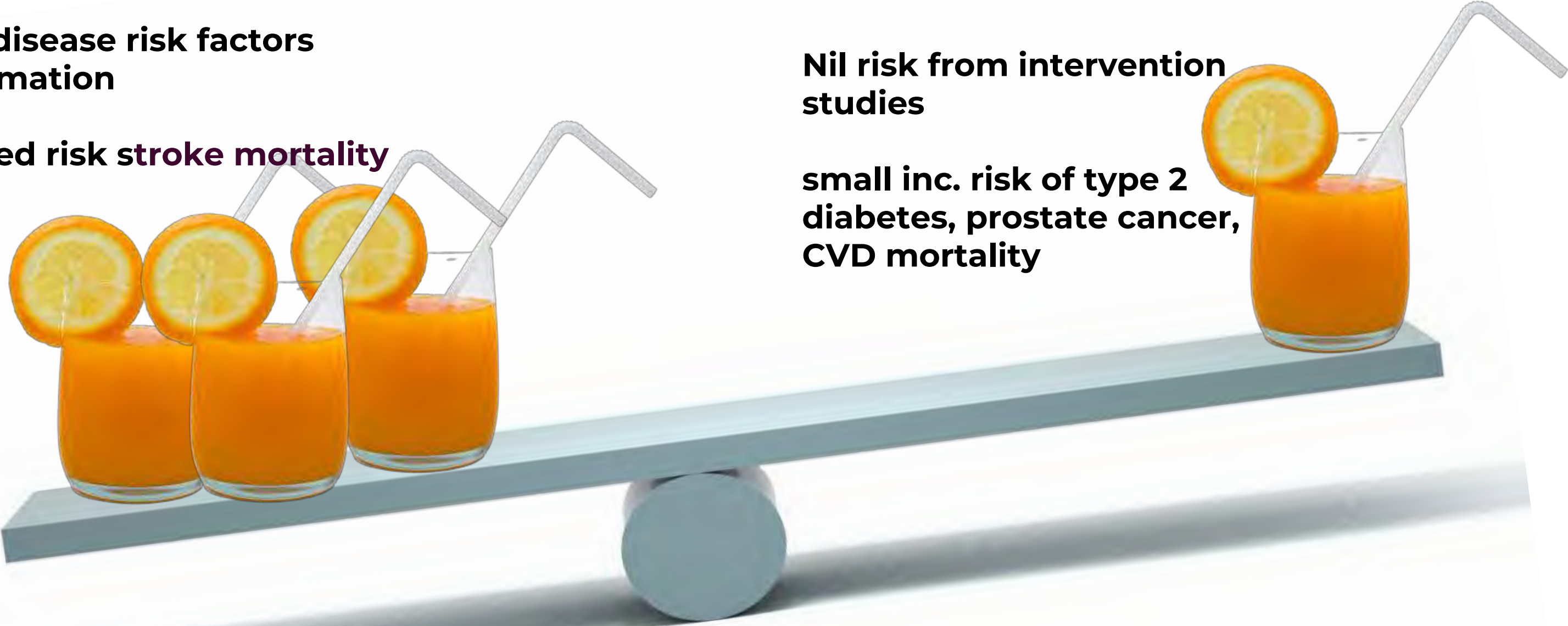
H a r m

**Heart disease risk factors
Inflammation**

Reduced risk stroke mortality

Nil risk from intervention studies


small inc. risk of type 2 diabetes, prostate cancer, CVD mortality



N 0

Causal effect on: Blood cholesterol, inflammation, insulin levels, body weight, BMI, waist circumference.
Risk of: death from any cause, CHD mortality; colorectal cancer, breast cancer; CVD, CHD, high blood pressure, stroke

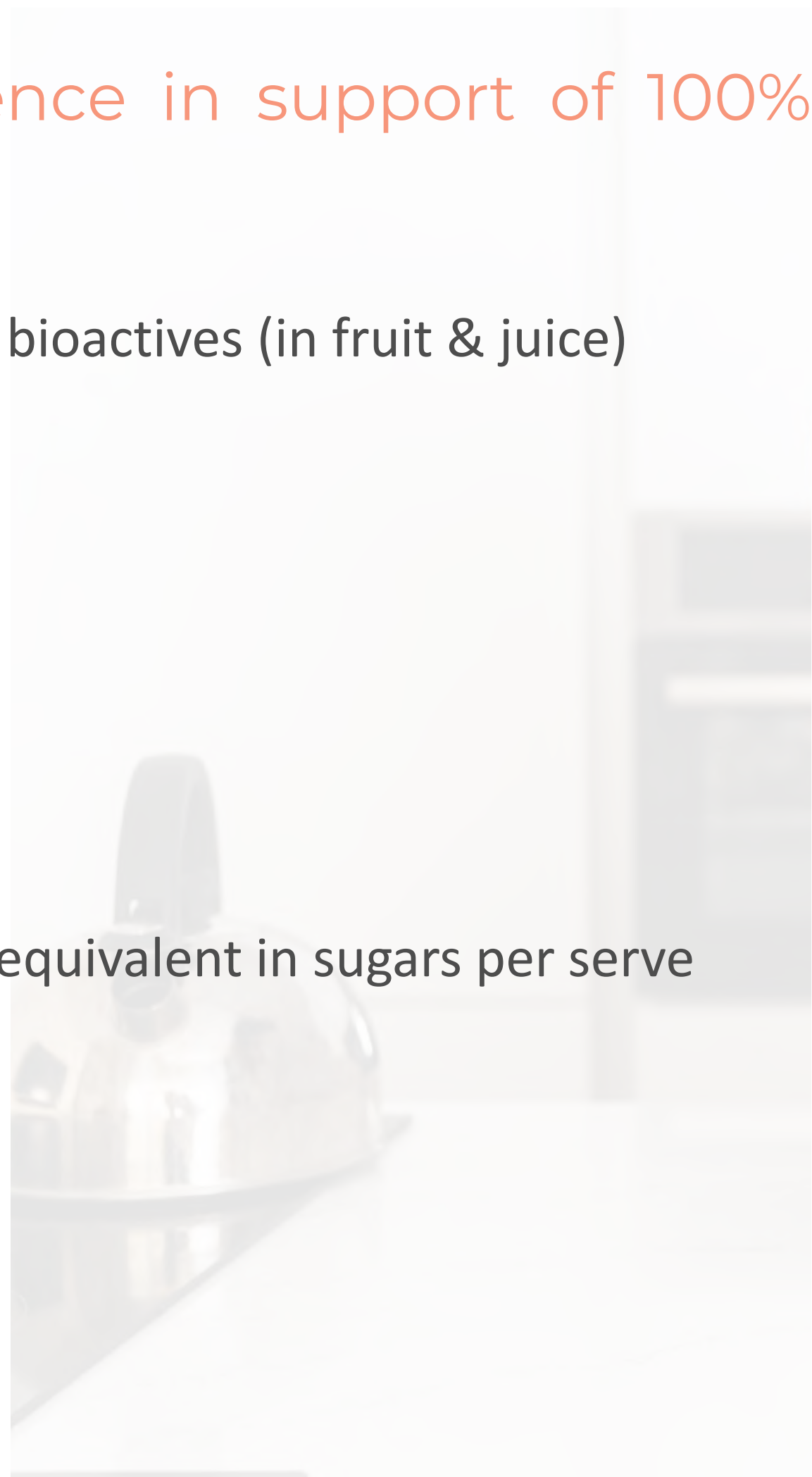




“On balance... limited potential harms associated with 100% juice consumption were identified...while improved cardiovascular and inflammatory health measures were seen from causal evidence.”

Additional science in support of 100% juice

- Health effects of bioactives (in fruit & juice)
- Hydration
- Cost
- Diet quality
- F&V serves
- Fruit & juice are equivalent in sugars per serve



02. Educate healthcare professionals



Objectives

- Build engagement informed by credible science.
- Increase knowledge in disease prevention and management.
- Showcase their unique value proposition



Citrus is on trend

KEY TRENDS

NATURALLY FUNCTIONAL

- The king of all trends – beats science based ingredients. People want natural ingredients – blueberries, almonds, olive oil surging

SUSTAINABILITY

- Not only good for me, but good for planet is increasingly driving consumer choice

NATURAL & REAL FOOD

- Desire for closer to nature = healthier fuelled by social media, increasing attention to nutrient density and awareness of health risks from 'ultra-processed'
- Less additives, clean label

BETTER CARBS

- Sugar still remains the biggest demon. But its all about better and fewer CARBs overall.
- Consumers love carbs but want 'better types' and permission to indulge.

IMMUNITY & GUT

- Everyone affected by digestive issue some time in life. Understanding that gut is central to overall health
- Consumers looking for vitamins, probiotics, traditional herbal remedies, protein to protect health, particularly immunity.

CONVENIENT PLANT CHOICE

- Plant-based is one of the biggest long term trends - people want to eat more fruit & vegetables. It's all about getting it in convenient forms to fit with busy lifestyles.

PROVENANCE

- Seeking food from 'somewhere' is preferred to 'anywhere' – linked to sustainability & real food.
- Local sourcing increasingly valued and understanding of farm to fork journey = ladders to healthier for me.

NUTRIENT DENSITY

- Increased desire for foods that give great nutrition 'bang for your buck'.
- Driven by increasing consumer concern for 'Ultra processed foods'.

"Fortification was a generation 1 strategy. A generation 2 strategy is delivering nutrient density via 'real foods'. Opportunity to drive foods that have been forgotten over time – plant-based foods that add 'nutrient dense' will be winners. Nutrient density is seen as relevant to older people, sports people and parents of growing children. New Nutrition Business 2022

NUTRITIONiQ identified themes

CITRUS IS VITAMIN C
BUT NOT TOP OF MIND

CITRUS BIOACTIVES &
HEALTH EFFECTS NOT KNOWN

JUICE MYTHS PERSISTENT

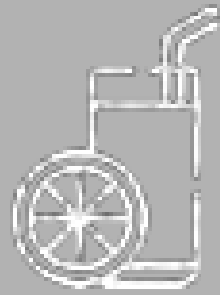
SUSTAINABILITY
KNOWLEDGE GAP



Strategic recommendations



Capitalise on strength in
C + educate that there's
more



Bust juice myths



Leverage sustainability
story



Inspire with practical
tips & tricks

Healthcare professionals recommend and support
consumption of citrus fruit and its juices





I also believe if more information of the overall health benefits of citrus fruits such as the benefit to immunity and inflammation properties for example are listed rather than just a good source of vitamin C may entice individuals to consume more in their daily diets

HCPs want to 'C' more in citrus
with culinary inspiration

Bust 100% juice myths



Establish its
superior nutrition



Demonstrate the
unintended
consequences



Reframe its
health effects



Educate HCP with
science

Support the case for 100% juice as a core food in the Australian Dietary guidelines



Messaging outcomes

Citrus as Medicine



More than vitamin C, for holistic health

Positive
Citrus = superior health properties

Top of mind
Recommend for specific health concerns & support overall health

Juicy myths



Full of goodness = beneficial for health

Neutral – Positive
Reassured in its nutrition credentials

Recommend as sometimes to everyday (core) food



think



feel



do





Any questions?

Let's connect:



[@nutritionresearchaus](https://www.facebook.com/nutritionresearchaus)



[nr_au](https://www.instagram.com/nr_au)



[nutrition-research-australia](https://www.linkedin.com/company/nutrition-research-australia)



info@nraus.com



www.nraus.com



Citrus Hub

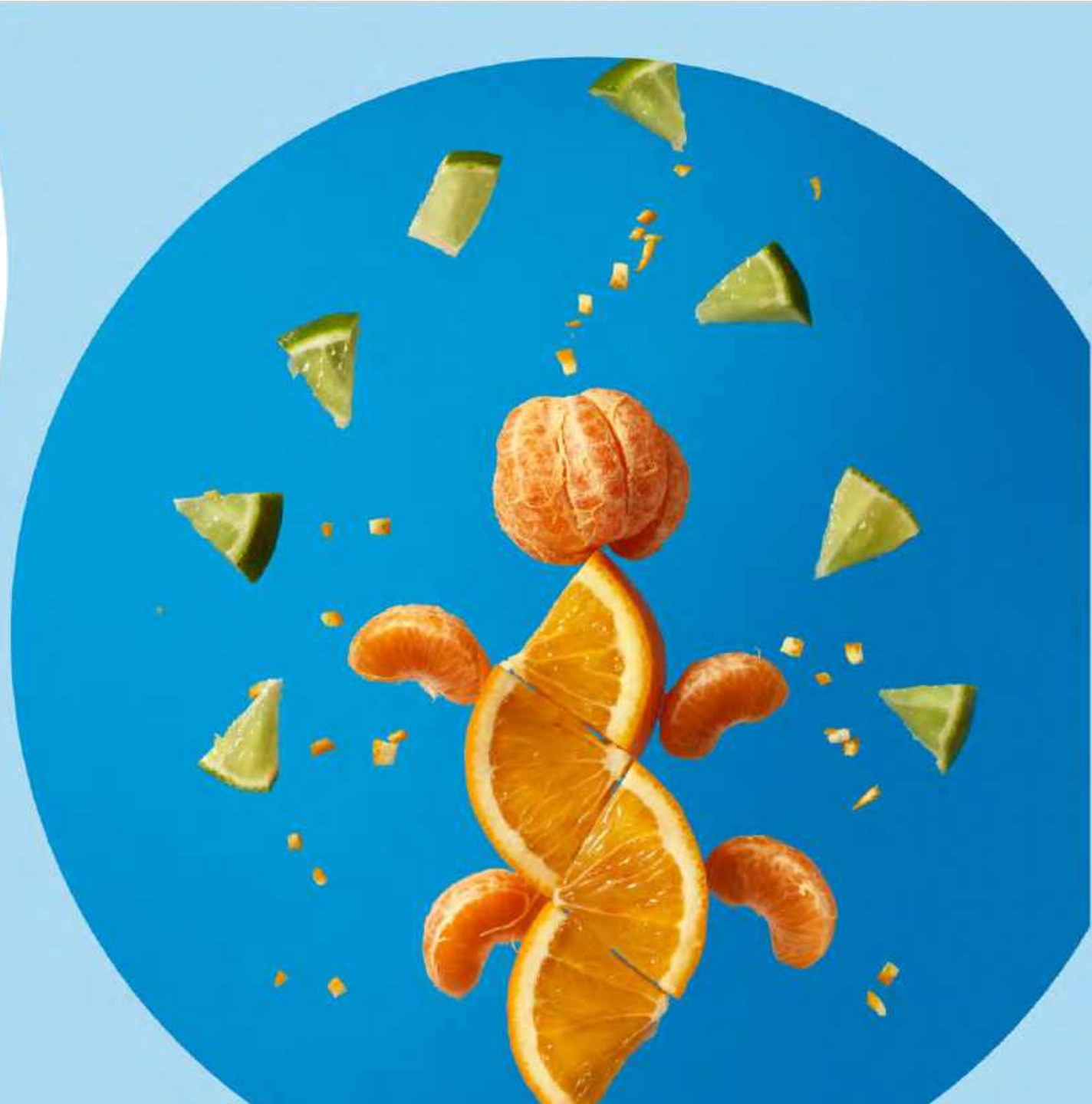


APPENDIX 19

Citrus & Juice

☒ otivation &
☒ indfullness

October 2023



Hello!

FOODiQ
global

Dr Emma Peckett



Citrus & Juice are misunderstood



Citrus & Juice are misunderstood



Why educate healthcare professionals?



New conversations needed



Vitamin C – Half could identify some nutritional properties, focus was vitamin C.



Not top of mind – so many fruits, why citrus?



Disconnect – between science, recommendations and practice.



Out of date – lack of modern information.



Citrus & Health

for health care professionals

Latest release: Heart Health | Immunity | Brain Health | Client friendly fact sheet | Recipes

Stay updated on citrus science, evidence-based resources, and new recipes

More to C in Citrus

Citrus fruits (oranges, mandarins, lemons, limes and grapefruits) have a famous place in nutrition science.

In 1747, in the first ever clinical trial, citrus fruits were shown to reverse signs of scurvy in sailors. It was not until the 1930s that it was discovered this was due to their rich vitamin C content.

Today, we know there is a lot more to citrus fruits than vitamin C.

All citrus fruits contain fibre, essential micronutrients like folate and potassium, and they are one of the richest sources of flavonoids, a class of plant bioactives. It is this unique, whole food package that is thought to work synergistically to deliver important health benefits, including immune support, brain health, and heart health.

Did you know?

Citrus fruits contain the plant bioactives hesperidin and naringenin. These are thought to have important health properties and are not commonly found in other foods.



More to 'C' IN CITRUS

Long known for their vitamin C content, modern nutritional research shows there is much more to citrus fruits than just vitamin C.

WHAT'S *new* IN CITRUS?

OLD PARADIGM:
HIGH IN VITAMIN C = PREVENTS DEFICIENCY

NEW PARADIGM:
UNIQUE CITRUS PACKAGE = MANY HEALTH BENEFITS

The many HEALTH BENEFITS OF CITRUS



HEART: 19% reduced risk of heart disease¹.



BRAIN: 18% reduced risk of dementia².



GUT: Improved gut microbiota composition³.



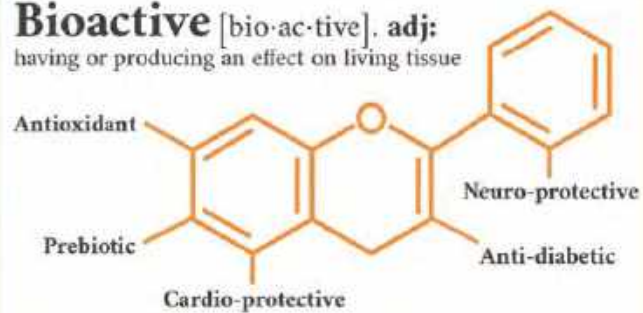
MOOD: 18% reduced risk of depression⁴.

THE NUTRIENTS IN CITRUS ARE ALSO IMPORTANT FOR IMMUNITY⁵

¹ Joshiwara (1999) <https://doi.org/10.1007/s12013-012-035-2>; ² Zhang (2017) <https://doi.org/10.1017/S000714911700109X>; ³ Fidella (2020) <https://doi.org/10.1029/cstc202023a>; ⁴ Chang (2015) <https://doi.org/10.3945/ajcn.115.124545>; ⁵ Henlla (2013) <https://doi.org/10.1002/14697580.CD000990.pub4>

CITRUS POLYPHENOLS are BIOACTIVES

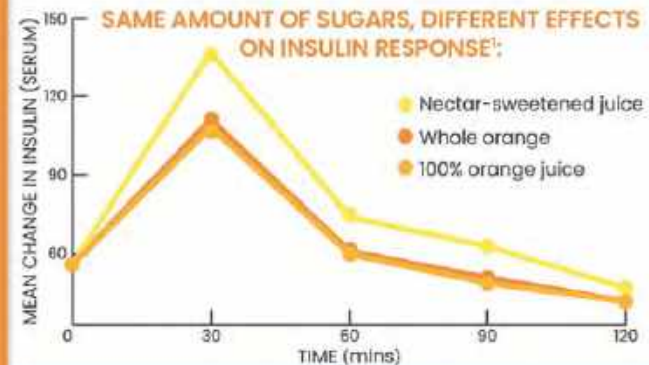
Bioactive [bio·ac·tive], **adj:**
having or producing an effect on living tissue



CITRUS FRUITS ARE ONE OF THE HIGHEST SOURCES OF FLAVANONES (A TYPE OF POLYPHENOL) IN THE DIET.

¹ Wahneed-Janabi (2020) <https://doi.org/10.22038/IJBM43.2019.35726.8353>

Understanding SYNERGY IN CITRUS



THE POLYPHENOLS IN CITRUS CAN HELP TO SLOW THE ABSORPTION OF NATURAL FRUIT SUGARS².

¹ Pappadreas (2016) <https://doi.org/10.3390/nu7092107>; ² Kim (2016) <https://doi.org/10.3390/nu801017>

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CITRUSLY DELICIOUS IDEAS in addition to whole fruit:

DINNER
Add juice & zest to soups or to cure seafood or beef


B'FAST
½ cup 100% juice

SNACK
Slices drizzled with extra virgin olive oil & cinnamon

LUNCH
Add sliced segments to salads

**AIM FOR CITRUS AT LEAST 3-4 TIMES A WEEK,
AS PART OF A BALANCED DIET.**



**Download the full
recipe book** 

Nutrition *Webinar*

Is citrus the affordable superfood?

Exploring the fascinating world of food synergy & bioactives.



Monday
20th November



1 – 2 pm AEDT



*Virtual & free,
register now!*



**Professor Linda
Tapsell**



**Dr Emma
Beckett**



Moving beyond the reductionist approach:

What should modern dietary recommendations consider with respect to 100% juice?

Expert Roundtable

October 11th 2023

10.30am - 2pm AEDT



Dairy & Heart Healthy Eating

“There is not enough evidence to recommend reduced fat over full fat products for the general population.”

Juice in Australian Guidelines

What is a serve of fruit?

A standard serve is about 150g (350kJ) or:

1 medium apple, banana, orange or pear

2 small apricots, kiwi fruits or plums

1 cup diced or canned fruit (no added sugar)

Or only occasionally:

125ml (½ cup) fruit juice (no added sugar)

30g dried fruit (for example, 4 dried apricot halves, 1½ tablespoons of sultanas)



Why just fruit?



How often is occasionally?



Why 125mL?

- 125ml = 250 × 300kJ
- Equivalent serve (350kJ) = 200mL



Juice in Australian Guidelines



Most Australians eat only about half the recommended quantity of fruit. However many of us drink far too much fruit juice. Fruit juices can be high in energy (kilojoules) and low in dietary fibre, and can even damage your teeth. Whole fruits are a much better choice, and are more filling.



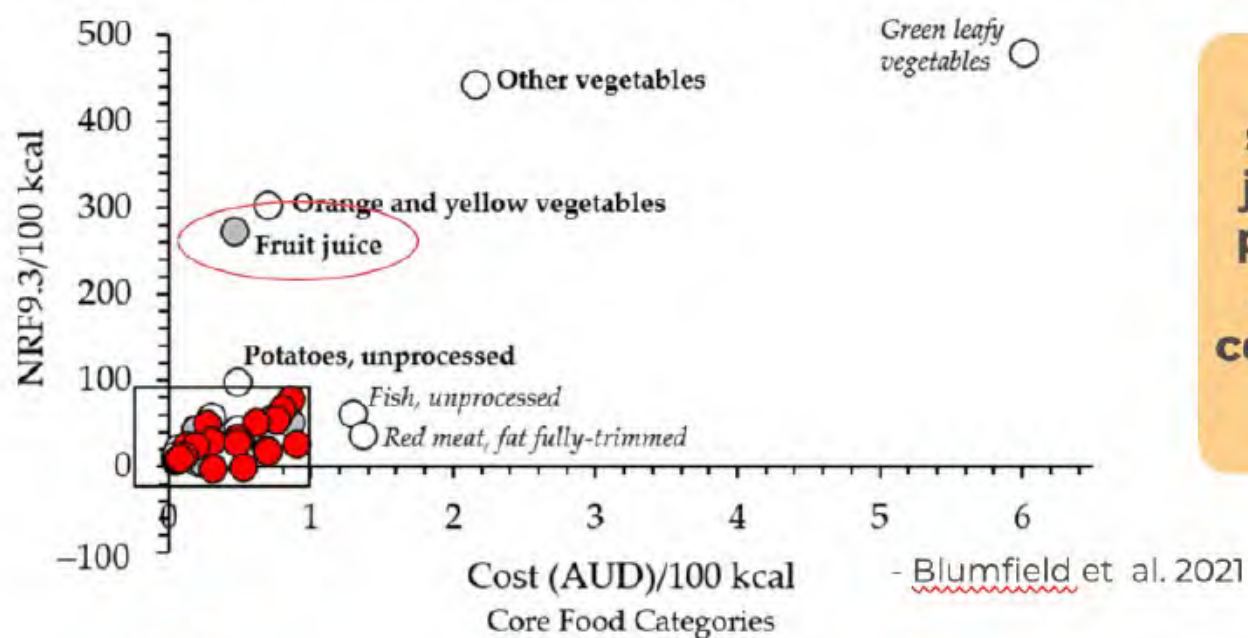
White paper



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global

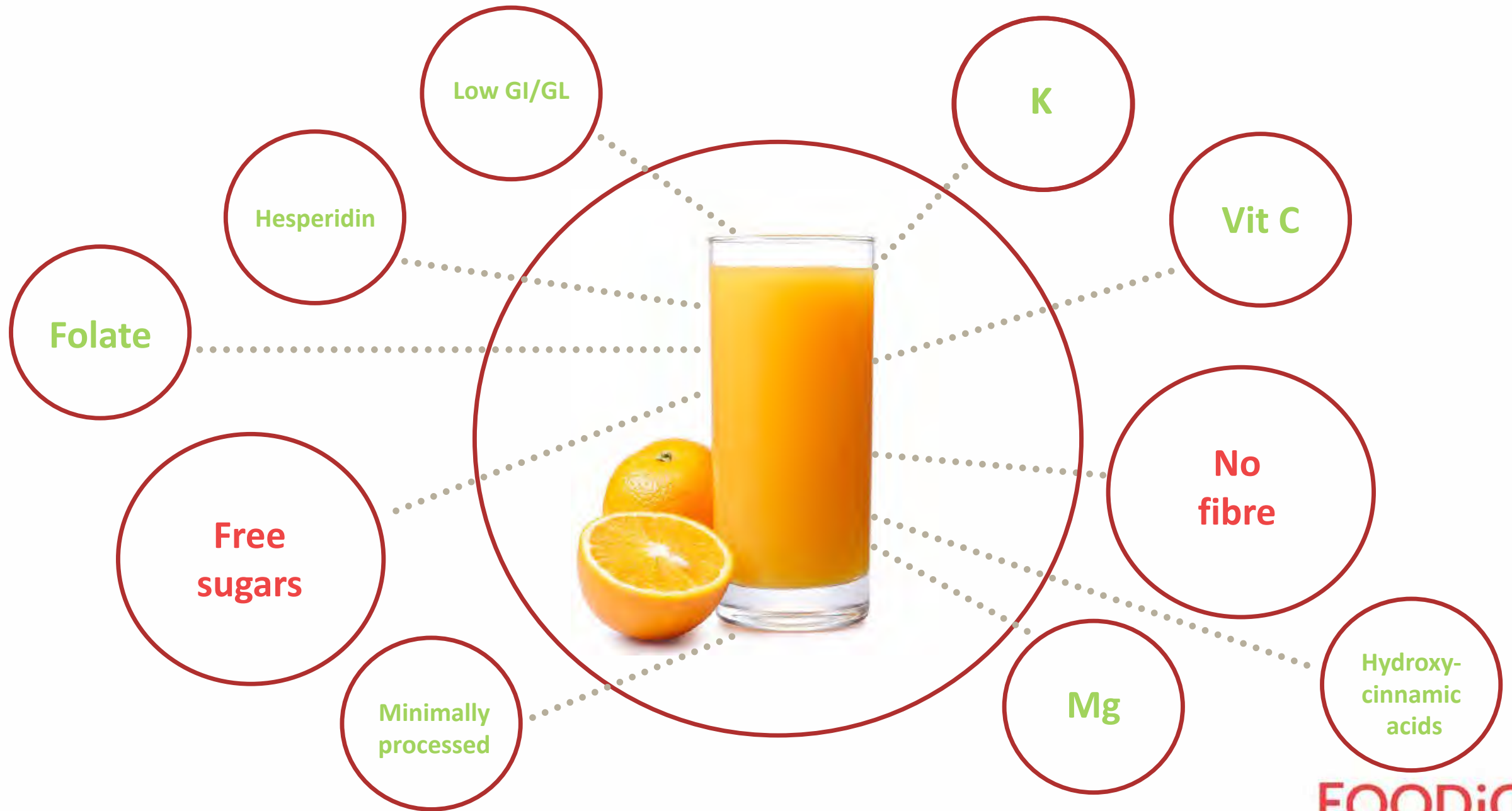


100% juice: the most nutrition for the lowest cost

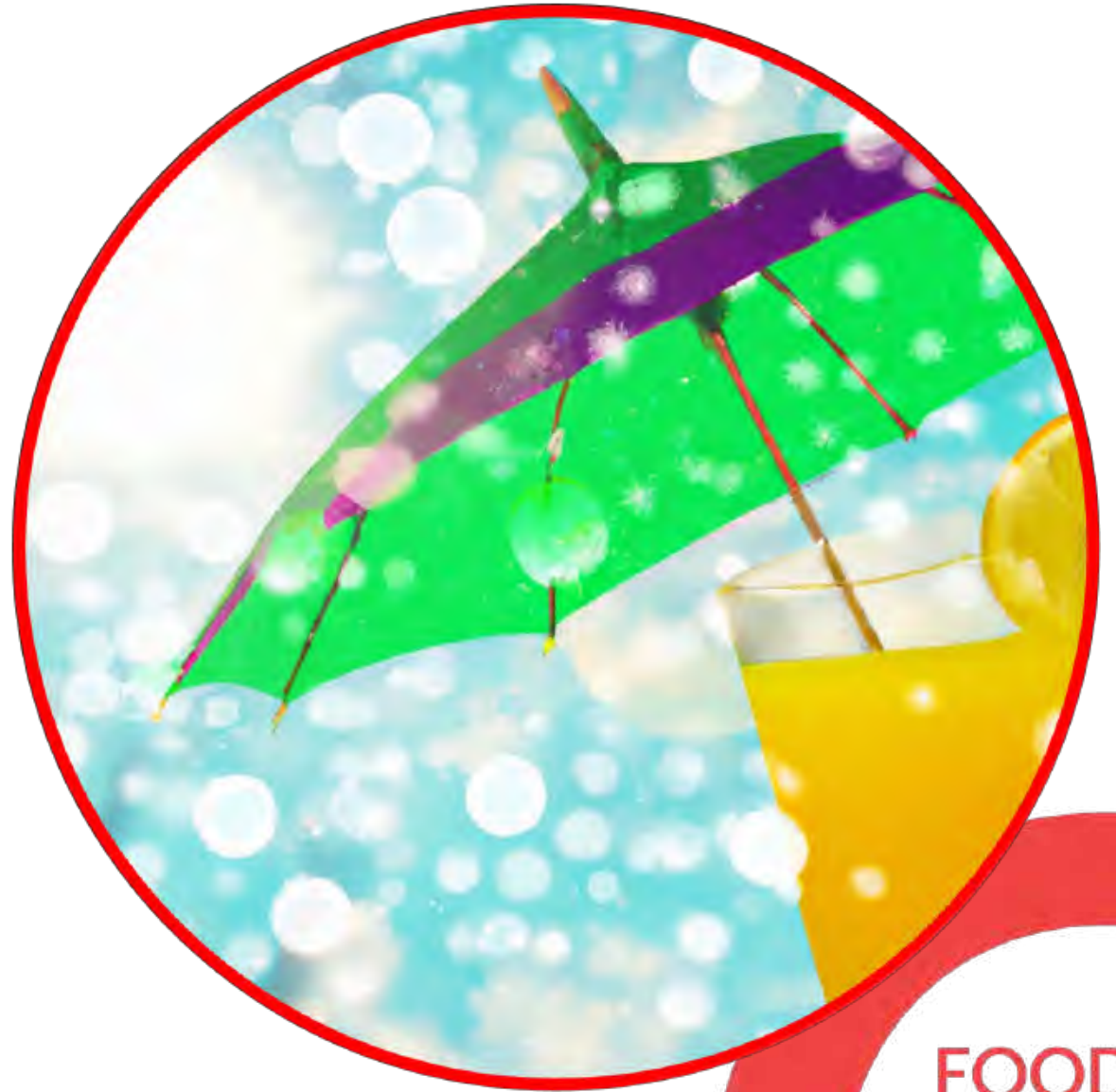


“The preponderance of evidence supports the position that 100% fruit juice delivers essential nutrients and phytochemicals, provides year-round access to a variety of fruits, and is a cost-effective way to help people meet fruit recommendations”.

- Clemens et al. 2015



Umbrella review



The balance of evidence for 100% juice and health

BENEFITS

RANDOMISED CONTROLLED TRIALS

Cardiovascular Risk Factors

DBP (n=1,225) [✓]
DBP (n=574) [✓]
SBP (n=1,225) [✓]
SBP (n=574) [✓]
Uric acid (n=390) [✓]
FMD (n=174) [✓]

Inflammation

IL-6 (n=301) [✓]
IL-6 (n=176) [★]
CRP (n=150) [✓]

COHORT STUDIES

Mortality

Stroke Mortality (n=128,270) [✓]

NEUTRAL

RANDOMISED CONTROLLED TRIALS

Cardiovascular Risk Factors

HDL-cholesterol (n=1,007) [✓]
LDL-cholesterol (n=880) [✓]
E-selectin (n=125) [✓]
ICAM-1 (n=125) [✓]
VCAM-1 (n=125) [✓]

Inflammation

CRP (n=506) [✓]
CRP (n=432) [✓]
CRP (n=138) [★]
MDA (n=254) [★]
IL-6 (n=176) [✓]
TNF- α (n=176) [✓]

Body composition

Body weight (n=975) [✓]
BMI (n=588) [✓]
Waist Circumference (n=411) [✓]

Metabolic outcomes

Insulin (n=1,691) [✓]

COHORT STUDIES

Mortality

All-cause (n=261,542) [✓]
CHD (n=261,542) [✓]

Cancer

Colorectal (n=109,279) [✓]
Breast (n=108,837) [✓]

Cardiovascular disease

CVD (n=167,879) [✓]
CHD (n=109,898) [✓]
Hypertension (n=83,178) [✓]
Stroke (n=148,839) [✓]

RISKS

COHORT STUDIES

Metabolic outcomes

T2DM (n=440,937) [9]

Cancer

Prostate cancer
(n=135,359) [✓]

Mortality

CVD (n=6,325) [✓]



Sparkling
Apple

Apple

Low Sugar

Light

Light

Cran-Orange

Cran-Orange

Ruby Red

Ruby Red

A FREE STROLLER

All Colgate Brand
Toilets & Creams

V8
healthy greens
POWER BLEND

New
\$2.40

Cranberry Classic

Cranberry Classic

Cranberry Classic

Cranberry Classic

Cran-Raspberry

Cran-Blueberry

Cran-Blueberry

V8
healthy greens

V8
purple power

V8
purple power

V8
purple power

V8
purple power

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purple power

V8
purple power

V8
purple power

V8
purple power

Coming up



New conversations needed



More than vitamin C – a comple^x & functional food



Front of minds for KoLs, policy & professionals



Reconnect & challenge biases



Update information & place in conte^xt

THANK YOU!

-  @foodiqglobal
-  foodiqglobal
-  foodiqglobal
-  info@foodiq.global
-  www.foodiq.global

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global



APPENDIX 20

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A **new narrative for
communicating
citrus health
benefits**



**Hort
Innovation**

**CITRUS
FUND**





Serious
about citrus



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**Why educate
healthcare
professionals?**



Citrus & health are misunderstood



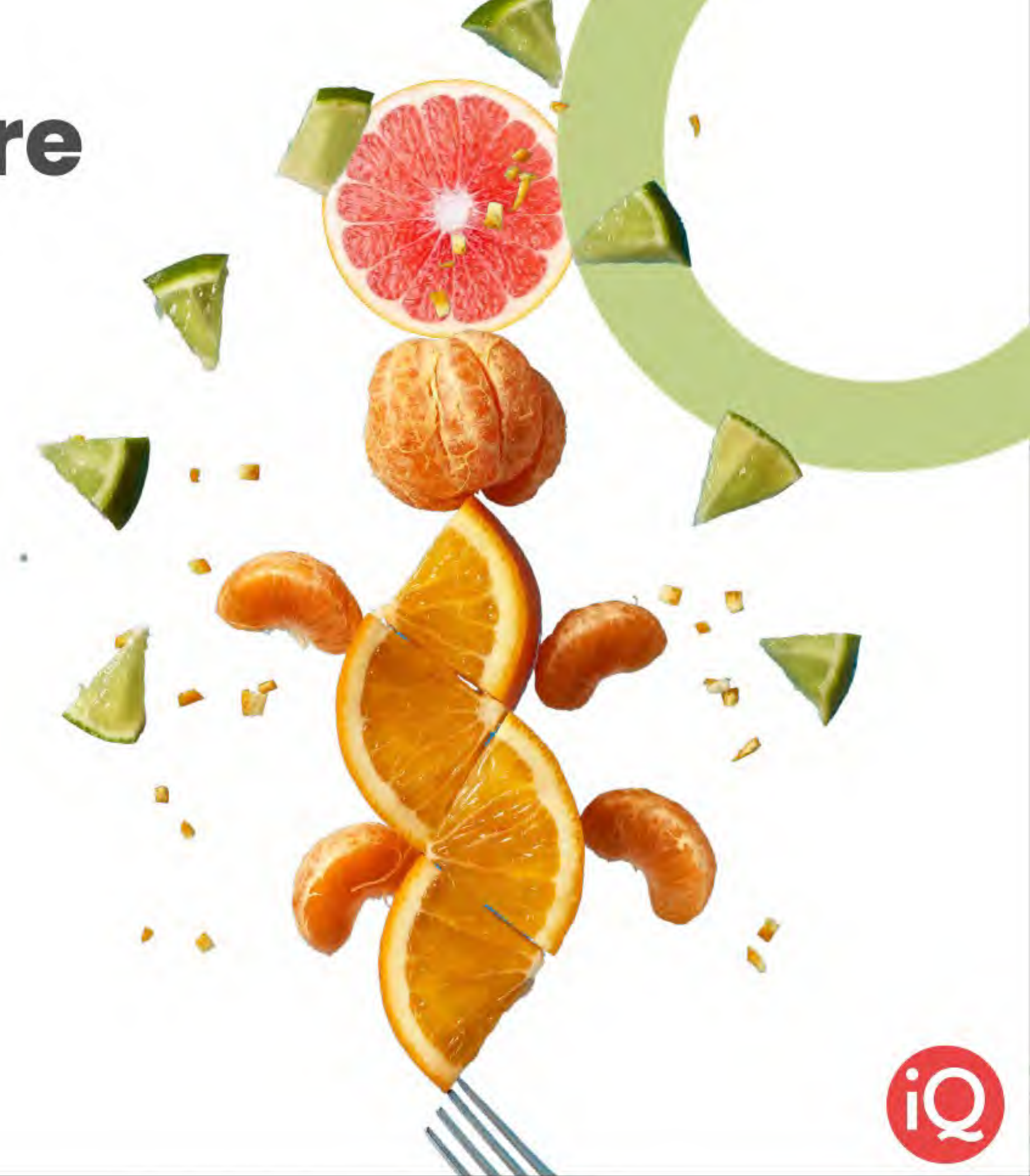
Update



Educate



Empower



New narratives needed



Not top of mind – so many fruits, why citrus?



Vitamin C – Half could identify some nutritional properties, focus was vitamin C.



Disconnect – between science, recommendations & practice.



Out of date – lack of modern information.



Reframing citrus

OLD PARADIGM:

Vitamin C = prevents deficiency



NEW PARADIGM:

Unique food matrix = Systemic health benefits

Need **specific** stories to stick



Generally
good

Vs.



Specifically
good



Citrus as a forgotten, affordable **superfood**



Affordable



Familiar



Accessible



Easy



Nutrient
dense



Bioactive
rich



Citrus has important, specific **benefits**

Citrus Fruits FOR BRAIN HEALTH

Brain health is moving to the forefront of dietary recommendations.

- ✓ Depression and dementia now leading causes of disease burden.
- ✓ Diet an established determinant of brain health¹.
- ✓ Better brain health not only reduces chronic disease risk, it also means improved mental health and everyday performance².

COMMON BRAIN HEALTH MEASURES IN SCIENTIFIC STUDIES:

- Cognitive function or performance:** High-level thinking such as attention, memory, decision-making, and judgment. *Measured over: SHORT TO MEDIUM TERM*
- Depression:** Depressed mood, diminished interests, and impaired cognitive function. *Measured over: MEDIUM TO LONG TERM*
- Cognitive decline:** Loss of memory or other cognitive functions in older age. Significant cognitive decline can result in dementia. *Measured over: LONG TERM*

THE EVIDENCE: citrus fruits benefit brain health outcomes over time

COGNITIVE FUNCTION In randomised controlled trials, flavonoid-rich orange juice improves cognitive performance in healthy adults^{3,4}.

- AFTER 2 HOURS:** Greater psychomotor speed after consuming 240 ml orange juice.
- AFTER 6 HOURS:** Improved executive function and subjective alertness after consuming 240 ml orange juice.
- AFTER 8 WEEKS:** Improved global cognitive function in older adults after consuming 500 ml orange juice daily.

DEPRESSION In a prospective analysis of US female nurses, citrus fruits and citrus juices had a lower risk of depression⁵.

- AFTER 10 YEARS:** 18% reduced depression risk with 2 or more servings of citrus fruits or juices daily.

DEMENTIA In a prospective cohort study, citrus fruits was associated with reduced dementia incidence⁶.

- AFTER 6 YEARS:** 18% reduced risk for citrus 3-4 times a week, and 23% reduced risk for citrus daily.

COGNITIVE DECLINE In recent analyses of large prospective cohorts of US health professionals, citrus fruits and their juices was associated with better cognitive function in older age^{7,8}.

- UP TO 18-22 YEARS:** In a 2019 analysis of the Health Professionals' Follow-Up Study cohort, orange juice reduced the odds of poor subjective cognitive function by 47%⁷.
- UP TO 30 YEARS:** In a 2021 analysis of the Nurses' Health Study and Health Professionals' Follow-Up Study, higher intake of oranges, grapefruit, and citrus juices were associated with better cognitive function⁸.

Prospective cohort study = an observational study that is considered to provide the greatest level of evidence relative to the other observational study designs. Randomised controlled trial = an experimental study considered to provide the most reliable evidence on the effectiveness of interventions.

In a cross-sectional study of over 2000 older adults, citrus fruits had one of the strongest positive associations with cognitive performance of all plant foods⁹.

Citrus Fruits FOR IMMUNITY

As new infectious challenges emerge and cold and flu viruses continue to circulate widely, interest in foods for immunity is strong.

Citrus is commonly believed to support immunity... but is it an evidence-based recommendation?

IMMUNITY RECAP
A healthy immune system is a balance of protective inflammation and anti-inflammatory pathways utilising antioxidants to prevent damage and support microbiomes. For both acute and chronic illness, this complex balancing act requires nutritional support for optimal barrier, detection, targeting, elimination, and memory function.

CITRUS FRUITS are a unique nutrition package for immune support

CITRUS IS NOTABLE FOR VITAMIN C WHICH IS WELL-ESTABLISHED IN SUPPORTING IMMUNITY

Vitamin C improves immune outcomes in meta-analyses

31 RCTs ¹⁰	3 RCTs ¹¹	24 RCTs ¹²	5 RCTs ¹³
Reduces duration and severity of common colds	Reduces risk and duration of pneumonia	No effect on common cold incidence generally	Decreased infection in short-term, high physical stress

Vitamin C is vital to:

- ➔ barrier function & wound healing via collagen promotion¹⁴
- ➔ chemotaxis to recruit cells to targets¹⁵
- ➔ function of white blood cells¹⁶
- ➔ antioxidant and anti-inflammatory activity¹⁷

EMERGING SCIENCE SHOWS CITRUS BIOACTIVES SUPPORT IMMUNITY

Bioactive citrus flavonoids are in all parts of the fruit¹⁸. Key citrus flavonones are not commonly found in other fruits¹⁹.

Bioactive citrus flavonoids support immunity in 3 ways

- 1 Anti-microbial**
 - Hesperidin and hesperetin reduce binding and replication of SARS-CoV-2, and free radical damage²⁰.
 - Hesperidin, hesperetin and quercetin prevent influenza replication²¹.
- 2 Antioxidant^{22,23}**
 - Enhance activity of human antioxidant enzymes, and inhibit pro-oxidant enzymes.
 - Absorb and neutralise free-radicals.
 - Hesperidin, naringenin and orange juice reduced reactive oxygen species in RCTs²⁴.
- 3 Anti-inflammatory**
 - Hesperidin and orange juice reduced inflammatory markers in humans²⁵.
 - Naringenin, naringin and narirutin: anti-inflammatory effects (pets & animals)²⁶.
 - Hesperidin and naringin: increased microbiome short chain fatty acids (SCFA) production, particularly immune modulating propionate²⁷.

Major Citrus Flavonoids^{28,29}
Hesperidin, Hesperetin, Naringenin, Naringin, Diosmin, Nobiletin, Quercetin

CITRUS FRUITS HAVE A UNIQUE FIBRE PROFILE

MOST FRUITS & VEGETABLES = PREDOMINATELY INSOLUBLE FIBRE

CITRUS FRUITS = A BLEND OF SOLUBLE (PREBIOTIC) & INSOLUBLE³⁰

Dietary fibres have direct and indirect impacts on the immune system.

- ✓ Soluble fibres (eg. pectins) abundant in citrus support gastrointestinal barrier function³¹ and feed the microbiome to support the gut-immunity axis³².
- ✓ Citrus peel dietary fibres contain monosaccharides (arabinose, rhamnose, xylose)³³ that increase anti-inflammatory SCFA³⁴.

Citrus Fruits FOR HEART HEALTH

Heart health is still the most pressing health concern in Australia.

Heart disease is the #1 cause of death in Australia³⁵.

- One death every 18 minutes and one hospitalisation every 80 seconds.
- Diet a widely established modifiable risk factor for heart disease.

COMMON HEART HEALTH MEASURES IN SCIENTIFIC STUDIES:

- Markers of cardiovascular disease (CVD) risk:** Biomarkers that increase CVD risk such as high blood pressure (BP) and lipids. *Measured over: SHORT TO MEDIUM TERM*
- Cardiovascular disease:** Diseases of the heart and blood vessels that includes coronary heart disease (CHD) and stroke. *Measured over: MEDIUM TERM*
- CVD mortality:** Death with CVD as the underlying cause. *Measured over: LONG TERM*

THE EVIDENCE: Citrus fruits benefit heart health outcomes

CVD MARKERS

- In meta-analysis of randomised controlled trials, citrus fruits and citrus juices improve markers of CVD³⁶.
 - 2.1% FMO
 - Improvement in flow-mediated dilation (FMD) in a meta-analysis of 35 randomised control trials (RCTs) for fruit juices (including citrus) vs. control.
 - 3.1 mmHg SBP
 - Reduction in systolic blood pressure (SBP) in a meta-analysis of 35 RCTs for fruit juices (including citrus) vs. control.

CVD

In large prospective cohorts of US health professionals, higher intake of citrus fruits and their juices was associated with reduced CVD risk³⁷.

- 19% RR
- Reduced risk (RR) of ischaemic stroke for citrus fruits and their juices.
- 25% RR
- Reduced risk of ischaemic stroke for citrus juices alone.

CVD MORTALITY

In a large prospective cohort study of US women³⁸:

- 15% RR
- Reduced risk of CHD mortality with grapefruit consumption.

Prospective cohort study = an observational study that is considered to provide the greatest level of evidence relative to the other observational study designs. Randomised controlled trial = an experimental study considered to provide the most reliable evidence on the effectiveness of interventions.

In the Nurses' Health Study and the Health Professionals' Follow-Up Study, citrus fruits (including juice) had one of the strongest protective associations for ischaemic stroke of all fruit and vegetable types³⁹.

More to 'C' IN CITRUS

Long known for their vitamin C content, modern nutritional research shows there is much more to citrus fruits than just vitamin C.

The many HEALTH BENEFITS OF CITRUS



HEART: 19% reduced risk of heart disease¹.



BRAIN: 18% reduced risk of dementia².



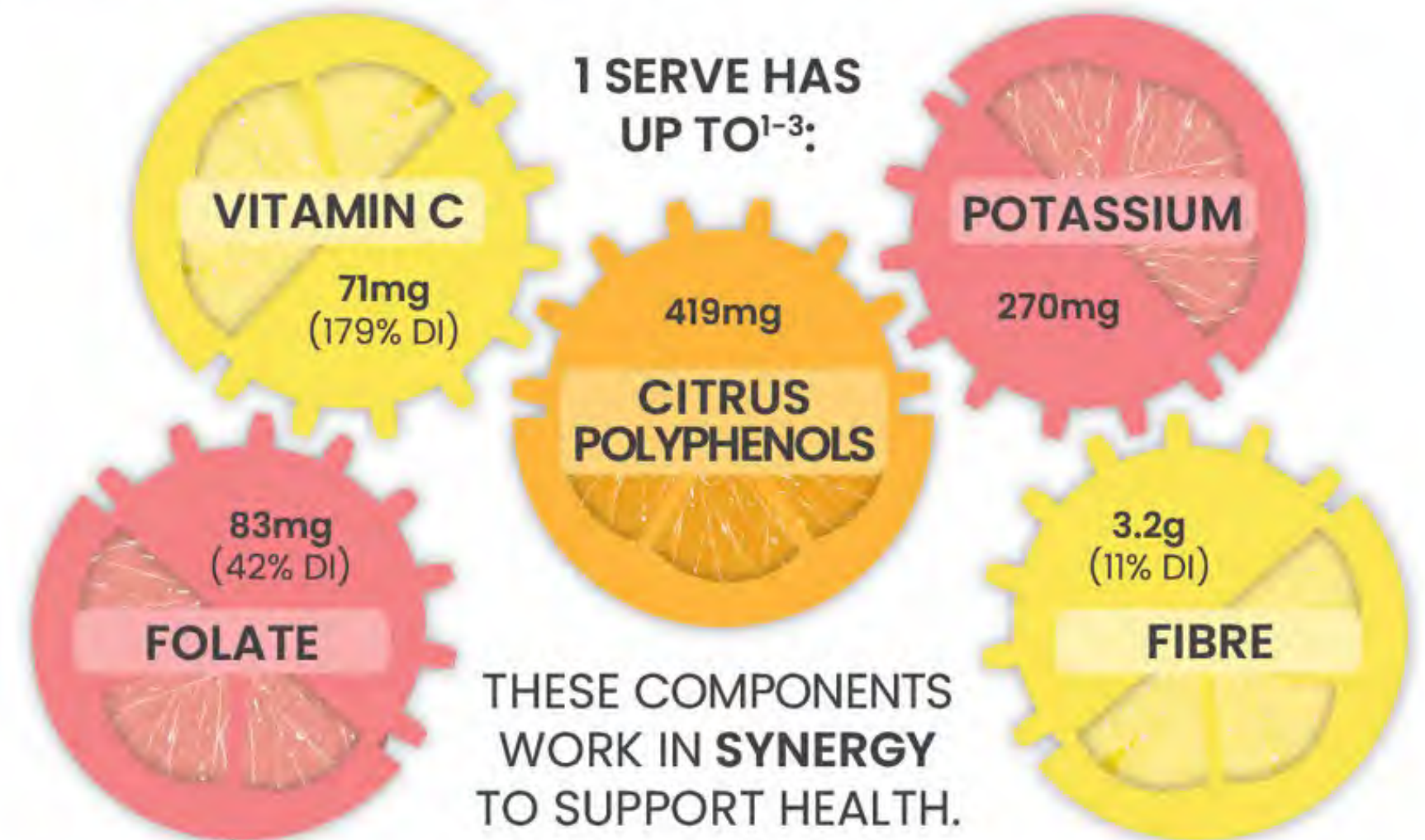
GUT: Improved gut microbiota composition³.



MOOD: 18% reduced risk of depression⁴.

THE NUTRIENTS IN CITRUS ARE ALSO IMPORTANT FOR IMMUNITY⁵.

1. Joshipuro (1999) <https://doi.org/10.1001/jama.282.13.1233> 2. Zhang (2017) <https://doi.org/10.1017/S000711451700108X> 3. Fidelix (2020) <https://doi.org/10.1033/c9fo02623a> 4. Chang (2016) <https://doi.org/10.3945/ajcn.115.1245-45> 5. Hemila (2013) <https://doi.org/10.1002/14697580.CD009880.pub4>

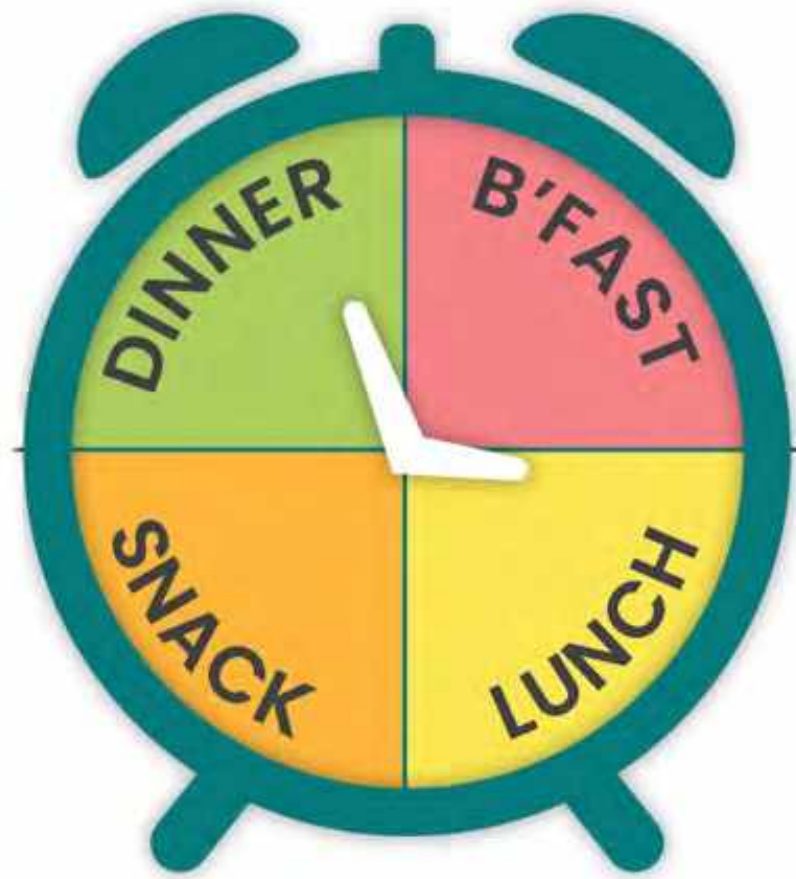


DI = Daily Intake. 1 serve = ~ 150 g

1. Australia New Zealand Food Standards Code – Schedule 1 – RDIs and ESADDIs <https://www.legislation.gov.au/Series/F2015L00491>. 2. Australian Food Composition Database (2022). 3. <http://phenol-explorer.eu/>



Citrus for culinary **inspiration**



<p>WHOLE AS A SNACK</p>	<p>SLICES IN WATER OR TEA</p>	<p>AS JUICE</p>
<p>GRILLED ADDED TO MEALS</p>	<p>FREEZE JUICE AS ICE BLOCKS</p>	<p>ADD LEMON JUICE & ZEST TO YOUR FAVOURITE SOUPS</p>
<p>USE LEMON OR LIME JUICE & ZEST TO CURE SEAFOOD OR BEEF</p>	<p>IN SALAD DRESSINGS</p>	<p>SLICE SEGMENTS INTO SALADS</p>

Savouring citrus:
FRESH & VIBRANT RECIPE INSPIRATIONS

Citrus fits healthy **dietary patterns**



- DASH-diet
- Mediterranean diet
- Plant-based/vegetarian
- Minimally processed

The whole fruit is edible & nutritious



100% citrus juice is **misunderstood**

What is a serve of fruit?

A standard serve is about 150g (350kJ) or:

- 1 medium apple, banana, orange or pear
- 2 small apricots, kiwi fruits or plums
- 1 cup diced or canned fruit (no added sugar)

Or only occasionally:

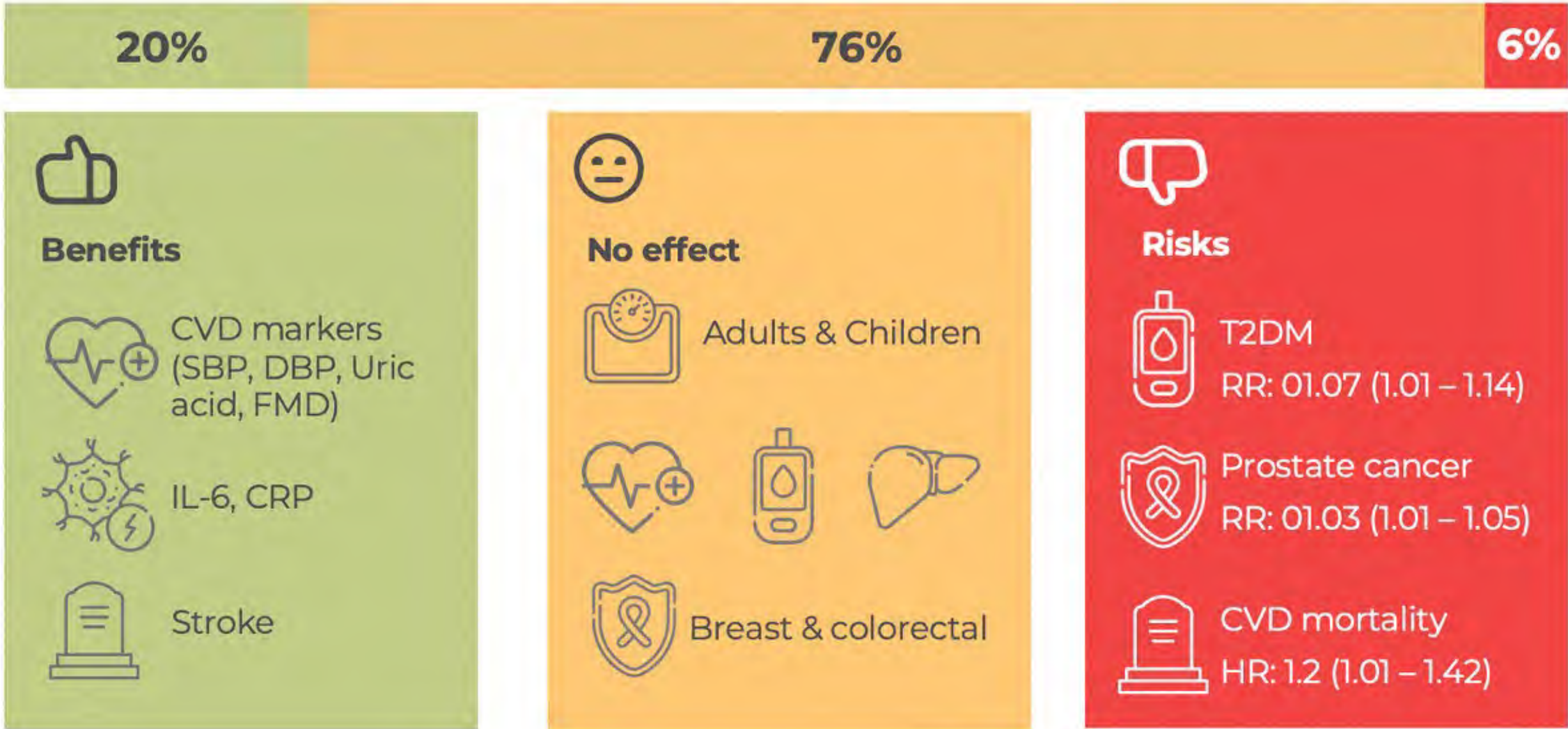
- 125ml (½ cup) fruit juice (no added sugar)
- 30g dried fruit (for example, 4 dried apricot halves, 1½ tablespoons of sultanas)




Most Australians eat only about half the recommended quantity of fruit. However many of us drink far too much fruit juice. Fruit juices can be high in energy (kilojoules) and low in dietary fibre, and can even damage your teeth. Whole fruits are a much better choice, and are more filling.

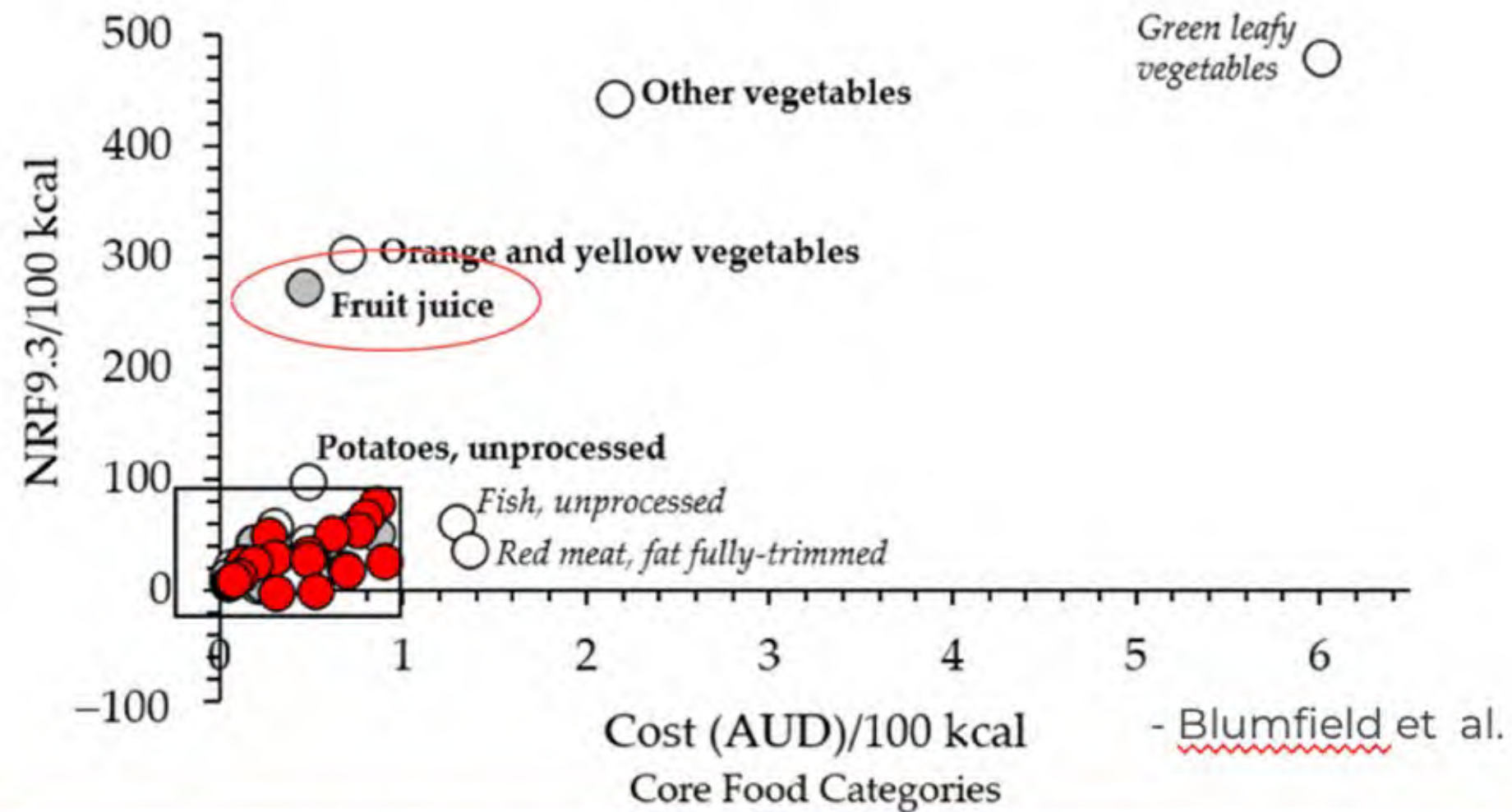


Updating the evidence for 100% juice & health



 No eligible evidence for harm to teeth





“The preponderance of evidence supports the position that 100% fruit juice delivers essential nutrients and phytochemicals, provides year-round access to a variety of fruits, and is a cost-effective way to help people meet fruit recommendations”.

- Clemens et al. 2015



K

Vit C

Hesperidin

Folate



Lower fibre

Free sugars

Mg

Acids



New narratives



Sticky stories – top of mind for KOLs & professionals



More than vit C – a complex & functional superfood



Reconnect & challenge biases



Up-to-date information & placed in context



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