

Conference Report

Consumer Acceptance of Future Foods in Asia-Pacific

Conference Details: Online, 28th February 2024, 09:00-14:30 SGT (GMT+8)

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Consumer Acceptance of Future Foods in Asia-Pacific Conference

The conference brought together delegates with a keen interest in consumer perceptions of future foods to share insights from their research within the Asia-Pacific (APAC) region via invited speaker presentations and flash presentations following participant submissions to a call for abstracts. The conference provided a platform for delegates to disseminate their work and offered opportunities for collaboration to better inform product development and interventions to help consumers navigate future foods. Over 350 delegates registered for the event including academics, health professionals, students, and individuals from industry and public agencies. Delegates joined from over 12 countries worldwide with the majority from the APAC region.

The conference began with an opening address from Dr Su (*Executive Director, Institute of High Performance Computing (IHPC), A*STAR*). Dr Su welcomed the delegates and presenters to the conference and gave a brief overview of the importance of understanding the changing food environment. He also encouraged delegates to use the conference as an opportunity to connect with researchers within the region with similar research interests. Dr Aimee Pink (*Scientist, IHPC and Singapore Institute of Clinical Sciences (SICS), A*STAR*) continued to encourage delegates to expand their networks and connect with potential collaborators in her conference introduction. As part of the introduction, Dr Pink commented on how the focus on future foods tends to be on how to make foods more efficiently and more economically whilst neglecting consumer perceptions. She raised the importance of bringing together researchers passionate about understanding consumer perceptions and how

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varied perceptions will be due to individual differences in food choices and eating behaviours. Dr Pink promoted the idea that “one size does not fit all” when it comes to consumers, and this was supported by a quote spotted on LinkedIn by Jessica Aschemann-Witzel to drive this home – **“There is no such thing as “the consumer” but many consumer segments and perspectives”**. To finish the introduction, Dr Pink briefly introduced the project and team behind the current research into consumer perceptions being conducted in IHPC and SICS, A*STAR as a segway into the first speaker.

Ms Arunika Pillay (*Senior Research Officer, SICS, A*STAR*) kicked off as the first speaker and discussed perceptions of plant-based meat, cultivated meat and insect protein in Singapore. This research addressed gaps in the current consumer literature by exploring children and parents’ perceptions of alternative proteins as well as their influence on each other’s perceptions. The qualitative study found that taste, cost, health, and familiarity influenced both child and parent perceptions. Parent discussions had a slightly greater focus on nutrition while children were more interested in the sustainability benefits of alternative proteins. The presentation concluded with plans to launch a survey to further explore the focus group findings with a larger sample from Singapore.

Next the conference moved onto the first set of flash presentations. Mr Brian Lin (*Scientist, The New Zealand Institute for Plant and Food Research Limited*) started us off by sharing his work on consumer perceptions towards cultivated food in Singapore and Vietnam. The consumer perceptions were gathered through a quantitative survey study and examined based on the theory of consumption values (that is ecological, functional, experiential, symbolic and epistemic). Unique differences in perceptions across consumers in the two

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countries were highlighted, especially the association of cultivated foods to ecological, symbolic, and epistemic values. Mr Lin concluded his presentation with a message on how understanding these nuanced insights could help shape strategies for fostering greater acceptance of cultivated foods.

Following up with another flash presentation, Ms Durga Devi (*Food technologist, ProPlant Foods Pvt Ltd (ProMeat)*) discussed her work investigating cross-cultural perceptions of future foods across three countries: India, China, and Japan. Ms Devi shared that consumers in these regions have specific taste bud characteristics which may impact their acceptance of future foods and provided insights into what these varying consumer preferences were. For example, consumers in India preferred strong spices while consumers in China had a liking for sour, bitter and pungent foods and Japanese consumers preferred umami flavours. To end off her presentation, Ms Devi gave suggestions on the type of future foods that may suit the specific preferences of these consumers.

Ms Janani R (*Research officer, Singapore Institute of Food and Biotechnology Innovation (SIFBI), A*STAR*) gave the final flash presentation of the opening set and discussed insights from an online survey examining the influence of meal type and eating environment on consumer perceptions, acceptance, and the expected consumption of alternative proteins. Through a series of questions, 12 conditions (three meal types (animal, plant, or hybrid proteins) x four environments (home, hawker, nature restaurant, or urban restaurant)) were provided and participants rated these conditions based on their perceived healthiness, naturalness, liking and expected consumption. It was found that perceptions of healthiness and naturalness were influenced by the environment while the meal type influenced consumers' liking and

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expected consumption. Moreover, the research has shown that there was no significant combined impact of the meal type and environment on all outcomes. Ms Janani then proceeded to conclude her presentation by suggesting that hybrid meals may be a potential solution to encourage a transition to plant-based meats by heavy meat eaters.

Moving on to the second speaker, Dr Keri Matwick (*Senior lecturer, Nanyang Technological University*) gave an in-depth review of sentiments across five future foods categories from various social media channels (that is Facebook, Twitter, Instagram, and online forums) in Singapore, from January to June 2023. Generally, sentiments across all five future food categories (plant-based meats, cultivated meats, micro-algae, fermentation foods and insect proteins) were negative, however for some food categories, the tone (positive to negative) of sentiments covered a much larger spectrum. The range of sentiments was speculated to be due to the wide variety of products available in this category. This was in stark contrast to micro-algae food which had no social traction. When examining the trend on social media channels, spikes in engagements were found which were attributed to buzzes created by the media such as the publicity received around mammoth meatballs. Among the extensive sentiments being gathered, health and safety were found to be a primary concern of future foods for consumers. Dr Matwick then concluded her presentation by noting that while novel foods may drive engagement in future foods, reactions may not be favourable and emphasised that it is key for the industry to monitor these sentiments and react to them by responding and engaging with consumers.

Following the break, Dr Ivy Gan (*Consumer Scientist, The New Zealand Institute for Plant and Food Research Limited*) shared insights from a focus group study exploring attitudes and

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perceptions of cultivated meat, fish and fruits in Australia and New Zealand. Emphasis was placed on the ethical implications of cellular agriculture with participants discussing sustainability, animal welfare, social justice and equity, culture and religion, and health and well-being. Dr Gan raised concerns about what makes a food system just, highlighting how novel food technology has the potential to improve affordability and accessibility but also has the potential to increase costs and in turn elitism which can further contribute to an unjust food system. The presentation concluded by emphasising the need for care when rolling out new food technologies to ensure it does not further exacerbate food system inequalities.

Next, we returned to the second round of flash presentations and Dr George Jacobs (*Kampung Senang Charity and Education Foundation*) shared his personal insights into being a vegan in Singapore and the attitudes of vegan and vegetarian (veg*n) consumers towards alternative proteins. He discussed the resistance towards alternative proteins amongst this demographic group in Singapore and summarised some of the reasons behind these thoughts. For instance, individuals following a veg*n diet expressed that they already had suitable and affordable substitutes in Singapore and did not feel the need to deviate from them. These individuals had often stopped consuming meat for an extended period and no longer had a desire for 'meat' even if it was kill-free, for example plant-based meat alternatives. For example, options such as cultivated meat which are animal-based were not appealing. There was also concern about health risks associated with the relative amount of perceived processing of alternative proteins, as well as doubts about recognizing certain foods as 'Generally Recognised As Safe' in the absence of long-term testing. Dr Jacobs concluded the presentation with observations of there being less of an activist orientation

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amongst veg*ns in Singapore and as a result there is less motivation to drive the sales and demand for alternative proteins to motivate the general public to reduce their meat intake.

Following up with another flash presentation, Ms Amelia Juraimi (*Research officer, IHPC, A*STAR*) discussed insights from an online survey study investigating regular consumers of plant-based meat alternatives (PBMA), defined as having consumed PBMA at least once a week, in Singapore and Australia. Consumers in Australia were found to have been incorporating PBMA in their diets longer than Singaporean consumers and hence, as expected, were consuming them more frequently and in higher amounts. Overall, consumers in both countries were satisfied with the current range of PBMA available and agreed that their local dishes would still maintain their heritage and nostalgia if the meat ingredients were replaced by PBMA. Ms Juraimi also shared some insights on the top motives of sustaining PBMA intake, specifically in Singapore, and concluded her presentation by noting that this was part of a larger project which included regular consumers in the United Kingdom (UK) as well. Within the larger project, investigation is underway into consumer's motives and barriers in sustaining PBMA intake that may predict consumption as well as a qualitative analysis to identify areas in which PBMA has not met consumers' needs and satisfaction.

Mr Kaustubh Chandramouli Manikandan (*Student, School of the Arts Singapore*) was the third flash presentation in this section and shared findings on dietary preferences, attitudes and eating habits of 13-18-year-old students consuming plant-based meat. He discussed how students currently have a predominantly meat-based diet, that taste and price were important factors when considering plant-based options and that positive attitudes towards

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plant-based meat did not translate to intention and actual consumption. He concluded his presentation by expressing the need for educational interventions with an emphasis on nutrition and health benefits to boost acceptance of plant-based meat. He also suggested focusing efforts on improving taste, texture, and juiciness to enhance positive perceptions and receptivity.

Singapore-based Dr Thimo Ruethers (*Research Fellow, James Cook University*) followed with a flash presentation on the health and allergy risks of future foods. He discussed emerging under-investigated novel risks and increased consumer concerns, food allergies and how those with a predisposition to seafood allergies may be susceptible to allergic reactions to insect proteins. He discussed the impact of allergies on quality of life and highlighted how allergies can range in severity and could be potentially life threatening. Dr Ruethers concluded by urging further efforts to address consumer concerns by understanding, mitigating and carefully communicating risks while including detailed allergen information on food products and developing hypoallergenic future foods.

To round off the morning, Dr Kit Teng Phuah (*Associate Professor, Tunku Rahman University of Management and Technology,*) presented her work advocating for the consumption of insect proteins and entomophagy. She had everyone on the edge of their seats with her presentation filled with videos and pictures of her eating sago worms, scorpions and even a live viewing of the worms! Dr Phuah drew a compelling argument for why insect-based products were the future, discussing their health benefits, their potential to alleviate food insecurity and how delicious they were. Though she may not have convinced all the delegates, she found that she was able to convince the younger participants in her study to

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try insect proteins. However, she found that older participants were a lot more resistant to trying insects predominantly because of concerns around health risks and possibly because of greater pre-existing health conditions. Dr Phuah concluded her presentation by encouraging everyone to forget their pre-existing beliefs and qualms about insects and to just give them a try!

After lunch, Ms Jennifer Morton (*Corporate Engagement Manager, The Good Food Institute APAC*) and Ms Divya Gandhi (*Research Specialist, The Good Food Institute APAC*) discussed the importance of market segmentation when understanding consumer needs carried out as part of the recent consumer insights study in Thailand, Malaysia, Vietnam, Philippines, Indonesia, and Singapore. They identified six segments of consumers based on their current and future interests in plant-based meat which included Enthusiasts, Expanders, Curious, Novices, Rejectors and Skeptics. Currently, there is a huge gap between the awareness and adoption of plant-based meat products in the market. Affordability is a critical lever to address this, especially given that it was found that plant-based meat products are seen in a positive light. Additionally, blended meat (conventional meat mixed with plant-based meat) may serve as a parallel path in this direction for cost economics and adoption amongst plant-based meat hesitant segments. Protein diversity instead of meat substitution may resonate in these markets, as consumers are overall not looking to reduce meat consumption. Notably, half of today's regular consumers of plant-based meat are millennials.

The conference then moved on to the final set of flash presentations. Dr Bianca Wassman (*Postdoctoral Researcher, ETH Zurich-Singapore*) shared her recently published findings on what influences Singaporean consumers' acceptance of novel micro-algae based foods. She

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discussed how sustainability, health concerns, and intentions to reduce meat were positively associated with greater acceptance of micro-algae based foods. Dr Wassmann also found that there was a greater preference for micro-algae meat alternative products, with seaweed products being a close second ahead of vegetables and dairy products. She concluded by drawing attention to the attributes consumers associate most with micro-algae based products, such as innovativeness, eco-friendliness, and healthiness.

Ms Qurrata Ayuni (*Student, Kasetsart University*) was the second flash presenter of this segment and shared her work on identifying preferences of attributes in Kombucha, a fermented beverage, among Thai and Indonesian consumers through a conjoint-based rating analysis. Overall, while consumers in both countries preferred a reduced sugar content, differences in price and taste preferences were found. Indonesian consumers preferred the original flavours of Kombucha and were willing to pay a regular price, in line with current market prices of other beverages, while Thai consumers liked having natural fruity flavours and preferred more affordable prices. In terms of health attributes, Thai consumers were driven by the gut health benefits of Kombucha as well. Ms Ayuni noted that these insights may guide product developers to tailor their food products to suit the specific market and consumer demands.

Finishing off with the final flash presentation of the day, Dr Chong Pik Han (*Senior lecturer, Massey University*) discussed results from two studies carried out at SIFBI, A*STAR, investigating the effects of different maillard reaction products (MRP) with various protein-to-sugar ratio on the sensory quality and effects of front-of-pack (FOP) labelling on consumer acceptance. MRPs were tested as they may potentially improve the flavour profiles of plant-

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based meat alternatives. In study one, glucose- and xylose-MRPs were tested with three different carriers (plain, wheat, and soy) alongside commercial animal-based and plant-based sauces acting as positive and negative controls. Results showed that a 'meaty flavour' was perceived in MRP sauces with wheat carriers and those with highly perceived meaty flavours were further tested for consumer's liking as well as the influence of FOP labelling in Study two. Dr Chong concluded his presentation by revealing that product sensory quality had a dominant impact on consumer acceptance and additionally, FOP labels relating to health benefits, were preferred by consumers.

Finally, as the last speaker of the day, Dr Andrew Powell (*CEO, Asia Biobusiness Pte. Ltd.*) gave an impactful talk on how to communicate effectively with consumers, especially in situations with low trust and high concern such as the introduction of novel foods. As observed from the series of talks earlier, consumer awareness does not equate to their acceptance. It was emphasised that experts and lay people think differently about risks and hence, it is critical to understand and actively listen to consumers' concerns before addressing them. While some communication tips and messaging tools were shared, Andrew noted that education may not always work in situations with highly perceived risks. He concluded his talk by leaving an impactful message - **"Consumers need to know that you care before they care about what you know"**. To foster trust and increase acceptance of future foods, it is evident that showing empathy and care are vital when communicating with consumers.

Dr Aimee Pink finished the conference thanking the presenters for their insightful presentations and the delegates for their engagement throughout the day. A reminder was

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given to take inspiration from the great research shared and to make connections with like-minded individuals for future research before the conference was brought to a close.

*This conference was hosted by Dr Aimee Pink with the assistance of Ms Amelia Juraimi and the wider project team at the Institute of High Performance Computing (IHPC), A*STAR, with support from the Social Science and Technology (SST) Horizontal Technology Coordinating Office (HTCO), A*STAR as part of the “Understanding perceptions of novel alternative proteins in families to develop an interactive educational platform to promote consumption” project as funded by the National Research Foundation, Singapore and the Agency for Science, Technology and Research (A*STAR) under the Singapore Food Story R&D Programme (Award: W22W3D0009).*

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