JOURNAL OF GASTRONOMY HOSPITALITY AND TRAVEL

ISSN: 2619-9548 **Journal homepage:** www.joghat.org

Received: 24.09.2025 Accepted: 01.12.2025

Journal of Gastronomy, Hospitality and Travel, 2025, 8(4), 1605-1616

Research Article

ARTIFICIAL MEAT IN FUTURE KITCHENS: CHEF CANDIDATES' FOOD TECHNOLOGY RISK PERCEPTIONS AND THE ROLE OF FOOD FEARS

Merve ONUR* (orcid.org/ 0000-0001-7985-1243)

[1] Kayseri University, Faculty of Applied Sciences, Gastronomy and Culinary Arts, Kayseri, Türkiye

Abstract

The growing global population and environmental issues have made lab-grown meat one of the future's important protein sources. Culinary acceptance of artificial meat is shaped not only by technological advancements but also by the attitudes of consumers and professional culinary professionals. In this context, aspiring chefs' neophobic or technology-related risk perceptions may influence future menu planning, recipe development, and customer orientation. This study explores the attitudes and usage intentions of chef candidates majoring in gastronomy and culinary programs towards artificial meat in the context of food neophobia, neophilia, and technology food risk perception. The data were collected via an online survey from 394 Turkish chef candidates and analyzed using structural equation modeling (SEM). Results show that a one-unit rise in technology food risk perception increases food neophobia by 23% (β=0.23; $p<0.05$) and decreases food neophilia by 45% (β=–0.45; $p<0.05$). Additionally, the increase in food neophobia negatively affects attitudes toward artificial meat by 18% (β=–0.18; $p<0.05$), while food neophilia positively influences them by 21% (β=0.21; $p<0.05$). The study's most remarkable finding is that a positive attitude toward artificial meat increases the willingness to use this product in the kitchen by 75% (β=0.75; $p<0.05$). Another noteworthy finding is that the effect of neophilia on attitudes toward innovative food technologies ($\beta = 0.21$; $p < 0.05$) is more potent than that of neophobia ($\beta = –0.18$; $p < 0.05$). This reveals that positive psychological tendencies may have a more decisive effect on an individual's attitudes than negative tendencies. Overall, the study shows that chef candidates' food technology risk perceptions significantly impact their fear of artificial meat, suggesting that these perceptions create a general resistance to using innovative foods in the kitchen. Encouraging positive attitudes toward innovations in food technology may be a more effective strategy for reducing individual resistance.

Keywords: Technology-Based Food Risk Perception, Artificial Meat, Food Neophobia, Attitude, Willingness to Use

Introduction

The population growth, expected to reach 11 billion by 2050 (Wilmoth et al., 2021), makes the sustainable feeding of the planet one of the most significant global challenges. Therefore, tapping alternative protein sources is scientifically and politically essential (FAO, 2023). In this context, lab-grown artificial meat is marketed as one of the most noteworthy innovations that could solve the environmental, ethical, and medical problems related to meat consumption (Bryant and Barnett, 2018).

Artificial meat ("in vitro meat," "clean/synthetic meat," or "cultured meat," as noted by Mancini and Antonioli, (2019) is a product developed in a laboratory environment. In that sense, it is defined as a typical technological product that integrates biotechnology, tissue engineering, and bioprocess/reactor technologies (Benny et al., 2022; Hong et al., 2021; Stephens et al., 2018). FDA has formally framed the technological nature of products by completing its first premarket reviews with the phrase "human food produced using animal cell culture technology" (FDA, 2022). However, this innovation is shaped not only by technological and biotechnological advancements but also by societal acceptance levels. As a matter of fact, individual and social resistance to future foods (e.g., artificial meat) is often rooted in psychological factors (Fasanelli et al., 2025; Siegrist and Hartmann, 2020; Siddiqui et al., 2022).

Relevant literature shows that individuals' neophobic tendencies towards foods shape not only their intention to consume a new product but also their cognitive and emotional evaluations (Ceylan, Muştu, and Sarıışık, 2020; Muhammad, 2016; Pliner and Hobden, 1992; Soylu et al., 2021). Similarly, biotechnological foods (e.g.,

*Corresponding author: merveonur@kayseri.edu.tr
DOİ: 10.33083/joghat.2025.582

artificial meat) are perceived as "unnatural," "artificial," and "unsafe," leading to consumer rejection (Cerjak and Faletar, 2025; Cox and Evans, 2008; Heidmeier and Teuber, 2023; Krings et al., 2022).

Concerning the acceptance of cultured meat, attitudes of not only consumers but also professional culinary actors who will develop, promote, and include this product in menus play a critical role (Cappelen and Strandgaard, 2024; Lewis, 2020; Sathatip et al., 2025). In particular, chef candidates' individual neophobic or technology food risk perceptions may be important in future menu planning, recipe development, and customer orientation processes (Fasanelli et al., 2025; Wang and Ko, 2024). Chefs serve as opinion leaders and role models in the field of gastronomy, either encouraging or limiting new kitchen trends (Ocejo, 2014; Inwood et al., 2009). However, there is scant knowledge about their perceptions of using protein-based future foods (Dion-Poulin et al., 2021) because most studies focus on consumer perception (Cornelissen and Piqueras‐Fiszman, 2023; Jacobs et al., 2024; Kombolo et al., 2023). Only a few studies have previously examined chefs'perceptions and use of alternative protein sources (insects) (Dion-Poulin et al., 2021; Halloran and Flore, 2018). But, no studies in the literature have identified chef candidates' perceptions and use of artificial meat. Therefore, understanding the attitudes of individuals in gastronomy students toward alternative proteins is academically and sectorally essential for sustainability.

Against this backdrop, the study primarily intends to examine the attitudes and usage intentions of chef candidates majoring in gastronomy and culinary programs in Türkiye towards artificial meat within the framework of their food neophobia-neophilia levels and technology food risk perceptions. In this regard, the following question guides the current study:

RQ1: To what extent do technology-based food risk perceptions and food fears influence chef candidates' attitudes toward new technological foods (artificial meat) and their intentions to use them in the kitchen?

Literature Review And Hypothesis Development

Rapid developments in food technology today have led to innovative applications such as genetically modified organisms (GMOs), artificial meat production, nanotechnology applications, and synthetic additives finding greater use in kitchens (Siegrist, 2008). Despite the potential benefits of these technological advancements, consumers appear to have a certain level of risk perception toward such foods (Bearth et al., 2014). Technology food risk perception is associated with individuals' assessment of such products as harmful, unnatural, or unethical (Verbeke, 2005). Specifically, individuals engage in cognitive and emotional responses when evaluating innovative practices in the food sector (Chen et al., 2013). However, studies reveal that food technology risk perception depends not only on individuals' knowledge levels but also on their psychological tendencies, especially food neophobia. Cox and Evans (2008) have shown that individuals' reservations about consuming products produced with new food technologies are often linked to neophobic tendencies. In addition, education level, cultural background, and professional interaction with the kitchen considerably shape perceptions about food technology (Siegrist and Hartmann, 2020). Chef candidates are exposed to these technological advancements during their culinary training, but individual risk perceptions are considered to lead to different responses during this process. It is assumed that as food technology risk perception grows, neophobic tendencies (i.e., hesitation towards new and unfamiliar foods) may also increase. In that regard, the following hypothesis is proposed to explain the relationship between chef candidates' food technology risk perceptions and their food neophobia levels:

H1: A growth in chef candidates' technology food risk perceptions results in an increase in their food neophobia levels.

H2: A growth in chef candidates' technology food risk perceptions results in a decrease in their food neophilia levels.

Consumer reactions to novel foods have riveted researchers in recent years, resulting in knowledge accumulation about the processes that lead to the acceptance or rejection of these foods. Food neophobia can prompt negative attitudes toward unfamiliar and non-traditional foods (Tuorila et al., 1998). Lab-grown food products, such as artificial meats, which consumers are unfamiliar with, may be perceived as risky, unnatural, or unreliable by individuals with high neophobia levels (Siegrist and Hartmann, 2020). It is also common for individuals to focus solely on the "unnatural" aspect of artificial meat, disregarding its benefits (e.g., environmental sustainability and animal welfare) (Wilks and Phillips, 2017). The literature has shown that food neophobia is directly related to negative perceptions of new food technologies (Verbeke, 2005). In this regard, the novelty of artificial meat and its different production process from traditional meat constitute a

barrier for neophobic individuals, increasing the likelihood of negative attitudes toward artificial meat among such individuals (Bryant and Barnett, 2018). While numerous studies have addressed the impact of food neophobia towards novel foods (functional food, insects, etc.) from the consumers' perspective (Cifci et al., 2020; Edwards, Hartwell and Brown, 2010; Huang, Bai, Zhang and Gong, 2019; La Barbera, Verneau and Grunert, 2018; Stratton, Vella, Sheeshka and Duncan, 2015), no empirical research addressed the attitudes of food neophobia towards artificial meat from the perspective of prospective chefs, leaving a gap in the literature. Accordingly, food fears (neophobia and neophilia) are considered to affect the attitudes of prospective kitchen staff towards innovative food technologies (artificial meat), making the testing of the following hypothesis seem meaningful:

H3: A growth in chef candidates' food neophobia levels leads to a decrease in their attitudes towards artificial meat.

H4: A growth in chef candidates' food neophilia levels leads to an increase in their attitudes towards artificial meat.

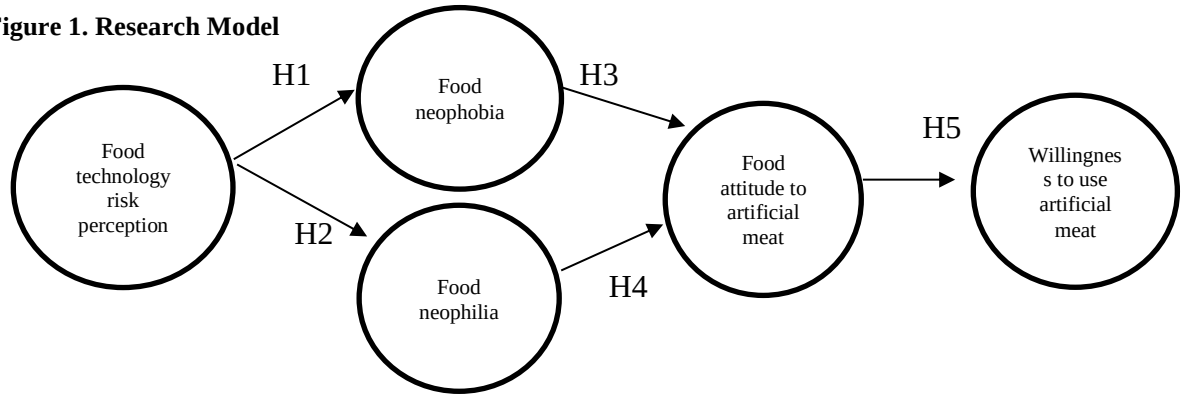
A growing consensus suggests that reducing meat consumption and/or developing new protein sources are essential to address critical challenges in health and sustainability. However, a relevant theoretical framework is required to support these transitions (Graça et al., 2019). In this sense, it is important to determine the attitudes of prospective chefs toward artificial meat, particularly concerning using alternative protein sources in the kitchen. While attitudes involve individuals' emotional and cognitive evaluations of an object or phenomenon, the social psychology literature has long accepted that these evaluations are related to behavioral tendencies (Ajzen, 1991). Chefs serve as opinion leaders and role models in gastronomy, either encouraging or limiting new culinary trends. (Ocejo, 2014; Inwood et al., 2009). In this regard, developing positive attitudes toward artificial meat among chef candidates may increase their willingness to use these products in gastronomic applications.

Researchers have largely targeted kitchen employee when advocating the acceptance of distinct food product (Dion-Poulin et al., 2021; Halloran and Flore, 2018; Leggett et al., 2021; Johnston, Biro, and MacKendrick, 2009). Therefore, chefs' attitudes may influence not only their usage trends but also the variety and sustainability of products offered to consumers (Michielsen et al., 2025). Accordingly, chefs are in a crucial position to promote direct marketing and the adoption of new culinary concepts (Curtis and Cowee, 2009; Sharma, Moon and Strohbehn, 2014; Stierand, 2015). In that vein, the attitudes of chef candidates should be considered not only as an individual assessment but also as a professional driver of food system transformation.

Psychological tendencies such as food neophobia and distrust of technological innovations may indirectly impact desire to use artificial meat. However, these effects appear weaker in individuals with positive attitudes, with increased intentions to use as attitudes become more positive (Faccio and Guiotto, 2019). In this sense, we can argue that a positive attitude toward artificial meat, a technological innovation, increases the willingness to use this product in the kitchen. Therefore, the following hypothesis appears plausible and testable based on the literature:

H5: A growth in chef candidates' positive attitudes towards artificial meat results in a rise in their willingness to use it.

Figure 1. Research Model



Methods

Design

This study SPSS software package was used to assess scale validity and reliability, LISREL 8.80 was employed to validate the model and test variable relationships.

Population and sample

The study group comprises gastronomy and culinary arts majors and associate degree students of culinary arts during the 2025-2026 academic year. The study's population consists of chef candidates in associate degree (culinary arts) and undergraduate (gastronomy and culinary arts) programs in Türkiye. The adoption of innovative food technologies is directly related not only to consumer attitudes but also to the perspectives of the professionals who will develop, present, and promote these products to the public. In this context, chef candidates, who will assume decision-making, creative, and guiding roles in kitchens in the future, are in a critical position in adopting food innovation. Alternative protein sources, especially artificial meat, require the support of professional culinary practice during the production and presentation stages. Therefore, accepting such foods in the kitchen directly relates to chefs' perceptions and tendencies (Chauhan and Philosophers, 2023), hence a population of chef candidates. 402 prospective chefs participated in the study. However, eight surveys with outliers were removed during the analysis, resulting in the analysis of 394 surveys. *The research has been deemed ethically appropriate by the Kayseri University Senate Ethics Committee under reference number E.151992. In this study, artificial intelligence was used in editing and language control.*

Data collection tools and methods

The study used the survey method to measure chef candidates' "technology food risk perceptions", "food neophobia and neophilia" levels, "attitudes toward new food technologies (artificial meat)", and "willingness to consume artificial meat". The data were acquired through a four-part online survey delivered online (Google Forms). The first part includes demographic information (gender, sectoral experience, and educational program).

The second part includes the "Perception of Risks" dimension of the "Food Technology Neophobia Scale", developed by Cox and Evans (2008) and adapted to Turkish by Kahriman and Baş (2024), used to measure technology-based risk perception in food. This construct was evaluated with a total of 3 items.

The third part involves Pliner and Hobden's (1992) five-item "Food Neophobia Scale" to determine food neophobia and neophilia levels. The scale was initially designed as a unidimensional construct with food neophobia and neophilia aligned on the same axis. However, subsequent studies have revealed that individuals' attitudes toward novel foods are more complex and multidimensional. Accordingly, the concepts of food neophobia and neophilia are thereafter considered as two related yet independent psychological tendencies (Capiola and Raudenbush, 2012). Such an approach assumes that an individual can simultaneously exhibit low levels of neophobia and neophilia, or possess varying degrees of both tendencies. In this context, food neophobia and food neophilia were modeled separately in this study. This approach allowed for a clearer and more discernible analysis of the impact of both tendencies on attitudes towards artificial meat. Additionally, confirmatory factor analyses demonstrated statistical support for including both dimensions in the model.

In the fourth part, attitudes toward and willingness to consume artificial meat were measured using Kiran et al.'s (2023) scale, which was adapted to assess "willingness to consume artificial meat". In this context, attitudes towards artificial meat were assessed with four items, and willingness to consume was assessed with three items. All the scales were designed using from "1 = Strongly Disagree" to "5 = Strongly Agree."

Results and Discussion

Demographic information

Gender, sectoral experience, and education program were the criteria used in this study to present sample characteristics. Descriptive statistics from the 394 samples revealed 207 males (52.5%) and 187 females (47.5%). Regarding sectoral experience, 103 chef candidates were experienced (26.1%), while 291 were inexperienced (73.9%). Concerning the education background, 242 (61.4%) students were enrolled in gastronomy (bachelor's degree) programs, while 152 (38.6%) were culinary arts majors.

Table 1. Distribution Of Demographic Information

Demographic criteria	Frequency	Percentage
Gender	***f***	***%***
Male	207	52,5
Female	187	47,5
Sectoral Experience		
Yes	103	26,1
No	291	73,9
Education Program		
Gastronomy	242	61,4
Culinary Arts	152	38,6

Assessment of the measurement model

The survey data were transferred to SPSS for analysis and subjected to normality assumptions. Skewness and kurtosis values between +1.5 and -1.5 showed a normal distribution (Kline, 2011). Factor analyses were conducted after data normality assumptions were established. Factor analysis can be performed in the social sciences using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Hair, Black, Babin, and Anderson (2014) state that item factor loadings of 0.50 or greater are considered significant in practice. Therefore, items with loadings lower than this value were removed from the analysis, and a reliability analysis was conducted.

Table 2. Exploratory and First-Level Confirmatory Factor Analysis

Factors/Items	EFA/CFA		Cronbach Alpha (α)	Explained Variance Percentage	CR	AVE
Food Technology Risk Perception (FTPR)						
"New food technologies may have long term negative environmental effects"	,80	,73	,865	78,919	0,72	0,46
"Society should not depend heavily on technologies to solve its food problems"	,77	,65				
"It can be risky to switch to new food technologies too quickly"	,78	,68				
Food Attitude (FA)						
"Production of artificial meat improves the current and future society's welfare"	,65	,56	,867	71,625	0,72	0,40
"Production of artificial meat is a necessary activity for society"	,73	,71				
"Production of artificial meat has more benefits than risks for society"	,70	,64				
"Production of artificial meat provides a balanced and varied diet"	,76	,60				
Willingness to Use Artificial Meat (WC)						
"I will use artificial meat if it was of better quality than ordinary food"	,79	,66	,874	80,295	0,75	0,50
"I intend to use artificial meat in the future"	,84	,83				
"I will use artificial meat if it was cheaper than ordinary food"	,77	,63				
Food Neophobia (FOBI)						
"I do not try food I do not know (+)"	,71	,70	,815	73,299	0,61	0,40
"I do not trust new foods (+)"	,63	,58				
"I am afraid of eating food I have not eaten before (+)"	,63	,53				
*The 2nd and 3nd statement was not included in the scale because it had a low factor loading (<.50)						
"I am very picky about the food I eat (+)"	,26					
"I do not eat ethnic food because it looks strange to me (+)"	,43					

Food Neophilia (FILI)						
"I am constantly trying new and different foods (-)"	,70	,60	,921	80,952	0,84	0,57
"I like going to restaurants that serve food from different cultures (-)"	,81	,81				
"I try new foods at social events (-)"	,86	,87				
"I like food from different cultures (-)"	,79	,72				
*The 6nd statement was not included in the scale because it had a low factor loading (<.50)						
"I'm not picky about food, I eat everything (-)"	,26					

Cronbach's alpha (α) analysis, a frequently used method for calculating the reliability of measurement results, was used. A Cronbach's alpha value between 0.60 and 0.80 indicates that the measurement tool is highly reliable (Kalaycı, 2009). Based on the findings, all scales used in the study were highly reliable. According to Psailla and Roland (2007), an AVE value above 0.40 is sufficient for scale reliability. At the same time, the composite reliability (CR) should be greater than the average variance extracted (CR>AVE) (Hair et al., 2014; Sharif et al., 2020; Singh and Kaur, 2015). The literature emphasizes that the CR coefficient should be greater than 0.70 (CR>70) (Hair et al., 2014; Hair et al., 2011). However, convergent validity is achieved if the AVE value is less than 0.50 and the CR value is greater than 0.60 (Fornell and Larcker, 1981; Shrestha, 2021). Based on this data, the developed scale's reliability level is high. The relevant values are given in Table 2. In the next step, the study relies on the fit indices most commonly used in model validation studies.

Assessment of the structural model

If the model fit indices were not within acceptable limits, modification (correction) indices were examined, and modification (correction) was made where necessary to address inconsistencies between the proposed and predicted models. The second-level goodness-of-fit values, χ^2/df (3.3), are slightly above the acceptable range of $2 < X^2/df \leq 3$. However, the literature suggests this ratio can be tolerated up to 5 in complex models (Marsh et al., 1988). The Goodness of Fit Index GFI (0.90), Root Mean Square Error of Approximation RMSEA (0.077), Normed Fit Index NFI (0.94), Non-Normed Fit Index NNFI or Tucker Lewis Index TLI (0.94), and Comparative Fit Index CFI (0.96) were found. Based on the basic indices and findings, the fit index values of the established model are within acceptable limits (Aksu et al., 2017; Kline, 2011). Consequently, the model is confirmed by the obtained data. All goodness-of-fit indices obtained for the study's measurement model are acceptable, with some exceeding the limits of good fit. These results indicate that the model is consistent with the data and that the measurement structure is satisfactorily established. The CFI (0.96) and TLI (0.95) values, in particular, support a good fit, which is reassuring for structural modeling.

Figure 2. Graphical Representation of The Path Analysis

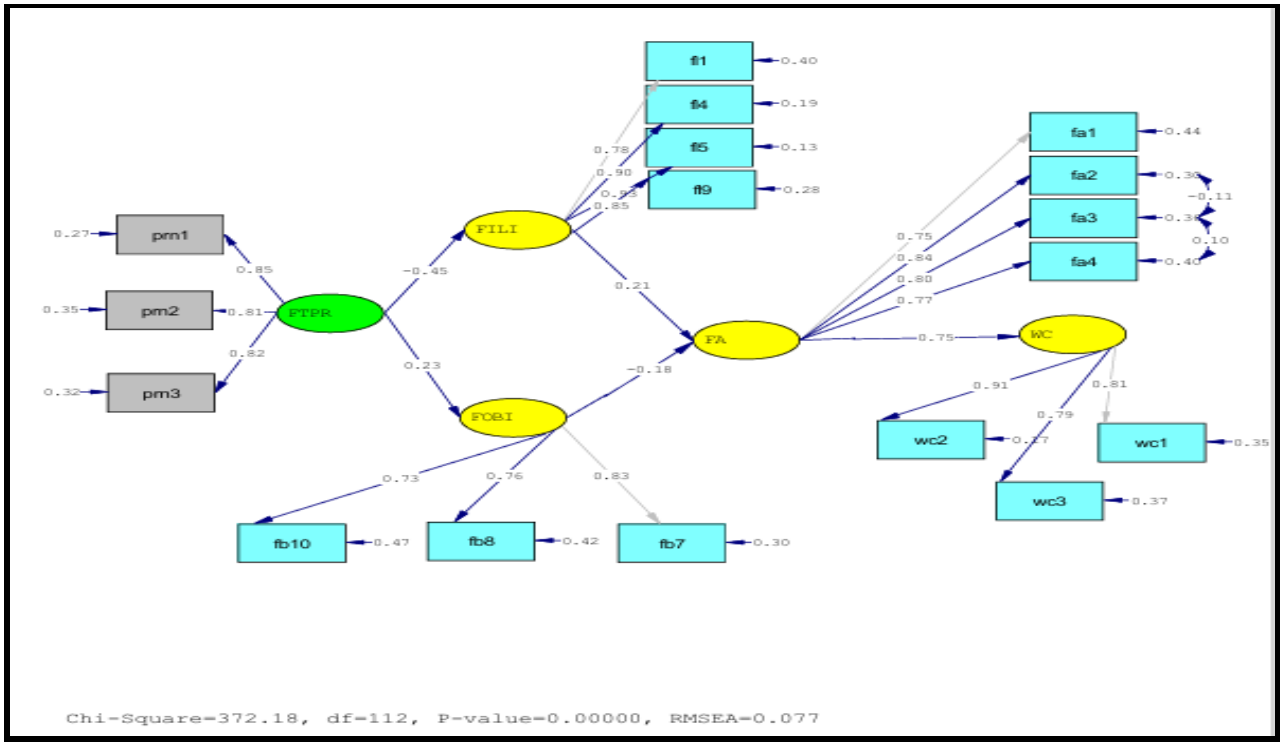


Table 3. The Results of The Path Analysis

	β	T	p	Hypotheses
H1: FTPR → FOBI	0,23	3,94	0.000	Accepted*
H2: FTPR → FILI	-0,45	-8,13	0.000	Accepted*
H3: FOBI→ FA	-0,18	-3,12	0.000	Accepted*
H4: FILI → FA	0,21	3,91	0.000	Accepted*
H5: FA→WC	0,75	12,44	0.000	Accepted*

FTPR (food technology risk perception); FOBI (food neophobia); FILI (food neophilia); FA (food attitude); WC (willingness to use artificial meat)

Kline (2011) suggested that beta coefficients ≤ 0.10 have a low impact, beta coefficients between 0.11 and 0.50 have a medium effect, and beta coefficients ≥ 0.51 have a high impact. Consequently, growing risk perceptions of food technology among chefs increase their food fears, negatively impacting their attitudes towards artificial meat and their willingness to use it in the kitchen. Hypotheses "H1, H2, H3, H4, and H5" were accepted within the scope of the study. See Table 3.

The SEM results demonstrate that all hypotheses were statistically significant, with all t-values in the model above 3. according to Kline (2011), a t-value of $|t| > 1.96$ indicates significance at a 95% confidence level, while the t-values in this study, which ranged from 3.12 to 12.44, suggest that the relationships are pretty strong and significant. An examination of the R^2 values in the model reveals that FILI and FOBI explain 8.7% of the variance in the FA variable, suggesting the impact of other important factors on FA. The fact that FTPR explains 21% of the variance in the FILI variable provides a moderate explanatory power and demonstrates that FTPR significantly affects FILI. However, only 5.4% of the variance in FOBI is explained by FTPR, suggesting that other variables affecting FOBI should be considered in the model. Regarding the WC variable, FA explains 57% of the variance. This value indicates the strongest explanatory power in the model, demonstrating the decisive effect of FA on WC.

The results of the study showed that a one-unit increase in food technology risk perceptions increased food neophobia among chef candidates by 23% ($\beta=0.23$; $p<0.05$) while decreasing food neophilia by 45%($\beta= -0.45$; $p<0.05$). It was found that one-unit growth in food neophobia among chef candidates impaired their attitudes towards artificial meat by 18% ($\beta=0.18$; $p<0.05$), while their neophilia towards food positively affected them by 21% ($\beta=0.21$; $p<0.05$). Finally, it was determined that a one-unit increase in attitude towards artificial meat positively affected their willingness to use artificial meat by 75% ($\beta=0.75$; $p<0.05$). The study findings reveal prospective chefs' risk perceptions of food technology significantly impact their fears of artificial meat. This suggests that food technology risk perception creates a general resistance to innovative foods.

The study's findings indicate that food technology risk perception significantly impacts chef candidates' food neophobia and neophilia, aligning with the approach developed by Cox and Evans (2008). The study also found that individuals' negative perceptions of new food technologies increase neophobic tendencies and create a reluctance to embrace innovation.

Findings also showed that a one-unit increase in food neophobia negatively affected attitudes towards artificial meat, while neophilia positively affected attitudes towards artificial meat. This result is consistent with the findings of Tuorila et al. (1998) and Wilks and Phillips (2017), which suggest that food neophobia is a key variable negatively affecting the acceptance of alternative foods. Lab-grown foods (e.g., artificial meat), in particular, are met with greater resistance by neophobic individuals due to perceptions of "unnaturalness" or "artificiality" (Bryant and Barnett, 2018; Siegrist and Hartmann, 2020). In contrast, individuals open to food innovation (neophiles) evaluate such products more positively and are less resistant to innovations (Faccio and Guiotto, 2019).

Another notable finding is that the effect of neophilia ($\beta = 0.21$; $p < 0.05$) is stronger than that of neophobia ($\beta = –0.18$; $p < 0.05$), suggesting that positive psychological tendencies may have a more decisive impact on an individual's attitudes than negative tendencies. Neophilia represents an individual's interest in and willingness to try new and unfamiliar foods (Capiola and Raudenbush, 2012), and this tendency plays a constructive role, particularly in the acceptance of innovative food technologies (Faccio and Guiotto, 2019).

In contrast, neophobia is more limited to avoidance and resistance-based reactions, weakening over time as the individual engages in direct experimentation (Wilks and Phillips, 2017).

On the other hand, since neophiles actively seek new tastes and are more open to alternative food experiences, they are more likely to develop positive attitudes toward innovative products such as artificial meat (Cifci et al., 2020). In this context, openness to food innovation is strengthened not only by suppressing negative judgments but also by supporting positive and heuristic tendencies. Consequently, encouraging positive attitudes toward innovations in gastronomy education may be more effective than reducing individual resistance.

One notable finding is that a positive attitude towards artificial meat increases the willingness to use it by 75% ($\beta = 0.75$, $p < 0.05$). This finding demonstrates that the "attitude-intention" relationship expressed in Ajzen's (1991) Theory of Planned Behavior in social psychology also applies to the gastronomy context. Chef candidates' positive attitudes toward artificial meat significantly increase their willingness to use these products in professional culinary practices. Similarly, studies such as Leggett et al. (2021) and Dion-Poulin et al. (2021) emphasize that chefs' attitudes play a decisive role in integrating food innovations into culinary practice.

When evaluated holistically, findings hint at a significant structural relationship between chef candidates' food technology risk perceptions, food neophobia/neophilia levels, and their attitudes toward and willingness to use artificial meat in the kitchen. This suggests, as stated by Siegrist and Hartmann (2020), that the adoption of innovative food technologies should focus on knowledge and individual psychological factors. As noted by Sathatip et al. (2025) and Cappelen and Strandgaard (2024), in particular, to increase the social acceptance of future foods such as artificial meat, developing chefs as individuals open to innovation should be a priority goal of gastronomy education programs. In conclusion, this study offers valuable contributions to both the academic literature and the field of practice by demonstrating that the psychological dispositions of chef candidates receiving gastronomy training strongly influence their attitudes and behaviors toward innovative and sustainable foods.

Conclusion

This study provides critical empirical findings to explain how the attitudes and culinary intentions of prospective chefs pursuing gastronomy training toward artificial meat, an innovative food technology, are shaped by individual psychological tendencies and food technology risk perceptions. The research model, tested using SEM, revealed that food technology food risk perception increases food neophobia and decreases neophilia, which indirectly significantly affects attitudes toward artificial meat and willingness to use it in the kitchen. One striking finding is that positive attitudes toward artificial meat strongly predict future willingness to use this product in professional culinary applications. This suggests that technical knowledge, competencies, and individuals' psychological tendencies and perceptions are decisive in adopting innovative foods like artificial meat.

Limitation

The study measured attitudes and intentions regarding a product (i.e., artificial meat) that has not yet been directly experienced in culinary practice. Participants' responses to a product they have not experienced in person are based on hypothetical preferences and may only reflect limited behavioral reality. Finally, since this study is limited to quantitative data, future researchers could explore individual perceptions and experiences in depth using qualitative methods.

Implications for gastronomy

The results suggest that prospective chefs' perceptions of new food technologies must be restructured for sustainable and ethical alternative protein sources to gain acceptance in the culinary field. Reducing food neophobia and encouraging neophilic tendencies, in particular, is critical to the success of this process.

Furthermore, since chefs are not only practitioners who prepare products in the kitchen but also opinion leaders who influence consumer preferences and shape food trends (Chauhan and Philosophers, 2023), their positive attitudes toward alternative foods may expedite the social acceptance of these products. Therefore, this study emphasizes the need to place chefs at the center of studies on the gastronomic integration of future foods and suggests that gastronomy education should not be limited to technical skills but also adopt a multidimensional structure that focuses on managing attitudes and psychological resistance toward innovative foods. To this end, it is crucial that gastronomy education programs not only impart technical skills but also enrich the content

with a critical education that discusses the ethical, environmental, and technological dimensions of innovative foods.

Finally, fostering positive attitudes among chefs toward new and future foods has the potential to encourage consumer acceptance (Fasanelli et al., 2025; Wang and Ko, 2024). Therefore, in gastronomy, positively promoting sustainable alternative proteins like artificial meat based on sensory experiences and supporting them with culinary practices by chefs can be a strategic approach for both culinary practice and societal transformation. Collaboration among industry stakeholders (educational institutions, chefs, restaurants, food technology companies) is particularly essential to develop holistic solutions that support the integration of future foods with gastronomy.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, *50*(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-T.

Aksu, G., Eser, M.T., and Güzeller, C.O. (2017). *Applications of exploratory and confirmatory factor analysis and structural equation model*. (in Turkish) Detay Yayıncılık.

Bearth, A., Cousin, M. E., and Siegrist, M. (2014). The consumer's perception of artificial food additives: Influences on acceptance, risk and benefit perceptions. *Food Quality and Preference*, 38, 14–23. https://doi.org/10.1016/j.foodqual.2014.05.008.

Benny, A., Pandi, K., and Upadhyay, R. (2022). Techniques, challenges and future prospects for cell-based meat. *Food Science and Biotechnology, 31*(10), 1225-1242. https://doi.org/10.1007/s10068-022-01136-6.

Bryant, C., and Barnett, J. (2018). Consumer acceptance of cultured meat: A systematic review. *Meat science*, *143*, 8-17. https://doi.org/10.1016/j.meatsci.2018.04.008.

Capiola, A., and Raudenbush, B. (2012). The effects of food neophobia and food neophilia on diet and metabolic processing. *Food and Nutrition Sciences*, *3*(10), 1397-1403. http://dx.doi.org/10.4236/fns.2012.310183.

Cappelen, S. M., and Strandgaard Pedersen, J. (2024). Culinary movements and higher education collaborating for sustainable development. *Industry and Higher Education, 38*(1), 27-39. https://doi.org/10.1177/09504222231194631.

Cerjak, M., and Faletar, I. (2025). Food technology neophobia and animal ethics orientation: Influences on cultured meat acceptance in Croatia. *Journal of Central European Agriculture*, *26*(2), 542-554. https://doi.org/https://doi.org/10.5513/JCEA01/26.2.4585.

Ceylan, V., Muştu, Ç., and Sarıışık, M. (2020). Associations between food neophobia and culinary creativity: a study with a sample of chefs and bartenders in Turkey. *Journal of Tourism and Gastronomy Studies*, *8*(4), 2402-2416.

Chauhan, Y., and Philosophers, C. (2023). Culinary creativity unleashed: A review of innovative techniques in food gastronomy. *International Journal for Multidimensional Research Perspectives, 1*(2), 37-46.

Chen, Q., Anders, S., and An, H. (2013). Measuring consumer resistance to a new food technology: A choice experiment in meat packaging. *Food Quality and Preference*, *28*(2), 419-428. https://doi.org/10.1016/j.foodqual.2012.10.008.

Cifci, I., Demirkol, S., Altunel, G. K., and Cifci, H. (2020). Overcoming the food neophobia towards science-based cooked food: The supplier perspective. *International Journal of Gastronomy and Food Science,* 22, 100280. https://doi.org/10.1016/j.ijgfs.2020.100280.

Cornelissen, K., and Piqueras-Fiszman, B. (2023). Consumers' perception of cultured meat relative to other meat alternatives and meat itself: A segmentation study. *Journal of Food Science*, *88*(S1), A91-A105. https://doi.org/10.1111/1750-3841.16372.

Cox, D. N., and Evans, G. (2008). Construction and validation of a psychometric scale to measure consumers' fears of novel food technologies: The food technology neophobia scale. *Food Quality And Preference*, *19*(8), 704-710. https://doi.org/10.1016/j.foodqual.2008.04.005.

Curtis, K. R., and Cowee, M. W. (2009). Direct marketing local food to chefs: Chef preferences and perceived obstacles. *Journal of Food Distribution Research, 40*(2), 26-36. https://doi.org/10.22004/ag.econ.99784.

Dion-Poulin, A., Turcotte, M., Lee-Blouin, S., Perreault, V., Provencher, V., Doyen, A., and Turgeon, S. L. (2021). Acceptability of insect ingredients by innovative student chefs: An exploratory study. *International Journal of Gastronomy and Food Science*, *24*, 100362. https://doi.org/10.1016/j.ijgfs.2021.100362.

Edwards, J. S. A., Hartwell, H. L., and Brown, L. (2010). Changes in food neophobia and dietary habits of international students. *Journal of Human Nutrition and Dietetics*, 23(3), 301-311. https://doi.org/10.1111/j.1365-277X.2010.01066.x.

Faccio, E., and Guiotto Nai Fovino, L. (2019). Food neophobia or distrust of novelties? Exploring consumers' attitudes toward GMOs, insects and cultured meat. *Applied Sciences*, *9*(20), 4440. https://doi.org/10.3390/app9204440.

FAO (2023). FAO strategic priorities for food safety within the FAO strategic framework 2022-2031.

Fasanelli, R., Casella, E., Foglia, S., Coppola, S., Luongo, A., Amalfi, G., and Piscitelli, A. (2025). Is Cultured Meat a Case of Food or Technological Neophobia? On the Usefulness of Studying Social Representations of Novel Foods. *Applied Sciences*, *15*(5), 2795. https://doi.org/10.3390/app15052795.

FDA (2022). *FDA completes first pre-market consultation for human food made using animal cell culture technology*. Access link: https://www.fda.gov/food/hfp-constituent-updates/fda-completes-first-pre-market-consultation-human-food-made-using-animal-cell-culture-technology?utm_source=chatgpt.com. Access Date: 11.08.2025

Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50. https://doi.org/10.1177/002224378101800104.

Graça, J., Godinho, C. A., and Truninger, M. (2019). Reducing meat consumption and following plant-based diets: Current evidence and future directions to inform integrated transitions. *Trends in Food Science and Technology, 91*, 380-390. https://doi.org/10.1016/j.tifs.2019.07.046.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., and Tatham, R. (2014). *Exploratory factor analysis multivariate data analysis*. Seventh Pearson new international ed (Harlow, UK: Pearson Education, 2014).

Hair, J. F., Ringle, C. M., and Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, 19(2), 139-152. https://doi.org/10.2753/MTP1069-6679190202.

Halloran, A., Flore, R. (2018). A New World of Ingredients: Aspiring Chefs' Opinions on Insects in Gastronomy. In: Halloran, A., Flore, R., Vantomme, P., Roos, N. (eds) Edible Insects in Sustainable Food Systems . Springer, Cham. https://doi.org/10.1007/978-3-319-74011-9_8

Heidmeier, A. K., and Teuber, R. (2023). Acceptance of in vitro meat and the role of food technology neophobia, dietary patterns and information–empirical evidence for Germany. British Food Journal, 125(7), 2540-2557. https://doi.org/10.1108/BFJ-03-2022-0244.

Hong, T. K., Shin, D. M., Choi, J., Do, J. T., and Han, S. G. (2021). Current issues and technical advances in cultured meat production: A review. *Food Science of Animal Resources*, 41(3), 355. https://doi.org/10.5851/kosfa.2021.e14.

Huang, L., Bai, L., Zhang, X., and Gong, S. (2019). Re-understanding the antecedents of functional foods purchase: Mediating effect of purchase attitude and moderating effect of food neophobia. *Food Quality and Preference,* 73, 266-275. https://doi.org/10.1016/j.foodqual.2018.11.001.

Inwood, S. M., Sharp, J. S., Moore, R. H., and Stinner, D. H. (2009). Restaurants, chefs and local foods: insights drawn from application of a diffusion of innovation framework. Agriculture and human values, 26(3), 177-191. https://doi.org/10.1007/s10460-008-9165-6.

Jacobs, A. K., Windhorst, H. W., Gickel, J., Chriki, S., Hocquette, J. F., and Ellies-Oury, M. P. (2024). German consumers' attitudes toward artificial meat. *Frontiers in Nutrition*, 11, 1401715. https://doi.org/10.3389/fnut.2024.1401715.

Johnston, J., Biro, A., and MacKendrick, N. (2009). Lost in the supermarket: the corporate-organic foodscape and the struggle for food democracy. *Antipode,* 41(3), 509-532. https://doi.org/10.1111/j.1467-8330.2009.00685.x.

Kahriman, M., and Baş, M. (2024). Reliability and validity of the food technology neophobia scale in a Turkish sample. *International Journal of Food Science and Technology*, *59*(4), 2603-2611. https://doi.org/10.1111/ijfs.17000.

Kalaycı, Ş. (2009). *SPSS applied multivariate statistical techniques*. Asil Yayınevi, Ankara. (in Turkish).

Kiran, F., Sultan, F., and Nawaz, M. A. (2023). Acceptance of Genetically Modified Organism: A Study based on Consumption Values, Food Attitude, and Food Technology Neophobia. *Journal of Management Sciences*, 10 (1), 57-75. https://doi.org/10.20547/jms.2014.2310104.

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York, NY: The Guilford Press.

Kombolo Ngah, M., Chriki, S., Ellies-Oury, M. P., Liu, J., and Hocquette, J. F. (2023). Consumer perception of "artificial meat" in the educated young and urban population of Africa. *Frontiers in Nutrition,* 10, 1127655. https://doi.org/10.3389/fnut.2023.1127655.

Krings, V. C., Dhont, K., and Hodson, G. (2022). Food technology neophobia as a psychological barrier to clean meat acceptance. *Food Quality and Preference,* 96, 104409. https://doi.org/10.1016/j.foodqual.2021.104409.

La Barbera, F., Verneau, F., Amato, M., and Grunert, K. (2018). Understanding Westerners' disgust for the eating of insects: The role of food neophobia and implicit associations. *Food Quality and Preference*, *64*, 120-125. https://doi.org/10.1016/j.foodqual.2017.10.002.

Leggett, K., McCann, R., Brunson, M., Miller, B. A., and MacAdam, J. (2021). "From a chef's perspective or what I can sell on the menu?" Exploring culinary professionals' attitudes toward specialty beef production and barriers to adoption. *Agroecology and Sustainable Food Systems,* 45(8), 1246-1266. https://doi.org/10.1080/21683565.2021.1888185.

Lewis, B. J. (2020). Culinary sustainability education: A culinary education as sustainability. University of Wisconsin-Stevens Point.

Mancini, M. C., and Antonioli, F. (2019). Exploring consumers' attitude towards cultured meat in Italy. *Meat Science*, 150, 101-110. https://doi.org/10.1016/j.meatsci.2018.12.014.

Marsh, H. W., Balla, J. R., and McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin*, 103(3), 391. https://psycnet.apa.org/doi/10.1037/0033-2909.103.3.391.

Michielsen, Y. J., van der Horst, H. M., and van de Nobelen, R. (2025). Beef or Beet Wellington? Chefs, meat reduction, and hindering and supportive forms of craftsmanship. *Food, Culture and Society,* 28(1), 60-83. https://doi.org/10.1080/15528014.2024.2322792.

Muhammad, R., Ibrahim, M. A., Ahmad, R., and Hanan, F. (2016). Psychological Factors on Food Neophobia among the young Culinarian in Malaysia: Novel food preferences. *Procedia-Social and Behavioral Sciences*, *222*, 358-366. https://doi.org/10.1016/j.sbspro.2016.05.180.

Ocejo, R. E. (2014). Show the animal: Constructing and communicating new elite food tastes at upscale butcher shops. *Poetics,* 47, 106-121. https://doi.org/10.1016/j.poetic.2014.10.006.

Pliner, P., and Hobden, K. (1992). Development of a scale to measure the trait of food neophobia in humans. *Appetite*, *19*(2), 105-120. https://doi.org/10.1016/0195-6663(92)90014-W.

Psailla, G., and Roland, W. (Eds.). (2007). E-Commerce and Web Technologies: 8th International Conference, EC-Web 2007, Regensburg, OPUS Journal of Society Research Germany, September 3-7, 2007, Proceedings (Vol. 4655). Springer.

Sathatip, P., Senachai, P., Leruksa, C., and Fakfare, P. (2025). Cultivating ethical culinary practices and sustainability awareness in culinary education: Fostering responsible future chefs. *Journal of Hospitality, Leisure, Sport and Tourism Education*, 36, 100531. https://doi.org/10.1016/j.jhlste.2024.100531.

Sharif Nia, H., Pahlevan Sharif, S., Koocher, G. P., Yaghoobzadeh, A., Haghdoost, A. A., Mar Win, M. T., and Soleimani, M. A. (2020). Psychometric properties of the death anxiety scale-extended among patients with end-stage renal disease. *OMEGA-journal of Death and Dying, 80*(3), 380-396. https://doi.org/10.1177/0030222817733220.

Sharma, A., Moon, J., and Strohbehn, C. (2014). Restaurant's decision to purchase local foods: Influence of value chain activities. *International Journal of Hospitality Management, 39*, 130-143. https://doi.org/10.1016/j.ijhm.2014.01.009.

Shrestha, N. (2021). Factor analysis as a tool for survey analysis. *American Journal of Applied Mathematics and Statistics*, 9(1), 4-11. https://doi.org/10.12691/ajams-9-1-2.

Siddiqui, S. A., Zannou, O., Karim, I., Kasmiati, Awad, N. M., Gołaszewski, J., ... and Smetana, S. (2022). Avoiding food neophobia and increasing consumer acceptance of new food trends—A decade of research. *Sustainability,* 14(16), 10391. https://doi.org/10.3390/su141610391.

Siegrist, M. (2008). Factors influencing public acceptance of innovative food technologies and products. *Trends in Food Science and Technology, 19*(11), 603-608. https://doi.org/10.1016/j.tifs.2008.01.017.

Siegrist, M., and Hartmann, C. (2020). Consumer acceptance of novel food technologies. *Nature Food, 1*(6), 343-350. https://doi.org/10.1038/s43016-020-0094-x.

Singh, F., and Kaur, M. (2015). Why exporting SMEs switch banks?. *Global Business Review,* 16(4), 652-664. https://doi.org/10.1177/0972150915581109.

Soylu, A. G., Taştan, H., Eban, F., and Aslantürk, E. (2021). Tüketicilerin Sokak Lezzetlerine Yaklaşimlarinin Neofobi Tutumlari Açisindan Değerlendirilmesi. *Safran Kültür ve Turizm Araştırmaları Dergisi*, *4*(1), 151-167.

Stephens, N., Di Silvio, L., Dunsford, I., Ellis, M., Glencross, A., and Sexton, A. (2018). Bringing cultured meat to market: Technical, socio-political, and regulatory challenges in cellular agriculture. *Trends in Food Science and Technology,* 78, 155-166. https://doi.org/10.1016/j.tifs.2018.04.010.

Stierand, M. (2015). Developing creativity in practice: Explorations with world-renowned chefs. *Management Learning,* 46(5), 598-617. https://doi.org/10.1177/1350507614560302.

Stratton, L. M., Vella, M. N., Sheeshka, J., and Duncan, A. M. (2015). Food neophobia is related to factors associated with functional food consumption in older adults. *Food Quality and Preference, 41*, 133-140. https://doi.org/10.1016/j.foodqual.2014.11.008.

Tuorila, H., Andersson, Å., Martikainen, A., and Salovaara, H. (1998). Effect of product formula, information and consumer characteristics on the acceptance of a new snack food. *Food Quality and Preference,* 9(5), 313-320. https://doi.org/10.1016/S0950-3293(98)00015-9.

Verbeke, W. (2005). Agriculture and the food industry in the information age. *European Review of Agricultural Economics*, 32(3), 347-368. https://doi.org/10.1093/eurrag/jbi017.

Wang, H. L., and Ko, W. H. (2024). Developing the indicators of culinary innovation from the sustainable development goals. *International Journal of Gastronomy and Food Science*, 37, 100994. https://doi.org/10.1016/j.ijgfs.2024.100994.

Wilks, M., and Phillips, C. J. (2017). Attitudes to in vitro meat: A survey of potential consumers in the United States. *PloS one*, 12(2), e0171904. https://doi.org/10.1371/journal.pone.0171904.

Wilmoth, J., Menozzi, C., and Bassarsky, L. (2021). *Global population growth and sustainable development. UN*. New York : UN. Retrieved from https://coilink.org/20.500.12592/pnvx2rx on 02 Sep 2025. COI: 20.500.12592/pnvx2rx.