

Article

Factors Affecting Consumers' Cultivated Meat Purchase Intentions

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Abstract: Cultivated meat is an innovative product that promises to provide a consumption experience and nutritional value equivalent to conventional meat, with significantly lower negative impacts. The aim of this study is to analyze the factors that influence the purchase intention of cultivated meat. A quantitative study was conducted with 304 Brazilian consumers. The data were analyzed using structural equation modeling. The study proposed a purchase intention model with aspects related to clean production, animal welfare, food safety, naturalness and the moderating effect of food neophobia. The results showed that clean production and food safety had a positive relationship with the intention to purchase cultivated meat. The naturalness of food, on the other hand, had a negative relationship with purchase intent. Furthermore, the higher the level of food neophobia, the less important the influence of clean production became with regard to cultivated meat purchase intentions.

Keywords: food consumption; alternative meat; cultured meat; neophobia; food safety



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1. Introduction

Global meat production is predicted to be 13% higher by 2028 as a result of income and population growth [1]. The high demand is spurred by the increasing participation of China in the global market, which is responsible for 29% of beef imports [2]. Brazil is one of the main suppliers of beef in the global market. However, the internal market consumes 76.3% of all the meat that is produced [3]. The average annual per capita meat consumption was 23 kg from 2017 to 2018 [4].

Meat consumption involves a series of decisions, comparing different product options that are capable of meeting a need [5]. Consumers choose a product based on the attributes they consider most relevant. The intrinsic attributes differentiate the product physically and the extrinsic ones expand the perception of delivered value [6]. The most valued attributes of beef are color, aroma, expiration date, price, date of manufacture and tax inspection stamp [5]. The most valued benefits are related to sensory aspects: freshness, flavor, tenderness, leanness and juiciness [7].

Consumption decisions can be influenced by factors other than physiological aspects. It has been found that meat consumption and the amount ingested are likely to be higher in the company of family or friends, in restaurants and on weekends [8]. The values acquired in social life also influence meat consumption. The food choices of meat consumers can be driven by concerns over health, the naturalness of food, animal welfare and environmental issues [9].

The forecast of an increase in world population, the growing demand for meat and the negative effects of livestock on the environment mean that it is necessary to seek alternatives [10]. Current meat production systems have a negative effect on the environment. Ruminant breeding accounts for approximately 15% of all greenhouse gas (GHG) emissions, significantly contributing to climate change [11].

Alternative meats based on insects, plants and fungi already occupy a market niche, but with the growing popularity of the vegan and vegetarian lifestyles, greater acceptance

of alternative meats is expected. Meat consumers who consider animal welfare and the environmental impacts of production processes are more open to change [12].

Artificial or cultivated meat is one of the candidates to replace conventional meat. It is generated from the *in vitro* culture of bovine musculoskeletal cells. However, the mammalian cell culture process still needs to be optimized. The texture, color and flavor have yet to become more similar to conventional meats, at competitive market prices, and more efforts have to be contributed to increase consumer confidence in biotechnology [13].

Cultivated meat promises to reduce the negative externalities of conventional production without sacrificing meat's attributes, which benefits consumers with environmental and/or ethical concerns [14]. However, people are reluctant to use new technologies that are usually unfamiliar to them and base their judgements on their own feelings [15]. The feeling of disgust and the description of technologies, which highlight various human interventions, increase the perception of risk and decrease consumer acceptance [16].

The perception of naturalness is vital for the consumption of cultivated meat, and trust in the food industry increases this perception [17]. Many consumers consider cultivated meat as "unnatural" food. The perceived artificiality of cultivated meat evokes a feeling of disgust, which induces negative evaluations and discourages the consumption of this product [17]. Food neophobia, which has been associated with a perception of something unnatural, and political conservatism have also proved to be powerful psychological predictors of acceptance [18].

The acceptance of cultivated meat is also influenced by culture, ethics, religious beliefs and other factors [19], which implies the importance of carrying out regional studies to identify the aspects that influence willingness to buy cultivated meat. Therefore, the purpose of this study is to analyze the factors that influence the purchase intention of cultivated meat. The study contributes to the area by proposing a purchase intention model with aspects related to clean production, animal welfare, food safety, naturalness and the moderating effect of food neophobia.

2. Hypothesis Development

Brazil is the second largest country in the production of beef in the world, with its growth strengthened by domestic demand and exports, especially to China [20]. In 2019, 213.60 million heads of bovine livestock were registered, and distributed over 162.5 million hectares of land [3].

The extensive production system is predominant in the country due to the low cost of inputs, equipment and labor [21]. Methane (CH₄) emission, produced through the enteric fermentation of animals, and nitrous oxide (N₂O), resulting from the decomposition of waste deposited in pastures, are greater in extensive production systems due to a longer grazing time [22]. The livestock sector is directly responsible for 28% of Brazilian GHG emissions, 61.1% corresponding to enteric fermentation and 32.2% to managed soil [23].

The intensive production system associates the use of protein and/or energy supplements with grazing during the dry season or throughout the year [21]. Supplementation with grains (corn and soy) allows for an enhancement in the stocking rate per hectare and reduces the time for slaughtering animals. Therefore, the intensive system increases productivity, reducing GHG emissions and the need for new pasture areas [24]. In Brazil, only 13% of slaughtered animals came from feedlot production systems in 2018 [3].

The expansion of corn and soy production is stimulated by the success of domestic meat producers in the international market and by exports, especially to China [25]. Therefore, raising cattle leads to deforestation and, consequently, the loss of biodiversity through its demand for supplements and feed [26]. Thus, meat production uses a large volume of water to supply animals and irrigate pastures and crops [27].

Cultivated meat leads to low GHG emissions and less use of land and water compared with conventional meat [28]. These environmental benefits are important for consumer acceptance [29], since some consumers are concerned about the environmental effects of current meat production methods [30]. Therefore:

H1. Clean production positively impacts cultivated meat purchase intention.

Most people enjoy eating meat, but believe that this attitude is harmful to animals. These inconsistent beliefs create a psychological conflict called “the meat paradox” [31]. The simultaneous presence of these positive and negative feelings characterizes consumers’ incongruous attitude to this product [32]. In this case, concern over animal welfare can lead people to stop consuming meat, adopting instead vegan or vegetarian diets.

Consumers who have a highly ambivalent attitude to meat continue to consume it by using moral disengagement strategies [33]. Moral concern is reduced by attributing animals to a lower mental capacity to suffer [31]. Personal responsibility is denied, justifying meat consumption as something natural, normal, necessary and nice [34]. Finally, these consumers protect their identities, seeking inconsistencies in the behavior of others [35].

However, ambivalent consumers have greater intentions to promote changes in meat consumption in the future [32], showing willingness to reduce meat consumption and introduce meat substitutes into their diets [36]. Nevertheless, intentions to reduce meat consumption can be influenced by the following sociopsychological factors: attitude, personal norm, perceived behavior control, emotion, social norm and awareness of the problem [37].

Animal welfare is considered an important factor in the decision-making process involved in purchasing beef [38]. Animal welfare is the prime reason for not consuming meat and one of the main benefits of cultivated meat [39,40]. The meat cultivation process requires muscle samples, meaning a significant reduction in the number of slaughtered animals [41]. Therefore, cultivated meat does not constitute the total liberation of animals, but the product succeeds in substituting conventional meat, replicating the consumption experience without directly challenging people’s thought patterns [42]. Therefore:

H2. Animal welfare positively impacts cultivated meat purchase intention.

The negative impacts of meat on health are the main reason for its lower consumption [39]. However, the intention to reduce meat consumption does not influence willingness to consume cultivated meat [43]. Antibiotics are substances capable of killing or inhibiting the growth of several microorganisms [44]. The indiscriminate use of antibiotics in animals can leave residues in meat, which cause direct toxicity or diseases with the development of resistant bacteria [45].

Consumers have very negative opinions regarding the use of antibiotics in livestock [46]. Mitigating the impacts of animal farming on antibiotic resistance boosts the acceptance of cultivated meat [47], as cultivated meat is kept in a controlled and monitored environment, where any sign of infection can be contained [41].

In recent years, there has been a global effort to ensure food quality and safety. Brazil, as one of the largest beef exporters in the world, has implemented federal and regional regulations that meet the Codex Alimentarius and World Health Organization guidelines [48]. The Federal Inspection Service (SIF), a technical-administrative unit of the Ministry of Agriculture, Livestock and Supply (MAPA), conducts inspections through animal product control programs.

Cultivated meat is produced in the laboratory. Consequently, cultivated muscle cells do not have the similar opportunity to find intestinal pathogens such as *E. coli* or *Salmonella* spp. [41]. Consumers also attribute a lower risk of zoonosis to cultivated meat compared with conventional meat [49]. Therefore:

H3. Food safety positively impacts cultivated meat purchase intention.

Naturalness is a greatly sought food attribute among consumers [50], and is especially associated with authenticity, creating feelings of trust, transparency and control [51]. Risk perceptions of chemicals in foods are positively correlated with consumers’ preference for natural foods [52].

The assessment of the naturalness of foods is based on the form of cultivation, the production process and the final product [50]. Generally, consumers classify foods as “natural” that are traditionally produced and minimally processed. “High-tech” production processes are associated with something scientific and unnatural, which can have a negative impact on the image of cultivated meat [41].

Cultivated meat can evoke feelings of “adulteration of nature” compared with other food technologies [53]. In this case, doubts may arise over the veracity of the product’s benefits, especially in terms of health and nutritional value [54].

The degree of importance that consumers attribute to the naturalness of food influences their perception of the naturalness of cultivated meat [55]. The strong perception of artificiality can generate a negative attitude to the product, which reduces the intention to try it and purchase it [29,43,56]. Therefore:

H4. *Unnaturalness negatively impacts cultivated meat purchase intention.*

Neophobia can be defined as a reluctance to eat and/or a tendency to avoid new foods, or a personality trait that is characteristic of people who are always likely to avoid new foods [57]. As the degree of neophobia increases, the familiarity of food becomes increasingly important, and factors related to health, natural contents and environmental concerns diminish in importance [58].

In new food purchase decisions, more neophobic consumers increase the projection of their personal values through product attributes, which lead them to a greater degree of abstraction [59]. This means that food neophobia plays a moderating role in the cognitive process and is closely related to the antecedents of purchase intention [60].

Neophobia can lead to complete rejection and a negative perception of cultivated meat, preventing consumers from making rational evaluations of the results [18]. Thus, the health risks of conventional meat become more acceptable compared with the same risks caused by cultivated meat [61].

From these discussions, the following hypotheses emerged:

H5. *Food neophobia negatively impacts cultivated meat purchase intention.*

H6. *Food neophobia negatively moderates the relationship between clean production and cultivated meat purchase intention.*

Based on the literature review, a research model was proposed (Figure 1). The model aggregates factors related to the cultivated meat perception (food safety and naturalness), environmental/ethical concerns (animal welfare and clean production) and psychological factors (food neophobia).

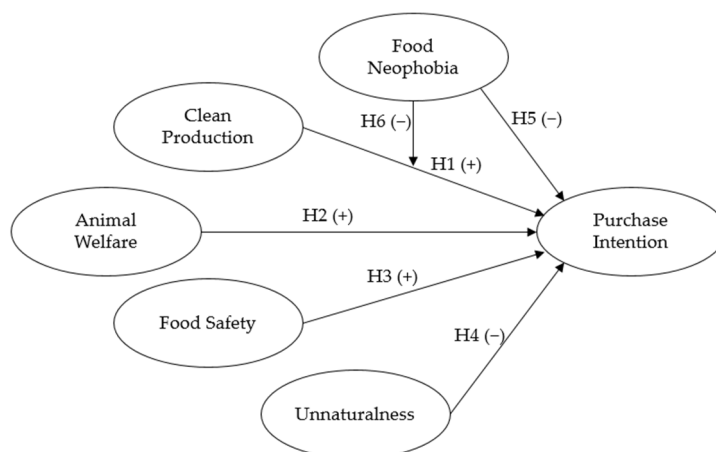


Figure 1. Research model.

3. Materials and Methods

This study of a quantitative and descriptive nature encompassed the variables related to the perception and purchase intention of cultivated meat. An online nationwide survey was conducted with consumers. The link to the questionnaire on a Google platform was shared by the authors on social media (Facebook and WhatsApp), from 3 June to 8 August 2021.

The target population of the study comprised consumers responsible for food purchases. The minimum size of the convenience sample was estimated with G*Power software (Version 3.1.9.7, Düsseldorf, Germany), considering the parameters test power (power = $1 - \beta$ error prob. II) of 0.80 and effect size (f^2) of 0.15 [62]. The minimum calculated value (total sample size = 43) was tripled to give greater consistency to the model in question.

A total of 334 questionnaires was collected, of which 30 were excluded because they did not stem from the target audience. Of the 304 valid questionnaires, 52% were submitted by women, 48% were aged between 18 and 24 years, 30% between 25 and 34 years, 10% between 35 and 44 years, 12% between 45 and 54 years and 6% 55 or higher. In total, 44.1% had not completed higher education at the time, and 28.6% had a monthly family income of USD 750.00 to USD 1316.50.

Furthermore, 41.1% of the respondents claimed that they had never heard of cultivated meat. This number was expected since cultivated meat is not yet commercialized in the country. However, a *t*-test showed that only 3 items of the 27 considering all scales in the survey were significantly different between people who had never heard of cultivated meat and people who had. This result indicated that the findings of this research were valid for both groups.

The following definition of cultivated meat was given to the respondents before they initiated their evaluations: “Cultivated meat is produced in the laboratory using bioengineering techniques. Its production occurs through the *in vitro* culture of animal cells, rather than slaughtered animals”.

3.1. Measurement Scales

To measure food neophobia, the scale of Pliner and Hobden [57] was used, comprising eight indicators. Purchase intention was measured using the scale adapted from Chang et al. [63], composed of five indicators. Clean production was measured with a scale adapted from Mgonja et al. [64], comprising four items. Animal welfare was measured with a scale adapted from Burnier et al. [65], comprising four items. Food safety was measured using a scale adapted from Wang and Tsai [66], comprising four items. Unnaturalness was measured using the scale adapted from Hwang et al. [67], comprising four items. All of the indicators of these scales were measured using a five-point Likert scale (ranging from 1 “I totally disagree” to 5 “I fully agree”).

3.2. Technical Data Analysis

The data were analyzed using structure equation modeling (SEM). This multivariate statistical technique describes all the relationships between the constructs—unobservable or latent concepts measured approximately using multiple indicators [68]. Since the test for normality showed that the data did not present a normal distribution (Kolmogorov–Smirnov test $p < 0.05$), partial least square (PLS) structural equation modelling was performed [62]. PLS is defined by two sets of linear equations: the internal model, which establishes the relationships between the latent variables (LVs), and the external model, which relates the LVs and their indicators [69]. Through this technique, the causal and hypothetical relationships between the constructs were determined.

4. Results and Discussion

For the convergent validation, the average variance extracted (AVE), Cronbach’s alpha (CA) and composite reliability (CR) were analyzed. It was necessary to remove two food

neophobia indicators, whose factor loads (correlations) had a lower value, in order to obtain a satisfactory AVE value ($AVE > 0.50$). After all the LVs presented a satisfactory fit (Table 1), the discriminant validation of the model was addressed.

Table 1. Reliability of measurements.

Constructs	Items	Mean (Standard Deviation)	Factor Loading	AVE	Composite Reliability	Cronbach's Alpha
Clean production	Cultivated meat can aid environmental sustainability.	3.62 (1.28)	0.928	0.800	0.941	0.916
	Cultivated meat can help to preserve the environment.	3.64 (1.31)	0.934			
	Cultivated meat can help to reduce environmental pollution.	3.50 (1.30)	0.896			
	Cultivated meat can help to reduce the use/waste of water.	3.54 (1.29)	0.815			
Animal welfare	I am concerned about whether the animals were raised as freely and naturally as possible.	3.45 (1.34)	0.938	0.838	0.954	0.935
	I am concerned about whether the animals were treated humanely and ethically throughout their lives.	3.49 (1.30)	0.950			
	I am concerned about whether the animals were given adequate food and sanitation.	3.81 (1.27)	0.838			
	I am concerned about whether the animals were slaughtered painlessly and in compliance with the norms of animal welfare.	3.49 (1.34)	0.930			
Food safety	I believe that cultivated meat is safe.	3.22 (1.22)	0.849	0.718	0.910	0.868
	I feel that cultivated meat is hygienic (for example, with no infectious diseases).	3.39 (1.21)	0.893			
	I believe that cultivated meat is clean (for example, with no parasites or insects).	3.51 (1.22)	0.873			
	I feel that cultivated meat contains no chemical residue (such as pesticides or heavy metals).	3.14 (1.32)	0.769			
Unnaturalness	Our lives began from a single cell, which is undoubtedly very natural. Cultivated meat comes from a single cell, just like the plants that we eat.	2.93 (1.25)	0.757	0.582	0.848	0.761
	Cultivated meat is more natural than conventional meat.	3.56 (1.32)	0.761			
	Eating man-made meat is a natural practice that does not separate us further from nature.	3.05 (1.32)	0.730			
	Cultivated meat is very natural.	3.49 (1.28)	0.802			
Food neophobia	I do not usually try new foods if they are different.	2.11 (1.17)	0.720	0.506	0.858	0.824
	I do not trust new foods.	2.17 (1.07)	0.848			
	If I do not know what is in food, I do not try it.	2.00 (1.18)	0.712			
	I do not like food from other cultures.	2.17 (1.14)	0.766			
	Ethnic food sounds too strange to eat.	2.52 (1.29)	0.657			
	I am afraid of eating things that I have never eaten before.	2.85 (1.31)	0.525			
Purchase intention	My food purchasing behavior could be influenced by the existence of cultivated meat.	3.00 (1.36)	0.853	0.740	0.934	0.911
	I would willingly buy cultivated meat.	3.20 (1.33)	0.908			
	I would be willing to pay more for cultivated meat.	2.42 (1.29)	0.733			
	I would buy cultivated meat if it were available where I do my shopping.	3.19 (1.34)	0.906			
	I would exchange animal proteins for cultivated meat.	2.83 (1.31)	0.887			

The criterion of Fornell and Larcker [70] was used to determine the discriminant validity of the model. The square roots of the AVE values of each construct, highlighted in the main diagonal of Table 2, were compared with the correlations that existed between the constructs. All the values of the correlations for each construct were lower than the

respective square roots of the AVE values. Therefore, the fitted model had discriminant validity between the constructs.

Table 2. Discriminant validity.

	AW	PI	FN	UN	CP	FS
Animal Welfare (AW)	0.915					
Purchase Intention (PI)	0.211	0.860				
Food Neophobia (FN)	−0.023	−0.147	0.711			
Unnaturalness (UN)	−0.077	−0.525	0.020	0.763		
Clean Production (CP)	0.228	0.593	−0.105	−0.530	0.894	
Food Safety (FS)	0.222	0.639	−0.162	−0.636	0.754	0.847

Note: Diagonals constitute the square root of AVE, while the other values represent the correlations.

The evaluation of the path model consisted of a significance test of the identified relationships. The significance of path coefficients was determined using a bootstrap procedure with 500 repetitions [62,68]. Table 3 shows that the LV unnaturalness, clean production and food safety had significant effects on the purchase intention for cultivated meat ($p \leq 0.05$). Meanwhile, food neophobia presented a significant moderating effect on the relationship between clean production and purchase intention.

Table 3. Path analysis.

Hypothesis	Structural Relationship	Structural Coefficient	Std Error	t-Value	p-Value
H1	Clean production → Purchase intention	0.220	0.068	3.212	0.001
H2	Animal welfare → Purchase intention	0.070	0.041	1.701	0.089
H3	Food safety → Purchase intention	0.326	0.077	4.210	<0.001
H4	Unnaturalness → Purchase intention	−0.181	0.057	3.174	0.001
H5	Food neophobia → Purchase intention	−0.063	0.040	1.546	0.213
H6	Moderation effect (Neophobia × Clean production) → Purchase intention	−0.141	0.048	2.922	0.003

Based on the results, four of the six hypotheses were supported, with a confidence level of 95% (Figure 2). Clean production and food safety showed a positive relationship with purchase intention regarding cultivated meat (H1 and H3). Unnaturalness, on the other hand, showed a negative relationship with purchase intention (H4). Food neophobia was not significantly correlated to purchase intention, but the model indicated that consumers with higher levels of neophobia attached less importance to clean production when purchasing cultivated meat (H6). The intention to purchase cultivated meat presented an R^2 of 47%, which, according to Cohen's classification [71], represents a large effect.

The results showed that clean production had a positive relationship with cultivated meat purchase intention (H1). From the perspective of the growing world population and climate change, it is hoped that consumers can appreciate the sustainable feature of cultivated meat.

The appeal of the sustainable benefits of cultivated meat depends on consumers' level of environmental awareness, that is, the extent to which they understand the negative impacts of meat production and consumption on the environment [72]. The high level of education of the respondents may have influenced the results obtained, given their positive relationship with environmental awareness [73]. However, few highly educated Brazilian consumers associated cultivated meat with environmental benefits [40].

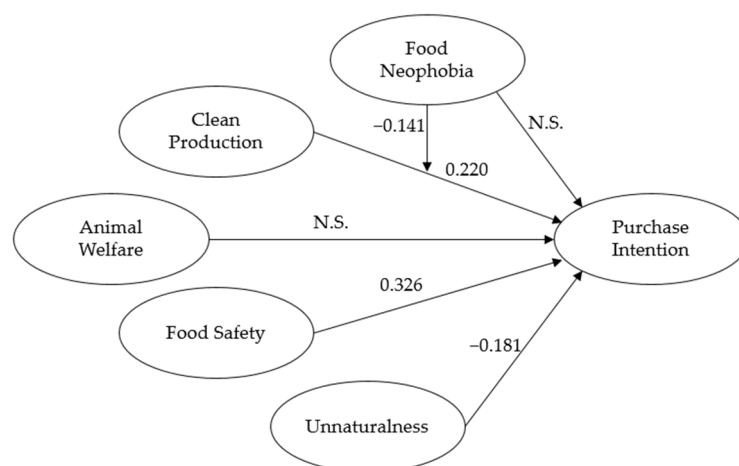


Figure 2. Structural equation modeling results. N.S. Not Significant.

Food safety had a positive relationship with the intention to purchase cultivated meat (H3). In recent years, the risks associated with zoonoses and residues of veterinary medicines in meat have been a matter of great concern for Brazilians [74,75]. Consumers were expected to attach great importance to food safety, especially when comparing cultivated meat and conventional meat [76]. This result corroborated a survey conducted by The Good Food Institute, which pointed out the strong influence of the nutritional and health benefits of cultivated meat on the purchase intention of Brazilian consumers [77].

Unnaturalness had a negative relationship with purchase intention (H4). Due to greater trust and control, consumers prefer to consume food that they perceive as more “natural”. Cultivated meat is perceived as an “unnatural” or “artificial” product, as high technology is involved in its production process. In other words, this perceived lack of naturalness negatively affects Brazilians in terms of purchase intention. Australian, Chinese, British, French, German, Mexican, South African, Spanish, Swedish and American consumers also consider naturalness as an important aspect for the acceptance of cultivated meat [17].

Brazilian specialists in the field of animal production also showed a strong perception of artificiality, closely linked to the lack of knowledge of the technology employed in the process [78]. This indicates a fundamental need to educate both professionals and consumers in order to encourage a greater acceptance of this innovative food.

Cultivated meat is an emerging food innovation that changes beef production through biotechnology. As the product is not yet marketed in Brazil, it was assumed that Brazilians would be more reluctant to consume this unknown food. Their lack of familiarity with the new technology could lead to mistrust regarding the “unnaturalness” of the product and the potential effects of prolonged consumption on human health [79].

However, the findings of the study did not establish a significantly negative relationship between food neophobia and purchase intention of cultivated meat (H5 rejected). The relationship between clean production and purchase intention was moderated using food neophobia (H6). As a personality trait, neophobia can influence food purchase decisions. As a consumer’s degree of food neophobia increased, the influence of environmental benefits on the cultivated meat purchase intention decreased. A lower perception of the product’s benefits has been reported in previous studies [61,67].

This occurs because, at certain times, consumers are forced to decide concessions between different factors when determining food purchase decisions [58]. In other words, consumers with higher levels of food neophobia do not consider less important choice factors (such as clean production) to ensure the satisfaction of other more important factors (such as safety), thereby avoiding unfamiliar food.

5. Conclusions

The aim of this study was to analyze the factors that affect the purchase intention of cultivated meat, proposing and testing a conceptual model, which linked clean production, animal welfare, food safety, unnaturalness and food neophobia to consumer purchase intention. Furthermore, the moderating effect of food neophobia on the association between clean production and purchase intention was analyzed.

This study contributed to the existing literature by proposing a model for the purchase intention of cultivated meat. Another contribution of the research was its analysis of the moderating effect of food neophobia on consumers. The results indicated that neophobia influenced how consumers evaluated the benefits of the product, thus, impacting their purchase intention. Furthermore, the results added to the body of knowledge related to food consumption and the acceptance of technological innovations.

The acceptance of innovative foods is influenced by factors related to the product (food safety and naturalness), environmental/ethical benefits (clean production and animal welfare) and psychological factors (neophobia). Identifying the factors capable of influencing the purchase intention of cultivated meat can help companies to develop marketing strategies for the product. For example, the results suggested that food safety significantly impacts consumers' purchase intention. Therefore, actions that seek to reduce the perception of chemical and microbiological contamination risks should be prioritized.

Policy makers should propose a legislation that guarantees this safety for the consumers. There are many regulatory concerns related to cultured meat that still need to be addressed through proper regulations and legislation [80]. Aligned to that, an effective labelling policy should also be proposed. A public and scientific effort is necessary to explain the new technology to consumers, even before the product's commercialization [56]. According to Apostolidis and McLeay [81], by stimulating the production and promotion of a new product, policy makers may help consumers deal with food neophobia.

Environmental awareness campaigns can be a relevant step for policy makers to strengthen the perceived environmental benefits and, consequently, the acceptance of this sustainable alternative in the market. Presenting evidence of the naturalness of the product could mitigate the negative effect of the production process of cultivated meat on consumers' evaluations of it. For this purpose, policy makers should also examine the development and utilization of comprehensible and trustworthy food labels (the use of technical terms in advertising should be avoided) that highlight the product's similarity to conventional meat.

A limitation of the study was the data collection process, which was nonprobabilistic, thus, precluding generalizations regarding the results. It would be interesting to conduct regional research, given the size of Brazil and its cultural diversity and social inequalities. Despite the paper's aim, it did not conduct a representative sample of Brazil, and a more representative sample in terms of age could be assessed in future studies. A suggestion for future studies would be to replicate this model to gauge the evolving perception of consumers concerning cultivated meat over time. It is hoped that growing concern over its environmental impacts could lead to greater acceptance of the product on the domestic market.

Cultivated meat is not commercially available in Brazil, and this limits the study of measuring only purchase intention. In the near future, consumers' purchase behavior can also be explored. Variables related to the sale environment of the product can also be included in the model to evaluate how these new relationships occur. Furthermore, different methodologies could be used, such as qualitative research or experiments to further the understanding of the introduction of food innovations on the Brazilian market.

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