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Assessing Consumer Perceptions and Intentions Toward Plant-Based Meat: Scale Development and Exploration

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ABSTRACT: This paper introduces a comprehensive multidimensional scale designed to assess consumer perceptions and intentions regarding plant-based meat (PBM) products. In light of the global shift toward sustainable food choices, this study addresses the need for a holistic instrument to gauge various facets of PBM adoption. The scale comprises five core dimensions: (1) Perceived Benefits of PBM, encompassing health, environmental, and ethical considerations; (2) Perceived Barriers to PBM, encompassing concerns related to taste, protein content, texture, price, and sustainability; (3) Consumer Attitudes Toward PBM, reflecting sensory experiences and perceived similarity to traditional meat; (4) Awareness of PBM, assessing knowledge of PBM existence and prior consumption; and (5) Purchasing Intentions of PBM, measuring intentions based on factors such as taste, health benefits, sustainability, price, labeling, and positioning.

The exploratory factor analysis (EFA) findings indicate that the multidimensional scale effectively captures the intricate nature of consumer perceptions regarding PBM. Notably, consumer attitudes toward PBM are influenced by sensory experiences and perceived product similarity to traditional meat. Additionally, perceived benefits, including health, environmental sustainability, and ethical considerations, significantly influence consumer attitudes and purchasing intentions. Conversely, perceived barriers, encompassing concerns about taste, protein content, and price, may present obstacles to PBM adoption. The scale's dimensions offer practical implications for marketers, policymakers, and scholars. Marketers can tailor their product positioning to emphasize factors such as taste, health benefits, and sustainability. Policymakers can design effective public health campaigns and policies to promote sustainable and healthier dietary choices. Scholars can utilize the scale to conduct in-depth research on PBM adoption, enabling cross-cultural comparisons, longitudinal studies, and intervention assessments.

KEYWORDS: Awareness, Barriers, Consumer attitude, Plant based meat, Perceived Benefits, Purchasing intention.

INTRODUCTION

Meat constitutes a crucial component of the human diet, providing essential nutrients such as vitamins, protein, minerals, and fats (Pereira and Vincent, 2018). However, the dynamics of consumer behavior regarding meat consumption are subject to unpredictable changes influenced by various factors encompassing appearance, safety, convenience, price, quality, as well as individual, social, economic, and cultural aspects (Säll and Gren, 2015; Röös et al., 2014; Xazela et al., 2017; Apostolidis and McLeay, 2016). Recent years have witnessed a notable shift in consumer preferences towards plant-based products, driven by health-conscious consumers seeking safer and healthier options with reduced health risks (Tuso et al., 2015). In contrast, diets rich in meat have been associated with health issues due to their high cholesterol and saturated fatty acid content. Apostolidis and McLeay (2016) note that the media has played a pivotal role in promoting the healthiness and sustainability of plant-based products over their animal-based counterparts. Religious considerations also factor into the discourse surrounding animal-based proteins (Dekkers et al., 2018). In response to these concerns, the development of plant-based meat analogues as alternatives to animal products has created substantial opportunities for the food industry. This paper explores these evolving trends and investigates the attitudes, awareness, perceived barriers, perceived benefits, and purchasing intentions of consumers regarding plant-based meat alternatives, with a specific focus on the Indian market. To comprehensively understand consumer attitudes and behaviors towards plant-based meat alternatives in the Indian context, it is imperative to develop a reliable and contextually relevant measurement scale. This study aims to fill this

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research gap by proposing a multidimensional scale that assesses consumer attitudes, awareness, perceived barriers, perceived benefits, and purchasing intentions related to plant-based meat alternatives.

LITERATURE REVIEW

Plant-based meat analogues, also known as meat substitutes, mock meat, or faux meat, are products derived from plants that are designed to resemble the appearance, taste, and texture of animal meat (Joshi and Kumar, 2015). They are typically made from rice, wheat gluten, legumes, yam flour, mushrooms, or pressed tofu, and are flavored to taste like various meats such as chicken, beef, lamb, gammon, sausage, and shellfish (Fresán et al., 2019). Compared to traditional meat, plant-based meat analogues have a lower environmental footprint, as they require less water, land, and energy to produce (Bryngelsson et al., 2017). In addition, they do not involve the suffering of animals in their production, which is important for many consumers who are concerned about animal welfare (Bryngelsson et al., 2017).

The global market for plant-based meat analogues has been growing rapidly in recent years, driven by changing consumer preferences for healthier and more sustainable food options. According to a report by Grand View Research (2021), the global plant-based meat market size was valued at USD 4.4 billion in 2020 and is expected to grow at a compound annual growth rate (CAGR) of 15.8% from 2021 to 2028. Effective distribution channels, such as supermarkets/hypermarkets, e-commerce, convenience stores, and specialty stores, play a crucial role in the growth and success of the plant-based meat market (Grand View Research, 2021).

The growth trend of the plant-based meat market has also been observed in India, where the market is still in its nascent stage but has been growing steadily. According to a report by IMARC (2022), the plant-based meat industry in India is expected to grow at a CAGR of 26.3% during 2023-2028. The availability of various plant-based meat analogues in the market and increasing awareness among consumers about the health and environmental benefits of plant-based diets are some of the drivers of this growth. The types of plant-based meat analogues available in the Indian market include soy-based, wheat-based, and pea-based products, among others. Leading companies in the Indian market include GoodDot, Veggie Champ, Imagine Meats, and Veggie Republic, among others. These companies offer a variety of plant-based meat products, such as kebabs, nuggets, biryani, sausages, and seekh kebab made from plant-based ingredients.

The growth of the plant-based meat market in India is being driven by various factors, including changing consumer preferences for healthier and more sustainable food options, increasing awareness about the health and environmental benefits of plant-based diets, and government initiatives aimed at promoting sustainable food systems (Arora et al., 2020). Additionally, the "Green India Mission" aims to promote the use of sustainable agricultural practices and reduce greenhouse gas emissions from agriculture (Jha, 2021).

Plant-based meat analogues have been growing in popularity globally due to several factors. One of the main reasons is the increasing awareness among consumers about the health and environmental benefits of plant-based diets. The rising concerns regarding the negative impacts of meat consumption on human health and the environment are driving the demand for plant-based meat products (Grand View Research, 2021). Advancements in food technology have also led to the development of plant-based meat products that closely resemble the taste, texture, and appearance of traditional meat products, making them a viable alternative for consumers who want to reduce their meat consumption without sacrificing taste and texture.

Furthermore, the rise of flexitarians, veganism, and vegetarianism, especially among younger generations, is contributing to the growing demand for plant-based meat analogues. Consumers are adopting plant-based diets and reducing their meat consumption, which is driving the growth of the plant-based meat market (Global Data, 2021). Plant-based meat analogues have the potential to meet the increasing demand for protein sustainably and affordably (Bryngelsson et al., 2017; Sajid et al., 2021). However, consumer acceptance of cultured meat, another alternative protein source, is still being explored. Consumers' willingness to try cultured meat was influenced by factors such as the type of meat being cultured, the perceived healthiness of the product, and the level of familiarity with the technology used to produce it (Bryant and Barnett, 2018).

In terms of nutritional composition, plant-based meat analogues are a good source of protein, fiber, and some micronutrients such as iron and zinc. They also do not contain harmful substances such as saturated fatty acids, cholesterol, or purines found in red meat, which have negative health effects (Rai et al., 2023). However, the nutritional quality of plant-based meat analogues is an ongoing area of research, with a focus on optimizing their protein and micronutrient content while minimizing their sodium and carbohydrate content (Al Husseini, et al., 2021). The sensory properties of plant-based meat analogues vary depending on the ingredients used in

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their formulation, with some able to mimic the taste and texture of traditional meat products while others may require some consumer adaptation (Fiorentini et al., 2020).

In terms of environmental impact, plant-based meat analogues have a lower carbon footprint and water footprint compared to traditional meat products (Henchion et al., 2017; Lynch and Pierrehumbert, 2019). They also have the potential to reduce land use and deforestation associated with animal agriculture (Poore and Nemecek, 2018). However, the environmental impact of plant-based meat analogues may vary depending on the sourcing and processing of their ingredients (Lynch and Pierrehumbert, 2019).

Research also suggests that plant-based diets have a number of health advantages, including reducing the risk of cardiovascular disease and obesity-related metabolic dysfunction (Wanezaki et al., 2015), boosting immune function (Khalid et al., 2022), and lowering clinical indices for Type 2 diabetes (Zhang et al., 2016). Plant-based meat analogues are an important component of plant-based diets, providing a sustainable and healthy source of protein.

Awareness of plant-based meat analogues

Awareness of plant-based meat analogues refers to whether or not a participant has knowledge of the existence of plant-based meat alternatives as a meat substitute. This awareness encompasses the recognition of the health benefits associated with reducing or eliminating animal products from one's diet, as well as the environmental advantages of using plant-based protein sources.(Tonheim et al., 2023). The awareness of plant-based meat products has been fueled by various factors such as increasing evidence on the health risks associated with the consumption of red meat, as well as the ethical and environmental considerations surrounding animal agriculture (Schorgg et al., 2021). According to a study conducted by the Vegetarian Resource Group, there is a growing awareness of health and ecological benefits when choosing a vegetarian, vegan, or semi-vegetarian diet (Jeżewska-Zychowicz & Plichta, 2022). Moreover, the global market for plant-based products is expanding rapidly, indicating a growing demand for vegetarian and vegan alternatives in various food categories (Moss et al., 2023). This highlights the importance of educating consumers about the taste, nutritional value, and availability of plant-based meat alternatives to increase their awareness and promote consumption.

Based on the above studies, it can be inferred that awareness of plant-based meat is a key factor in promoting consumption. In the context of consumers in India, it would be interesting to study if the awareness of plant-based meat is associated with the consumers' purchasing intentions. Therefore, the following hypothesis is proposed:

H1: Plant-based meat (PBM) awareness will positively impact consumers' purchasing intentions of PBM.

Consumer attitudes toward plant-based meat products

Consumer attitudes toward plant-based meat products are an important factor in the emergence and development of a vegetarian consumer culture, according to Bryant & Sanctorum (2021). Attitudes can be influenced by a variety of factors such as health concerns, environmental sustainability, animal welfare, taste, and cultural identity. He et al. (2020) found that taste, texture, and sensory experience were key drivers of consumer acceptance, and that higher levels of awareness of plant-based meat alternatives were associated with more positive attitudes and higher intentions to purchase and consume these products. However, consumers who were more health-conscious or concerned about animal welfare or environmental sustainability were more likely to have positive attitudes toward plant-based meat alternatives. Demartini et al., (2022) found that labelling and the social category associated with plant-based meat alternatives can significantly influence consumers' attitudes and willingness to try these products. Given this background, it is hypothesized that PBM awareness will be positively related to consumers' attitudes toward PBM products in the Indian context.

H2: PBM awareness will be positively related to consumers' attitudes toward PBM products.

Perceived barriers

According to research, there are several perceived barriers to plant-based meat consumption. For example, a study by Broad (2020) found that some individuals perceive plant-based meat alternatives as unappetizing, unfamiliar, and lacking in texture. Similarly, Szenderák (2020) found that taste and texture were significant barriers to plant-based meat consumption, particularly among meat-eaters. In addition, a study by Kuosmanen et al., (2023) found that individuals were deterred from purchasing plant-based meat alternatives due to their higher cost compared to traditional meat products. A study by He et al., (2020), found that consumers generally perceive plant-based and cultured meat products to be more expensive than conventional meat products, and this perception negatively affects their willingness to pay for these alternatives. Finally, research by Tachie et al., (2023) found that

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ethical concerns related to the use of genetically modified ingredients and their potential impact on the environment were barriers to plant-based meat consumption.

Studies suggest that product awareness can play an important role in shaping consumers' perceptions of a product's value and price (Yu & Lee, 2019). Generally, consumers who are more aware of a product are more likely to have a positive perception of it and less likely to perceive barriers to its consumption. For example, a study by Bryant & Sanctorum (2020) found that individuals who were more familiar with plant-based meat alternatives were more likely to perceive them as healthier, more environmentally friendly, and more humane, and less likely to perceive barriers to their consumption. Similarly, a study by Reipurth et al., (2019) found that consumers who were more aware of plant-based foods were more likely to consume them and less likely to perceive barriers to their consumption, such as high price and lack of availability. Thus, product awareness can play an important role in reducing perceived barriers and increasing consumer acceptance of plant-based meat alternatives. Therefore it is hypothesised that

H3. Plant-based meat alternatives awareness will be negatively related to perceived barriers to plant-based meat alternatives products

Perceived benefits

Plant-based meat alternatives have various benefits, including health, environmental, and ethical advantages. Studies have shown that plant-based meat analogues can lower the risk of chronic diseases, such as heart disease, cancer, and diabetes (Satija et al., 2019; Tuso et al., 2013). Additionally, the production of plant-based meat analogues is associated with lower greenhouse gas emissions, land use, and water consumption compared to traditional meat production (Poore & Nemecek, 2018). Plant-based meat analogues are often lower in saturated fat and calories than traditional meat, and can be a good source of fiber and protein (Singh et al., 2021). Furthermore, the use of plant-based meat analogues may also address animal welfare concerns by reducing the demand for animal products (Koneswaran & Nierenberg, 2008).

Perceived benefits refer to an individual's subjective evaluation of the advantages or positive outcomes they believe they will experience by adopting or using a particular product, service, or behavior. Hwang et al. (2020) note that consumers' perceived benefits of plant-based meat alternatives (such as health, environmental sustainability, and ethical considerations) can influence their attitudes and behaviors related to these products. Research suggests that perceived benefits are positively related to consumers' attitudes towards a product or behaviour (Loh & Hassan, 2022). In the context of plant-based meat alternatives, individuals who perceived meat substitutes as healthier, tastier, and more convenient are more likely to have positive attitudes towards them and be more willing to consume them. Similarly, Segovia, et al. (2023) found that consumers who perceived plant-based meat alternatives as healthier and more environmentally sustainable were more likely to have positive attitudes towards them and be more willing to purchase them.

Moreover, perceived barriers can have a negative effect on consumers' perceived benefits of plant-based meats. If a consumer perceives the taste or texture of plant-based meat to be a barrier, they may also perceive it as less beneficial than traditional meat. Pohjolainen et al., (2015) found that concerns about the taste and nutritional value of plant-based meats were significant perceived barriers to consumption. On the other hand, Ho et al., (2022) found that consumers' willingness to pay for plant-based meat alternatives was positively associated with perceived health benefits and perceived environmental benefits, indicating that perceived benefits can still be a driving factor in consumer purchase decisions despite perceived barriers.

The relationship between perceived barriers and perceived benefits is not always straightforward and can be influenced by various factors such as taste, texture, nutritional value, health benefits, and environmental benefits. However, the relationship between perceived barriers and perceived benefits is important as they can impact consumers' purchase decisions. Therefore perceived barriers and perceived benefits are important factors that influence consumers' attitudes toward plant-based meat alternatives and can impact consumers' purchase decisions. These findings can be used to support our hypothesis in the Indian context;

H4: Plant-based meat alternatives awareness will positively influence perceived benefits of these products.

H5. Perceived benefits will positively influence consumers' attitude toward PBM products

H6: Perceived barriers will negatively influence consumers' attitudes toward PBM products.

Purchasing intentions of Plant-based meat alternatives

Plant-based meat alternatives have become increasingly popular in recent years, and several factors influence consumers' purchasing intentions of these products. According to Onwezen et al. (2020), taste, health benefits, environmental sustainability, and price are among the most important factors. In addition, labeling can also impact consumers' purchasing intentions. Ortega et al. (2022) also

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noted that labelling of food identity effectively increased relative demand for plant-based meat alternatives. Consumers were also more likely to purchase products positioned as a positive addition to their diet rather than a replacement for meat.

Perceived benefits are positively related to consumers' purchasing intentions of plant-based meat alternatives products. Bryant (2022) found that consumers who perceived plant-based meat alternatives as healthier and more environmentally sustainable were more likely to purchase them. Seo et al. (2023) also found that environmental and perceived health benefits were some of the most important factors influencing consumers' purchase decisions of plant-based meat alternatives. Consumers' willingness to pay for plant-based meat alternatives was also positively associated with perceived health benefits and perceived environmental benefits.

Attitudes towards a product strongly predict behavioral intentions to purchase that product (Ajzen and Fishbein, 1980). In the case of plant-based meat consumption, an individual's attitude towards consuming plant-based meat and their perception of what their social network thinks about consuming plant-based meat (perceived subjective norms) can influence their intention to consume or not consume plant-based meat. Therefore, the Theory of Reasoned Action (TRA) can provide a useful framework for understanding and predicting consumers' intentions to consume plant-based meat alternatives.

Similarly, Liu et al. (2020) found that attitudes towards a product were a significant predictor of purchase intentions, even after controlling for other factors such as subjective norms and perceived behavioral control. Other studies in various contexts have also found a positive relationship between attitudes and purchasing intentions, suggesting that customers who have a more positive attitude towards a product or service are more likely to intend to purchase it.

Furthermore, demographic and socio-economic factors such as age, gender, education level, and income may influence consumers' purchasing intentions regarding plant-based meat alternatives. However, further research is needed to explore the relationship between these factors and consumers' purchasing intentions in the Indian context.

In summary, it is hypothesized that perceived benefits and attitudes towards plant-based meat alternatives will be positively related to consumers' purchasing intentions (H7 and H8). Additionally, demographic and socio-economic factors may also influence purchasing intentions (H9).

H7: Perceived benefits will positively impact consumers' purchasing intentions of plant-based meat alternatives products

H8: Consumers' attitudes will positively impact consumers' purchasing intentions of PBM products.

H9: Consumers' demographic and socio-economic factors such as age, gender, education level, and income may influence their purchasing intentions regarding plant-based meat alternatives.

CONCEPTUAL MODEL

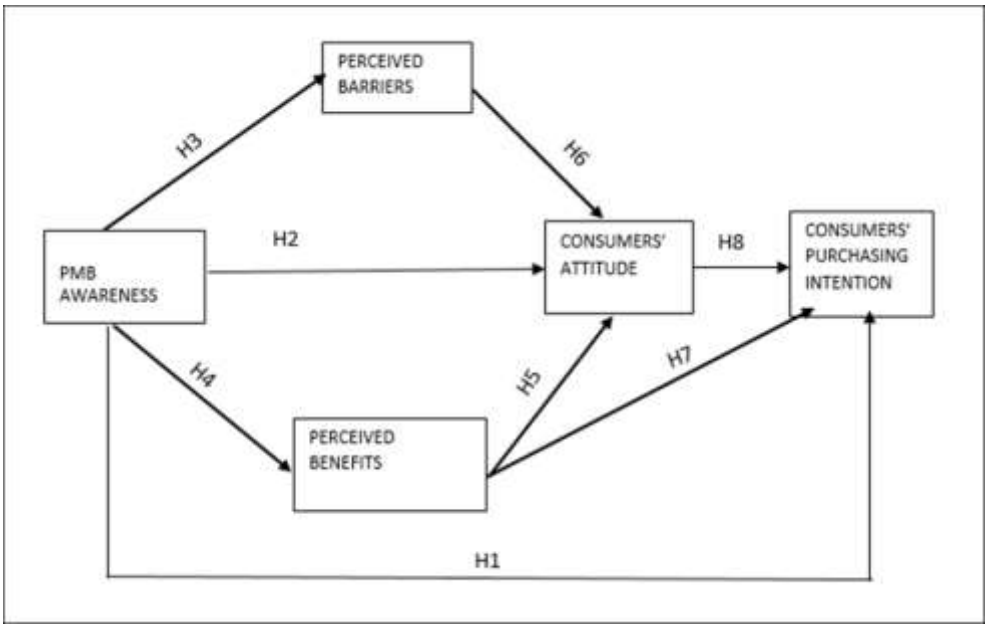

Figure 1: Consumer Decision-Making Model for Plant-Based Meat Alternatives

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SCALE DEVELOPMENT

Based on literature review a pool of items were generated to measure the constructs mentioned in the model. Inter-rater reliability was assessed using a panel of six reviewers, consisting of three individuals from academia, two hoteliers and one nutritionist. The obtained Fleiss Kappa coefficient was 0.72, indicating a substantial level of agreement among the reviewers (Landis & Koch, 1977). To evaluate content validity, these experts were tasked with rating various statements on relevance, clarity, and simplicity. Following this evaluation three statements were reworded and one statement was excluded due to its lack of specificity and potential to introduce multicollinearity concerns.

Consumer Attitude towards Plant Based Meat

ATT1 I think the taste of plant-based meat products are comparable to traditional meat products.
ATT2 I think the texture of plant-based meat products are comparable to traditional meat products.
ATT3 I think the sensory experiences of plant-based meat products are comparable to traditional meat products.
ATT4 Plant-based meat products have a similar taste to traditional meat products.

Awareness of Plant Based Meat

AWA1 I am aware of the existence of plant-based meat alternatives.
AWA2 I have tried plant-based meat alternatives before.

Perceived Barriers Towards PBM

PBAR1 I find the taste of plant-based meat products to be unappetizing.
PBAR2 I am concerned that plant-based meat products do not provide enough protein.
PBAR3 The texture of plant-based meat products is a barrier for me to consume them.
PBAR4 I perceive plant-based meat products to be more expensive than traditional meat products.
PBAR5 I worry about the use of genetically modified ingredients in plant-based meat products.
PBAR6 I perceive plant-based meat products to be less nutritious than traditional meat products.
PBAR7 I am skeptical about the environmental sustainability of plant-based meat products.
PBAR8 The lack of availability of plant-based meat products is a barrier for me to consume them.
PBAR9 I am concerned about the healthfulness of plant-based meat products.
PBAR10 I perceive plant-based meat products to be less culturally acceptable than traditional meat products.

Perceived Benefits towards PBM

PBEN1 Plant-based meat products are healthier than traditional meat products.
PBEN2 Eating plant-based meat products is better for the environment than eating traditional meat products.
PBEN3 Plant-based meat products are a good source of protein.
PBEN4 Eating plant-based meat products can lower the risk of chronic diseases.
PBEN5 Plant-based meat products are more ethical than traditional meat products.
PBEN6 Plant-based meat products are lower in calories than traditional meat products.
PBEN7 Eating plant-based meat products can help address animal welfare concerns.
PBEN8 Plant-based meat products are a good option for people who want to reduce their meat consumption.
PBEN9 Plant-based meat products are a more sustainable choice for the future.
PBEN10 Plant-based meat alternatives have a positive impact on the environment.
PBEN11 The environmental impact will be reduced
PBEN12 Plant-based meat products are healthier than traditional meat products.
PBEN13 Plant-based meat alternatives are a healthy alternative to traditional meat products.
PBEN14 Plant-based meat products consistent with my values and beliefs
PBEN15 Plant-based meat products will become more popular in the future.

Purchasing Intentions of PBM

PINT1 Taste is very important for me when considering purchase of plant-based meat alternatives
PINT2 Health benefits is very important for me when considering purchase of plant-based meat alternatives

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PINT3	Environmental sustainability is very important for me when considering purchase of plant-based meat alternatives
PINT4	Price is very important for me when considering purchase of plant-based meat alternatives
PINT5	I will purchase plant-based meat alternatives if they are labeled as "vegetarian"
PINT6	I will purchase plant-based meat alternatives if they are positioned as a positive addition to my diet rather than a replacement for meat
PINT7	I will purchase plant-based meat alternatives if they are labeled as "meat substitutes" or "mock meat"

An EFA was performed using Principle Component Analysis and Varimax rotation. The minimum factor loading criteria was set to 0.5. The communality of the scale, which indicates the amount of variance in each dimension, was also assessed to ensure acceptable levels of explanation. The results show that all communality for all the items were over 0.5 except for AWA2, PBAR5, PBAR10, PINT5, PBEN6 and PINT7. However, on extracting the rotated Component Matrix, loadings of AWA2, PBAR5, PBAR10 were greater than 0.5 so they were retained and PINT5, PBEN6 and PINT7 were removed as their loadings were less than 0.5
And important step involving weighing the overall significance of the correlation Matrix through Bartletts Test of Sphericity which provides a measure of the statistical probability that the correlation Matrix has significant correlations among some of its components. The results were significant, (Chi square = 2981.364 with p< 0.005) which indicates its suitability for factor analysis. The Kaiser-Meyer-Olkin Measure of sampling adequacy MSA which indicates the appropriateness of the data for factor analysis, was 0.859. In this regard, data with MSA values above 0.8 are considered appropriate for factor analysis. Finally the factors solution derived 5 factors for the scale which accounted form 63.654% of the variation in the data.

Table 1. Rotated Component Matrix

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
PBEN2	.864				
PBEN7	.846				
PBEN5	.836				
PBEN9	.792				
PBEN10	.776				
PBEN11	.749				
PBEN12	.737				
PBEN8	.693				
PBEN1	.685				
PBEN14	.685				
PBEN13	.673				
PBEN3	.601			.549	
PBEN15	.597				
PBEN4	.586				
PINT5					
PINT7					
PBAR9		.738			
PBAR4		.721			
PBAR7		.716			
PBAR6		.701			
PBAR5		.675			
PBAR3		.632			
PBAR10		.631			
PBAR2		.630			

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PBAR1		.618			
PBAR8					
PINT4			.740		
PINT1			.724		
PINT2			.711		
PINT6			.689		
PINT3	.531		.620		
PBEN6					
ATT2				.753	
ATT1				.738	
ATT3				.732	
ATT4				.598	
AWA1					.723
AWA2					.629

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

From the table 1 it can be seen that PINT5 and PINT7 loaded less than 0.5 on factor 1; PBEN3 cross loaded on factor 1 and factor 4;PBAR8 loaded less than 0.5 on factor 2; PINT3 cross loaded on factor 1 and factor 3; PBEN6 loaded less than 0.5 on factor 3. Removing these items one by one an EFA was performed again using Principle Component Analysis and Varimax rotation. The minimum factor loading criteria was set to 0.5. The communality of the scale, which indicates the amount of variance in each dimension, was also assessed to ensure acceptable levels of explanation. The results show that all communalities were over 0.5. And important step involving weighing the overall significance of the correlation Matrix through Bartletts Test of Sphericity which provides a measure of the statistical probability that the correlation Matrix has significant correlations among some of its components. The results were significant, (Chi square = 2421.425 with $p < 0.005$) which indicates its suitability for factor analysis. The Kaiser-Meyer-Olkin Measure of Sampling adequacy MSA which indicates the appropriateness of the data for factor analysis, was 0.855. In this regard, data with MSA values above 0.8 are considered appropriate for factor analysis. Finally the factors solution derived 5 factors for the scale which accounted form 66.633% of the variation in the data.

Table 2. Revised Rotated Component Matrix

	Component				
	1	2	3	4	5
PBEN2	.872				
PBEN7	.849				
PBEN5	.845				
PBEN9	.807				
PBEN10	.805				
PBEN11	.764				
PBEN12	.754				
PBEN8	.704				
PBEN13	.699				
PBEN1	.693				
PBEN14	.686				
PBEN15	.618				
PBEN4	.592				
PBAR4		.727			

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PBAR6		.725			
PBAR9		.722			
PBAR7		.709			
PBAR10		.660			
PBAR5		.658			
PBAR2		.655			
PBAR1		.641			
PBAR3		.637			
ATT2			.760		
ATT1			.744		
ATT3			.738		
ATT4			.595		
PINT1				.790	
PINT4				.741	
PINT6				.682	
PINT2				.682	
AWA1					.782
AWA2					.781

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

FINDINGS

The exploratory factor analysis (EFA) conducted in this study resulted in the development and validation of a multidimensional scale aimed at measuring several critical constructs related to consumer perceptions of plant-based meat (PBM) products. Through EFA, a five-factor solution was achieved, collectively accounting for 66.633% of the data's variance. These factors were labeled as follows: (1) Perceived Benefits of PBM, which encompassed health, environmental, and ethical advantages; (2) Perceived Barriers to PBM, representing concerns regarding taste, protein content, texture, price, and sustainability; (3) Consumer Attitudes Toward PBM, reflecting sensory experiences and perceived similarity to traditional meat; (4) Awareness of PBM, indicating knowledge of PBM existence and prior consumption; and (5) Purchasing Intentions of PBM, gauging intentions based on factors such as taste, health benefits, sustainability, price, labeling, and positioning.

DISCUSSION

The derived multidimensional scale effectively captures the multifaceted nature of consumer perceptions and intentions regarding PBM products. Notably, consumers' attitudes toward PBM were found to be influenced by factors such as taste, texture, and sensory experiences, highlighting the importance of product development and sensory appeal. Moreover, the perceived benefits of PBM, including health, environmental sustainability, and ethical considerations, emerged as significant drivers of consumer attitudes and purchasing intentions. Conversely, perceived barriers, such as concerns about taste, protein content, and price, were found to potentially hinder PBM adoption. Awareness of PBM played a pivotal role, emphasizing the need for education and marketing strategies to enhance consumer knowledge. Additionally, purchasing intentions were influenced by a combination of factors, including taste, health benefits, price, and labeling, underscoring the complexity of consumer decision-making in this context.

IMPLICATIONS OF THE SCALE'S DIMENSIONS

The multidimensional scale developed in this study offers valuable insights for various stakeholders. Marketers can use it to tailor their product positioning, emphasizing factors such as taste, health benefits, and sustainability to appeal to consumers. Policymakers can leverage these dimensions to design effective public health campaigns and policies that promote sustainable and healthier dietary

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choices. Scholars now have a robust tool to conduct in-depth research on PBM adoption, allowing for cross-cultural comparisons, longitudinal studies, and the examination of intervention effectiveness.

FUTURE DIRECTIONS FOR RESEARCH

This study opens avenues for future research. Cross-cultural investigations can explore how these dimensions vary across different consumer groups and regions. Longitudinal studies can track changes in consumer perceptions and behaviors over time. Segmenting consumers based on their attitudes and barriers can provide a deeper understanding of target audiences. Additionally, assessing the impact of interventions, such as educational campaigns or sensory improvements, can help refine strategies to promote PBM adoption. Further research can delve into sustainability perceptions and examine the impact of health messaging on consumer behavior within the PBM context. To further strengthen the scale, confirmatory factor analysis may be performed with a different sample, ensuring the robustness of the multidimensional structure. Overall, this multidimensional scale provides a strong foundation for advancing research on plant-based meat and sustainable dietary choices.

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