

Seaweed-Based Functional Foods in Sri Lanka: Buddhist Ethics, Food Neophobia and Perceived Health Benefits

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Introduction

Seaweeds are known worldwide as nutritionally rich marine macroalgae with a great potential for application in functional food systems. Three economically important species *Sargassum* sp., *Codium* sp. and *Ulva* sp. are abundant in coastal waters of Sri Lanka and have been studied for their bioactive compounds, mineral composition and antioxidant properties (Wijesundara and Nanayakkara, 2020; Jayawardena et al., 2021). However, the commercial use of them as functional food ingredients is still limited in the Sri Lankan market despite the widely reported nutritional and nutraceutical benefits (Ranasinghe et al., 2022).

The research on adoption of innovative and functional foods in general, indicates that the acceptance of novel food products by consumers is influenced by the interaction of cultural, psychological and informational elements (Verbeke et al., 2009). In this wider context, the largely Buddhist population of Sri Lanka follows rules of eating based on purity, non-violence (ahimsa) and naturalness, which might impact the acceptance of seaweed-based foods, but concrete information about the Sri Lankan seaweed market is scarce and this study aims to fill this void. Food neophobia (Pliner and Hobden, 1992) is a significant psychological barrier that can impede consumers from adopting new seaweed products, whereas the awareness of health benefits, such as anti-inflammatory, anti-obesity and immunomodulatory properties, has been demonstrated to lower this resistance (Verbeke et al., 2009). The theoretical underpinning that links these cultural, psychological and health-belief factors with purchasing intention is based on Ajzen's (1991) Theory of Planned Behaviour which states that attitudes, subjective norms and perceived behavioural control combine to influence behavioural intention. The understanding of the interaction of these dynamics is important for the formulation of successful strategies for entering the market for seaweed-derived functional foods in Sri Lanka. In addition to the immediate economic investigation, this understanding is relevant to the coastal fisheries sector of Sri Lanka where seaweed farming and collection represent

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an underutilised potential for diversifying livelihoods and improving the use of marine resources.

Objectives

This study aims to:

1. Assess the current level of consumer awareness and acceptance of seaweed-based functional foods derived from *Sargassum* sp., *Codium* sp., and *Ulva* sp. among Sri Lankan consumers.
2. Evaluate the influence of Buddhist ethical values and cultural food norms on consumer attitudes toward seaweed-based products.
3. Quantify the role of food neophobia as a psychological barrier to market acceptance.
4. Determine the extent to which perceived health benefits moderate or mediate the relationship between food neophobia and purchase intention.
5. Identify key demographic and attitudinal segments that represent priority market opportunities for seaweed-based functional foods in Sri Lanka.

Methodology

This research is a mixed-methods approach consisting of quantitative survey data and qualitative focus group data, in two phases. A pilot phase with a part of the complete instrument has been completed ($n = 50$). The results of this are described in the Results section below. The main phase of data collection is intended to follow the same framework at full capacity.

The research will be conducted in three provinces of Sri Lanka (Western, Southern and Central) chosen to reflect demographic and cultural variation across urban, semi-urban and rural communities. A systematically developed questionnaire in Sinhala with an English translation for validation and reporting will be distributed among a stratified random sample of 400 adult consumers (18-65 years) with purchasing authority in their households. The survey will include the Food Neophobia Scale (Pliner and Hobden, 1992), Buddhist Ethical Values in Food Consumption Scale adapted to the Sri Lankan context and Perceived Health Benefits Scale developed by the researcher based on the consumer-acceptance item pools of previous functional food studies (Verbeke et al., 2009). Purchase intention will be measured through a five-point Likert scale. Four focus group discussions (FGDs) with 8 to 10 participants will be conducted simultaneously in urban and semi-urban settings to investigate more thoroughly the cultural and religious determinants affecting meal selections.

Structural Equation Modelling (SEM) in AMOS will be employed to analyse the direct and indirect relationships between the Buddhist ethical values, food neophobia, perceived health benefits and purchase intention. This is based on the Theory of Planned Behaviour (Ajzen, 1991). The focus group discussions will provide qualitative data that will be thematically analysed using Braun and Clarke's (2006) six-phase approach to complement the quantitative findings and to explore nuances in consumer rationale which a rigid questionnaire may not capture.

Results

The preliminary survey (n = 50) showed that about 62% of the respondents had a low to moderate level of knowledge about seaweed as a culinary product, and only 18% of the respondents reported having some kind of experience with seaweed-based products. Preliminary descriptive results indicate food neophobia was higher in the 35-60 age group and particularly in rural and semi-urban areas compared to younger urban dwellers who appeared to be more accepting of novel food formats. Formal significance testing will be performed once the full sample has been collected. Buddhist ethical principles were positively associated with preferences for plant- and sea-based components seen as 'natural' and 'minimally processed'. This pattern tentatively aligns with previous studies of values-based dietary choice (Verbeke et al., 2009), but needs to be confirmed with more complete data. Health benefits, particularly related to gut health, weight management and immune performance, were the main expected drivers for future consumption of seaweed. In the initial data, those that rated expected health benefits high also demonstrated low food neophobia and high purchase intentions. The proposed SEM study will test mediating effect of perceived health benefits between food neophobia and purchase intention and moderating effect of Buddhist ethical principles on the relationship.

Discussion / Conclusion

These initial findings are consistent with the wider literature on the acceptance of functional and innovative foods, which also highlights consumer knowledge, cultural values and perceived health benefits as aggregate motivators for adoption (Verbeke et al., 2009; Berthon and Myrnes-Hansen, 2023). They argue that the marketability of functional foods derived from seaweed in Sri Lanka is not only determined by the nutritional superiority of the products, but also on the products embodying the Buddhist virtues of purity, non-harm and naturalness, and the efforts to reduce food neophobia through education and sensory experiences, especially among middle-aged rural populations. The relationship between perceived health benefits and lower levels of food

neophobia is consistent with the Theory of Planned Behaviour (Ajzen, 1991) in which positive attitudes strengthen more definite behavioural intentions. Taken together, these initial trends suggest that religious, psychological and health-related beliefs are unlikely to be independent of one another, and that marketing efforts based on only one of these may be less than optimal compared to a more holistic approach.

The preliminary data, consistent with the study objectives, show the absence of consumer awareness of seaweed as a functional food (Objective 1), a possible positive correlation between the ethical principles of Buddhism and the willingness to consume products derived from seaweed (Objective 2) and a measurable effect of food neophobia as a barrier to acceptance (Objective 3). Objective 4 will be answered by the upcoming SEM analysis that will investigate the proposed mediating and moderating effects. Objective 5 will be enabled by the full sample that will identify significant demographic and attitudinal groups. Validation of these associations at a coarse level will provide food producers, policy makers and coastal fisheries stakeholders with an evidence base to promote seaweed as a natural, ethically sound and health-promoting dietary choice within the Sri Lankan market.

Keywords - Seaweed functional foods, Food neophobia, Buddhist ethical values, Consumer acceptance, Sri Lanka

References

- Ajzen, I. (1991). 'The theory of planned behavior', *Organizational Behavior and Human Decision Processes*, 50(2), pp. 179–211.
- Berthon, D. and Myrnes-Hansen, K.V. (2023). 'Consumer willingness to pay for seaweed-based food products', *Food Quality and Preference*, 104, p. 104737.
- Braun, V. and Clarke, V. (2006). 'Using thematic analysis in psychology', *Qualitative Research in Psychology*, 3(2), pp. 77–101.
- Jayawardena, T.U. et al. (2021). 'Bioactive compounds and health benefits of edible marine macroalgae from Sri Lanka', *Marine Drugs*, 19(4), p. 188.
- Pereira, L. (2016) *Edible Seaweeds of the World*. Boca Raton: CRC Press.
- Pliner, P. and Hobden, K. (1992). 'Development of a scale to measure the trait of food neophobia in humans', *Appetite*, 19(2), pp. 105–120.
- Ranasinghe, R.A.S.N. et al. (2022). 'Consumer awareness and attitudes toward seaweed consumption in Sri Lanka', *Ceylon Journal of Science*, 51(1), pp. 45–56.
- Verbeke, W. et al. (2009). 'European consumers' acceptance and rejection of novel and functional fermented milks', *British Food Journal*, 111(7), pp. 655–668.
- Wijesundara, C. and Nanayakkara, N. (2020). 'Nutritional composition of selected seaweed species from the coastal waters of Sri Lanka', *Journal of Food Science and Technology*, 57(8), pp. 2898–2906.