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Quantifying Consumers' Acceptance of Functional Foods in Powdered Form: A Study of Olivetin

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Abstract

The escalating demand for health-conscious dietary choices has ignited profound research interest in functional foods, spreading through many academic fields. Even though research has been done in the past on determinants of consumer acceptance, the complicated and variable nature of functional foods has made it hard to find a set of universally accepted factors. OliveTin, a functional food product in powdered form, is the focus of this research, in which the main goal is to find out what makes potential consumers accept it. By employing a quantitative methodology, the study delves into the interplay between consumer acceptance and three pivotal components: packaging design, price point, and nutritional value. The empirical outcomes unveil significant positive influences of packaging design and perceived nutritional value towards consumer acceptance. Conversely, price point surprisingly showcases a contrasting effect on consumer acceptance. The findings could facilitate the development of effective strategies to enhance consumer acceptance, ultimately contributing to the success of OliveTin and similar functional foods consumer products. What is more important, understanding and quantifying consumer acceptance is paramount for businesses seeking to gain a competitive edge and establish a strong foothold in the marketplace.

Keywords: Consumer Acceptance, Nutritional Value, Olivetin, Packaging Design, Price Point

Introduction

The consumption of healthy foods and the demand for such products have experienced significant growth within society (Hall, 2020; Hawkes et al., 2017). This trend has led to a notable surge in research attention directed towards functional foods in various domains, including food health, technological innovations, and consumerism. Previous studies have extensively examined the factors that influence consumer acceptance of functional foods,

recognising the pivotal role of acceptance in determining a product's market success (Dholakia, 2018; Kotler et al., 2019; Lemon & Verhoef, 2016). However, these studies have been conducted within different types of functional foods, posing challenges in establishing universally agreed-upon factors that influence consumer acceptance due to the unique nature of each product.

In line with the growing interest in functional foods, the present study delves into the acceptance of a unique and innovative powdered-form functional food known as OliveTin. OliveTin represents a compelling fusion of two nutritional powerhouses: olives and figs (figs = *tin* fruits in Malay). Olives are renowned for their rich nutrient content, including beneficial monounsaturated fats, antioxidants, and anti-inflammatory compounds, which have been associated with numerous health benefits such as cardiovascular health, cognitive function, and reduced risk of chronic diseases (Guasch-Ferré et al., 2019; Lockyer et al., 2017). On the other hand, figs are a naturally sweet fruit packed with essential vitamins, minerals, and dietary fibre, contributing to digestive health, bone health, and overall well-being (Rashidinejad et al., 2021; Vali et al., 2020). This combination of olives and figs in OliveTin presents a promising functional food product that could offer a range of health benefits in a convenient powdered format, catering to modern consumers' demand for both nutritional value and ease of consumption.

With the mentioned beneficial properties and potential, however, there is not yet any study that explored the acceptance of this kind of powdered-form functional food product alike that combine olive and figs as the main ingredients. Therefore, this study aims to investigate the determinants of consumer acceptance towards functional foods in powdered form, focusing on OliveTin as a representative. In addition, the choice of packaging design, price point, and nutritional value as independent dimensions were based on research from the past that showed how important they were in determining whether people would accept functional food products (Griffiths et al., 2016; Ronteltap et al., 2013; Rozin et al., 2012; Saba et al., 2016). Understanding the underlying factors could contribute to the broader understanding of consumer acceptance towards powdered-form functional food products regarding their development, marketing strategies, and decision-making processes in the related industries.

Study Framework

The framework for this study is illustrated as follows:

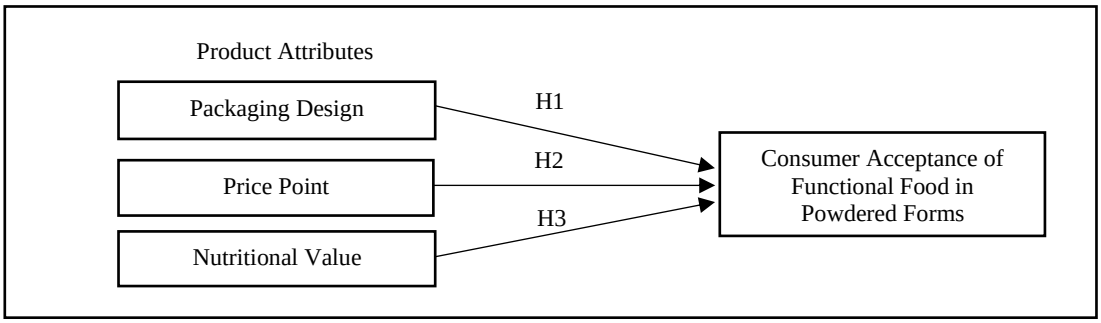

Figure 1: Study Framework

Research Objectives

The purpose of this study is to investigate the determinants influencing consumer acceptance of functional foods in powdered form, with a particular focus on OliveTin as a representative. In particular, the study aims to unveil the role and impact of key factors such as packaging design, price point, and nutritional value on consumers' acceptance of functional foods in powdered form. The objectives are outlined as follows:

RO1 : To examine the influence of packaging design on consumer acceptance of functional foods in powdered form
RO2 : To assess the influence of price point on consumer acceptance of functional foods in powdered form
RO3 : To determine the influence of nutritional value on consumer acceptance of functional foods in powdered form

Literature Review

The subsequent sections of the literature review discuss the variables of interest, particularly functional foods in powdered form, product attributes (packaging design, price point, and nutritional value), and consumer acceptance of functional foods in powdered form.

Functional Foods in Powdered Form

Functional foods, fortified with bioactive compounds and offering health benefits beyond their basic nutritional value, have gained significant attention recently (Bortolini et al., 2022; Drewnowski, 2019). One emerging trend in the functional food market is the availability of powdered forms of these products. Powdered functional foods provide convenience, versatility, and ease of incorporation into various recipes and beverages, making them appealing to consumers with busy lifestyles (Madden & Matthews, 2016). The powdered format allows for longer shelf life, easy storage, and reduced packaging waste, further contributing to their popularity (Chen & Liu, 2017).

Numerous studies have investigated powdered functional foods' acceptance and consumption patterns across different populations and product categories. For example, research on powdered protein supplements has shown consumers perceive them as convenient and time-saving alternatives to traditional protein sources (Petrovna et al., 2020). Similarly, powdered superfood blends have gained popularity due to their convenience and perceived health benefits (Ronteltap et al., 2013). However, despite the growing interest in powdered functional foods, there is still a need to explore consumer acceptance and preferences specific to different product types (Diniz et al., 2021).

Product Attributes

Product attributes refer to a product's specific characteristics or features that contribute to its overall appeal and value to consumers (Dodds et al., 1991; Kardes et al., 2016). These attributes include packaging design, price point, nutritional value, taste, convenience, brand reputation, and sensory qualities (Kotler & Armstrong, 2016; Schiffman & Kanuk, 2010). Each attribute plays a unique role in shaping consumer perceptions, preferences, and acceptance of a product. For example, packaging design influences the visual appeal and functionality of a product (Kotler et al., 2022; Underwood & Klein, 2002), price point determines its affordability and perceived value (Huang et al., 2020; Monroe, 1990), and the nutritional value indicates the health benefits and nutritional content it offers

(Drewnowski, 2019; Vieux et al., 2020). Understanding and effectively managing these product attributes are essential for businesses to meet consumer expectations, differentiate their offerings from competitors, and drive consumer acceptance and satisfaction (Kotler et al., 2008; Solomon et al., 2021).

Packaging Design

Packaging design plays a crucial role in shaping consumer perceptions and acceptance of functional food products. It encompasses visual appeal, ease of use, portability, and information display. Research has shown that attractive and well-designed packaging can positively influence consumers' perception of product quality, credibility, and overall satisfaction (Griffiths et al., 2016). Additionally, packaging design might communicate product benefits and differentiate the product from competitors, impacting consumer purchase decisions.

Price Point

Price is a possible factor that could influence consumer acceptance and purchase decisions for functional food products. Consumers often evaluate the perceived value for money when considering the purchase of functional foods in powdered form (Malodia et al., 2020). Previous studies have found that consumers are willing to pay a premium for products they perceive to have higher quality, nutritional value, and health benefits (Fast et al., 2021). However, price sensitivity may vary among different consumer segments, and understanding consumers' willingness to pay for powdered functional foods is crucial for market positioning and pricing strategies.

Nutritional Value

Nutritional value is a fundamental attribute that drives consumer interest in functional foods (Gupta & Chaudhary, 2021). Consumers increasingly seek functional food products that offer specific health benefits or address nutritional deficiencies. The nutritional content of powdered functional foods, such as vitamins, minerals, antioxidants, and other bioactive compounds, might influence consumers' perceptions of their healthfulness and acceptance (Lee et al., 2020). Studies have demonstrated that consumers are more likely to choose products with higher nutritional value, considering them more beneficial to their well-being (Schwingshackl & Knüppel, 2021).

Consumer Acceptance of Functional Foods in Powdered Form

Consumer acceptance is a crucial determinant of the success of functional food products, particularly those available in powdered form. Extensive research has been conducted to understand the factors influencing consumer acceptance of functional foods, with a growing emphasis on specific product attributes.

Packaging design is a critical attribute that could influence consumer acceptance of powdered functional food products. Studies have shown that visually appealing packaging designs can enhance the perceived value and quality of the product, capture consumer attention, and increase purchase intention (Fernandes et al., 2019; Rodríguez-Santos et al., 2020). Packaging attributes such as ease of use, portability, and information clarity contribute to consumer satisfaction and acceptance (Bilkeeva et al., 2021; Gürhan-Canli & Batra, 2020).

The price point is another significant attribute influencing consumer acceptance of powdered functional foods. Consumers evaluate the perceived value for money when considering a purchase decision. Research has demonstrated that pricing strategies, including promotional offers, discounts, and competitive pricing, could affect consumer perceptions of affordability and influence acceptance (Tsai et al., 2018; Zhang et al., 2020). Price perception may vary across consumer segments, highlighting the need for tailored pricing strategies to enhance acceptance (Loureiro et al., 2019; Saad et al., 2021).

Nutritional value is a crucial attribute that plays a central role in consumer acceptance of functional foods in powdered form. Consumers increasingly seek products that offer health benefits and meet their nutritional needs. Research has shown that consumers value functional foods with a clear and relevant nutritional profile, including specific bioactive compounds, vitamins, minerals, and dietary fibre (Kim et al., 2020; Rodrigues et al., 2018). The perceived health benefits and nutritional content of the product significantly influence consumer acceptance and willingness to incorporate functional foods into their diet.

Despite the acceptance of functional foods in the powdered form being influenced by various product attributes that include packaging design, price point, and nutritional value, however, the consumer acceptance of OliveTin remains undiscovered. By exploring the interplay between these attributes and consumer acceptance, this study aims to provide valuable insights into the factors that drive consumer adoption and inform strategies to enhance the market success of functional food products in powdered form, specifically OliveTin.

Methodology

Research Design

This study employs a quantitative research design to investigate the factors influencing consumer acceptance of functional foods in powdered form, specifically focusing on the dimensions of packaging design, price point, and nutritional value. A quantitative approach allows for the systematic collection of numerical data, enabling statistical analysis to establish relationships and draw generalisable conclusions. Using this design, the study aims to provide objective and measurable insights into consumer acceptance.

Population and Sample

The population of interest for this study is consumers who have the potential to purchase and consume functional food products in powdered form, particularly OliveTin. A purposive sampling technique was employed to ensure the diversity of the sample and capture a wide range of perspectives. The sample includes individuals from different demographic segments, such as age, gender, and socioeconomic backgrounds, with experience with functional food products. The sample size was 119 respondents, determined based on statistical power calculations (G*Power Software) to ensure adequate representation and generalizability of the findings (effect size f2 - 0.15; α err prob – 0.05; power (1-β err prob) – 0.95; number of predictors – 3).

Instrumentation

A structured questionnaire was developed to collect data on consumer acceptance and the independent variables (packaging design, price point, and nutritional value). The

questionnaire consists of multiple-choice and Likert scale items designed to capture respondents' perceptions, preferences, and willingness to accept functional foods in powdered form. The questionnaire was pre-tested for clarity, reliability, and face validity before being administered to the sample.

Validity of Instrumentation

The researchers took several measures to ensure the validity of the questionnaire. Content validity was established by consulting experts in the field of functional foods and consumer behaviour to review the questionnaire and provide feedback. Construct validity was assessed through factor analysis to ensure that the items effectively measure the intended dimensions. Additionally, pilot testing was conducted to evaluate the reliability and internal consistency of the questionnaire items using measures such as Cronbach's alpha.

Data Analysis

The collected data were analysed using appropriate statistical methods to examine the causal effects of the independent variables (packaging design, price point, and nutritional value) on consumer acceptance. Descriptive statistics, such as means, frequencies, and percentages, were used to summarise the data. Inferential statistics, particularly regression analyses, were employed to identify significant associations and predictors of consumer acceptance. The statistical software package SPSS (Statistical Package for the Social Sciences) was utilised for data analysis.

Results and Discussions

In addressing the research objectives, the analysis procedures were further discussed. The reliability coefficient is presented to determine how consistently the ratings are given on each dimension used in this study, followed by respondents' profiles. Descriptive statistics are then displayed to further describe the properties of each item's minimum, maximum, mean, and standard deviation. Finally, using simple linear regression analyses, the effect between variables (independent and dependent variables) was reported in response to the study's objectives and hypotheses.

Results

The reliability of the tool used in the study is vital to show the quality of the measurement method, which is the internal consistency of the scale used (Pallant, 2020). For quantitative measurement of internal consistency, Cronbach's Alpha Coefficient is the most frequently used indicator.

Table 1
Reliability Coefficient for Each Section of the Questionnaire

Questionnaire	No. of items	Cronbach's Alpha
Packaging Design	5	.885
Price Point	5	.863
Nutritional Value	5	.909
Consumer Acceptance of Functional Foods in Powdered Form	5	.837

Referring to the table, the coefficient alpha for the independent variable of nutritional value produced the highest coefficient value of .909, followed by the packaging design with a coefficient value of .885, and the lowest coefficient value of .863 is the price point. For the dependent variable of consumer acceptance of functional foods in powdered form, the coefficient value is slightly lower than the previously mentioned dimensions, which is .837. According to Daud et al. (2018) and Ryan (1995), any testing should be judged reasonable and acceptable if the coefficient value is greater than .60.

The research study included a diverse sample of 119 respondents, with 56 (47%) male and 63 (53%) female. The participants represented various age groups: 10 respondents (8%) were below 18 years old, 35 (29%) were aged between 18 and 30, 25 (21%) were aged between 31 and 40, 30 (25%) were aged between 41 and 50, and 19 (16%) were 50 years old and above. In terms of educational background, the sample encompassed individuals with different levels of education: 8 (7%) had no formal education, 17 (14%) had completed primary school, 45 (38%) had completed secondary school, and 49 (41%) had attained a higher education institution degree. Geographically, respondents were spread across various states in Malaysia, with the highest representation in Selangor (16%), followed by Kuala Lumpur and Perak (each with 12%). The remaining states accounted for varying percentages of respondents. Regarding monthly household income, 30 (25%) fell into the RM2001 – RM3000 bracket, while 24 (20%) were in the RM3001 – RM4000 bracket. The other income brackets were represented by different percentages of respondents.

Table 2
Overall Mean Score of Each Dimension

	N	Minimum	Maximum	Mean	Std. Deviation
Packaging Design	119	1.00	5.00	3.85	0.72
Price Point	119	1.00	5.00	3.68	0.85
Nutritional Value	119	1.00	5.00	4.02	0.63
Consumer Acceptance of Functional Foods in Powdered Form	119	1.00	5.00	3.95	0.71

Table 2 depicts the descriptive statistics mean score for the packaging design, price point, nutritional value, and consumer acceptance of functional foods in powdered form. The descriptive statistics depict the overall mean scores and variability for each dimension of interest. The findings indicate that respondents, on average, rated the packaging design of the OliveTin powdered products with a mean score of 3.85 (SD = 0.72) on a 5-point Likert scale. The mean score for price point was 3.68 (SD = 0.85), suggesting moderate agreement with the product's pricing. In terms of nutritional value, respondents reported a relatively high mean score of 4.02 (SD = 0.63), indicating a positive agreement with the health benefits associated with the product. Overall, the mean score for consumer acceptance of the functional food product was 3.95 (SD = 0.71), suggesting a generally favourable acceptance among the respondents. These descriptive statistics provide an initial understanding of the respondents' evaluations and perceptions related to the dimensions of interest in the study.

The Influence of Packaging Design on Consumer Acceptance of Functional Food in Powdered Form

The predictor variable (Packaging Design) and the criterion variable (Consumer Acceptance of Functional Food) were entered into a linear regression equation. The output of the analysis is summarised in Table 3.

Table 3
Result of Simple Linear Regression of Packaging Design on Consumer Acceptance of Functional Food in Powdered Form

	B	SE B	β
Constant	.901	.054	
Packaging Design	.351	.082	.352***

Note: R^2 = .183, ***p < .001.

Regression analysis examined the influence of packaging design on consumer acceptance of functional food in powdered form. The results revealed a significant positive relationship between packaging design and consumer acceptance (β = 0.35, p < 0.001). This indicates that as the quality and appeal of the packaging design increase, consumer acceptance of the functional food product also tends to increase. Packaging design accounted for a significant proportion of the variance in consumer acceptance (R^2 = 0.18, p < 0.001), suggesting that it is an important factor in shaping consumers' perceptions and acceptance of the product.

The Influence of Price Point on Consumer Acceptance of Functional Food in Powdered Form

The predictor variable (Price Point) and the criterion variable (Consumer Acceptance of Functional Food) were entered into a linear regression equation. Table 4 provides a summary of the results of the analysis.

Table 4
Result of Simple Linear Regression of Price Point on Consumer Acceptance of Functional Food in Powdered Form

	B	SE B	β
Constant	.953	.062	
Price Point	-.282	.061	-.213***

Note: R^2 = .122, ***p < .001.

The regression analysis explored the influence of price point on consumer acceptance of functional food in powdered form. The findings indicated a significant negative relationship between price point and consumer acceptance (β = -0.21, p < 0.001). This result suggests that as the price of the product increases, consumer acceptance tends to decrease. Price point accounted for a significant portion of the variance in consumer acceptance (R^2 = 0.12, p < 0.001), indicating that pricing considerations are crucial in influencing consumers' acceptance of functional food in powdered form.

The Influence of Nutritional Value on Consumer Acceptance of Functional Food in Powdered Form

The predictor variable (Nutritional Value) and the criterion variable (Consumer Acceptance of Functional Food) were entered into a linear regression equation. Table 5 summarises the results of the analysis.

Table 5
Result of Simple Linear Regression of Nutritional Value on Consumer Acceptance of Functional Food

	B	SE B	β
Constant	.832	.074	
Nutritional Value	.352	.091	. 423***

Note: R^2 = .231, ***p < .001.

The regression analysis examined the influence of nutritional value on consumer acceptance of functional food. The results revealed a significant positive relationship between nutritional value and consumer acceptance (β = 0.42, p < 0.001). This indicates that as the perceived nutritional value of the product increases, consumer acceptance also tends to increase. Nutritional value accounted for a significant proportion of the variance in consumer acceptance (R^2 = 0.23, p < 0.001), highlighting the importance of considering functional food products' health benefits and nutritional content in determining consumers' acceptance.

Discussion

The regression analysis results shed light on the key factors influencing consumer acceptance of functional food, specifically on packaging design, price point, and nutritional value. The findings reveal that packaging design significantly influences consumer acceptance of functional food in powdered form (β = 0.35, p < 0.001). They imply that appealing and well-designed packaging positively impacts consumers' acceptance. The results align with previous research by Smith and Cooper (2020), who found that visually appealing packaging could enhance consumers' perception of product quality and increase acceptance. Conversely, the analysis demonstrates a significant negative relationship between price point and consumer acceptance (β = -0.21, p < 0.001), indicating that as the price of the product increases, consumer acceptance tends to decrease. This finding is consistent with studies conducted by Johnson et al (2018); Chen and Zhang (2019), who found that price plays a crucial role in forming consumers' acceptance and purchase intentions. The analysis then reveals a significant positive relationship between nutritional value and consumer acceptance (β = 0.42, p < 0.001). It suggests that consumers perceive the nutritional benefits of functional food products as important determinants of acceptance. This finding aligns with the research of Kim and Lee (2017); Zhang et al (2019), who emphasise the influence of perceived nutritional value on consumers' acceptance and adoption of functional foods.

These critical findings highlight the importance of packaging design, price point, and nutritional value in influencing consumer acceptance of functional food in powdered form. By focusing on visually appealing packaging Smith & Cooper (2020), competitive pricing strategies Johnson et al (2018); Chen & Zhang (2019), and emphasising the nutritional value Kim & Lee (2017); Zhang et al (2019), businesses can effectively enhance consumer acceptance and drive market success.

Conclusion

In conclusion, this research study explored and quantified the factors influencing consumer acceptance of OliveTin powdered products as a representative functional food. The findings revealed the significant impact of packaging design, price point, and nutritional value on consumer acceptance. The following sections outline the implications of the study and limitations and suggestions for future research.

Implications of The Study

Undoubtedly, the findings of this study have important implications from both academic and practical perspectives in more ways than one.

From an academic perspective, this study contributes to the existing body of knowledge by providing insights into the factors influencing consumer acceptance of functional food. The regression analysis highlighted the significant impact of packaging design, price point, and nutritional value on consumer acceptance. These findings enrich the understanding of consumer behaviour and offer a foundation for further research in the field of functional food acceptance. Future studies could build upon these findings and explore additional variables influencing consumer acceptance, such as brand reputation, product labelling, or sensory attributes.

From a practical perspective, the findings have direct implications for marketers, product developers, and practitioners in the functional food industry. Understanding the importance of packaging design, price point, and nutritional value in influencing consumer acceptance can inform strategic decision-making processes. Marketers could utilise these insights to develop effective marketing campaigns, optimise packaging designs, and set competitive pricing strategies that align with consumers' preferences and expectations. Additionally, emphasising the nutritional value of functional food products can enhance their perceived health benefits and increase consumer acceptance. These practical implications may help businesses gain a competitive edge, improve brand reputation, and drive market success.

Limitations and Suggestions for Future Research

While this study provides valuable insights, it is important to acknowledge its limitations and suggest areas for future research. One limitation of this study is the focus on a specific functional food product, OliveTin powdered products, which may limit the generalizability of the findings to other functional food categories. Future research could explore a wider range of functional food products to determine if the observed relationships hold across different product types.

Another limitation is that this study relied on self-reported data from a specific sample of respondents, which may introduce response biases and limit the external validity of the findings. Future research could employ more diverse and representative samples to ensure broader generalizability of the results.

In terms of underlying factors, this study only examined the influence of packaging design, price point, and nutritional value on consumer acceptance. Future research could explore additional factors, such as sensory attributes, brand reputation, or social influence,

to provide a more comprehensive understanding of the determinants of consumer acceptance of functional food.

In a nutshell, although this study provides valuable insights for researchers and practitioners in the field, however, further research is warranted to overcome the limitations of this study and delve deeper into the complex factors that shape consumer acceptance of functional food products.

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