Food Neophobia and Willingness to Try Plant - Based Meat in Bangkok

Nahathai Monta[1*],Suwanna Sayruamyat[2] and Aerwadee Premashthira[3]

[1*,2,3]Faculty of Economics, Kasetsart University

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Abstract

This article aims to explore food neophobia and consumers' willingness to try the product of plant-based meat (PBM). 232 responses were collected via questionnaires. The results demonstrate that the 196 responses (84.4 percent) who are willing to try PBM have a lower food neophobia score (2.3 score) than respondents who were not willing to try the product (3.8 score) Food neophobia effects consumer decision and the group with lower score have higher intention to try PBM. Two-Step Cluster Analysis separates respondents into 4 groups: Meat Lover, Pork Lover, Beef Lover and Red Meat Lover. Meat Lover is not willing to try PBM while other groups reject it. The results indicates that there are consumers interested in and willing to try PBM products. Thus, food entrepreneurs should add PBM menu. It will be an alternative dish for customer and increase profits for food entrepreneurs and the producer should use this data to develop marketing strategies focusing on the group who have willingness to try PBM products.

Keywords: 1) Plant-Based Meat 2) Food Neophobia 3) Willingness to Try

[1*] Master Student, Program of Science in Agribusiness; E-mail: Nahathai.mon@ku.th

[2] Lecturer, Department of Agricultural and Resource Economics

[3] Assistant Professor, Department of Agricultural and Resource Economics

Introduction

Consumers all over the world are gradually migrating away from meat consumption and toward vegetarianism. The primary causes for this shift in consumer dietary patterns, according to studies, are health, weight control, animal welfare, and the environment (Grant and Richter, 2019)

Between 2014 and 2017, the number of vegetarians in the United States increased steadily. Over three years, the number of vegans in the United States increased considerably to 19.6 million. As a result, consumer demand for plant-based goods is increasing globally, not only in the United States (Vou, 2019). The ongoing expansion of the vegetarian market and the advancement of food production technology have led to the development of meat imitation products to provide more choices for consumers, such as plant-based meat imitation products (PBM). The main ingredients for plant-based meat are various nuts, potatoes, beetroot, and coconut oil. Those are brought to the production process, and the final product has a meat-like appearance, color, and texture. According to the report from "The Good Food Institute (2019)", the PBM category in the United States sold more than 208 million units, valued at approximately 939 million dollars, and the growth rate of the PBM category increased by 18 percent from 2018 to 2019. The exponential growth of the PBM market has attracted many food companies in Thailand, and they have started to develop the PBM products into the market. For instance, the Meat Avatar company produces and sells plant-based minced pork as well as plant-based crispy pork. All the ingredients are derived from plants (Charoensiriphan, 2019). Furthermore, NR Instant Produce Company Limited or NRF has recently raised funds in the stock market to further develop PBM products with a target of 30–40 percent of the total sales in 2024, demonstrating the rising trend of the PBM product market in Thailand (Sirinanthawitthaya, 2020).According to the 2017 Food Consumption Behavior study, 88.2 percent of respondents ingested meat, while 11.8 percent refused to eat meat (National Statistical Office Thailand, 2017, pp. 15-16) showing a growing trend of meat rejection by consumers. However, compared to the total number of meat-eaters, it is still a small percentage. As a result, in this study, meat customers were polled to determine their willingness to try PBM products and to what extent.

Nonetheless, there are still constraints on product accessibility, with the majority of products sold in the Bangkok area, while these products can only be obtained in the leading modern trade department stores in other regions, which are insufficient to meet the needs of consumers. Furthermore, the PBM products, as well as the constraints on individual preference elements that will influence readiness to take them, are not thoroughly understood. Individual tastes differ. These are determined by cultural origins, tastes, food intake habits, customer attitudes toward products, and the fear of trying new or unusual meals (Food Neophobia: FN). Food neophobia is a crucial factor for willingness to

try PBM products. Mistrust and apprehension about the product may cause people to refuse to try it or change their eating habits in the future. As a result, a study on food fear and willingness to try plant-based meat would be fascinating to do. Furthermore, due to the diversity of individual preferences, consumers would be divided into groups to better understand and design market strategies for businesses.

This study will be beneficial to both food entrepreneurs and producers. Given the growing popularity of PBM products, the shop owner may want to include a PBM menu as an alternative for customers. As a result, profits for food entrepreneurs would increase. This study could be used by PBM producers to gather data in order to develop a marketing strategy focused on consumers who are willing to try PBM products. To elaborate, producers could either produce ready-to-eat meals containing PBM ingredients or provide consumers with a positive experience by allowing them to sample PBM products. Food neophobic consumers would experience less fear as a consequence of this, and becoming more familiar with PBM products. As a result, meat-eaters will be encouraged to consume meat-like products.

Literature Review

The study of individuals, groups, or organisations, as well as all activities associated with the purchase, use, and disposal of goods and services, is known as consumer behaviour. Stewart, et al. (2014, pp. 132–133) define consumer behaviour as "how the consumer's emotions, attitudes, and preferences affect buying behaviour" (Stewart, et al., 2014, pp. 132-133).

According to Schwantes' research (2018, pp. 404–405), meat consumption behaviour is influenced by social norms, cultural beliefs, and family food consumption habits. In fact, this suggests that people eat meat for various reasons, including household preference and family tradition. In terms of alternative meat consumption from Nakhanithi's research (2020, pp. 35-38), a study of the behaviours and attitudes of consumers in Bangkok showed that the customers are interested in meat imitation products. However, they have no knowledge of the product as they have never tried PBM products before. Moreover, they are unfamiliar with the products and could feel the unnaturalness of the meat. They are also concerned about the safety of consuming plant-based meat. Thus, these perspectives would have a huge impact on consumers' willingness to try PBM products. Therefore, with reference to Hwang, et al. (2020, pp. 9-11) the study about the willingness to try cultivated meat and plant-based meat alternatives was analysed. The results showed a negative relationship between distrust of biotechnology and food neophobia. To further elaborate, the more food neophobia an individual has, the less food knowledge that individual desires to know. Nowadays, consumers have various choices and options from new food inventions to meet their needs. The excitement of trying new foods only happens to certain groups of consumers. On the other hand, those who

have food neophobia will always have a refusal to try new foods. Faccio and Guiotto (2019, pp. 9-10) once said that an individual's ideological attitudes and preferences are highly related to their refusal to try new foods due to distrust in the products. For instance, vegans have a higher tendency of having food neophobia than other consumers, according to the study conducted to examine groups with different diets comparing the consumer's attitude towards insects as food. Vegans consider not only meat consumption as a moral issue but also refuse to consume GMO food and cultivated meat due to the general distrust of their "unnaturalness" and the potential consequences of the new technologies on health.

According to Matsumoto, S and Otsuki, T. (2018, pp.14-15), consumer acceptance is still difficult for food entrepreneurs despite the fact that consumers have tried new foods. This is primarily due to increased consumer awareness and caution regarding the food's trustworthiness, potential genetically modified organisms (GMOs), and the health implications of food safety. Other factors that influence consumer willingness to try new foods include consumer perception, personal attitude, and interest. Consumers, on the other hand, express a willingness to experiment or try new foods when benefit and ease of use are present, which is one of the behaviours that can be conducted (Kamel and Hassan, 2006, p.297)

Because there are numerous consumer groups based on individual personality traits, it is necessary to understand the behaviours and needs of each group. Using the concept of consumer segmentation, we can divide consumers into different groups analysed by cluster analysis. This will divide consumers into two or more subgroups, allowing for in-depth analysis of each group's behaviours and attitudes (Hair, et al., 2014, p.415) which can be used to develop marketing strategies. For instance, Wolf, Malone and MCFadden (2020, p.11209) studied about beverage milk consumption patterns in the United States and found that households consumed dairy milk with some regularity and consumed little or no plant-cased beverages were the largest group. A second group was flexitarian households, which consumed both dairy milk and plant-based beverages on a regular basis, and a third group was plant-based consumers, who only drank plant-based beverages. Households that were flexitarian or plant-based were more likely to have young children and were more liberal than dairy-consuming households. For almost all consumption needs, both groups were willing to substitute plant-based beverages for dairy milk. Nutritionists will benefit from this information because they will be able to clearly formulate marketing strategies to meet the needs of each consumer group and persuade certain groups of consumers to switch to other types of milk.

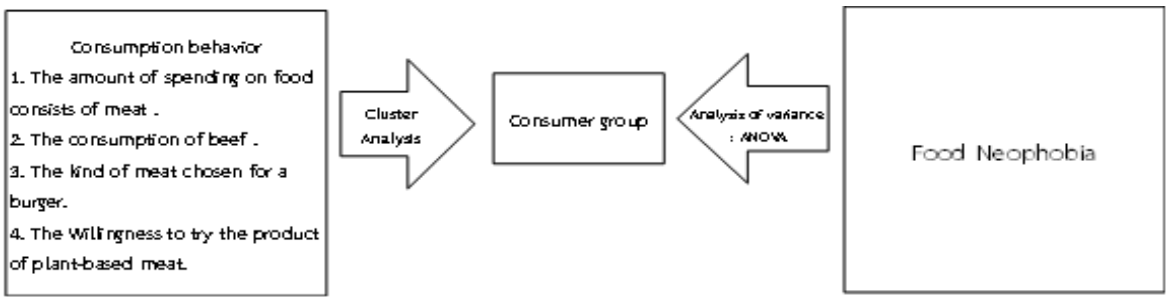
Objectives

1. To study food neophobia and consumer's willingness to try the product of plant-based meat in Bangkok

2. To categorise consumers by their consumption behaviours into different groups

3.To analyse the differences in food

neophobia among consumer groups according to their consumption behaviours. The conceptual framework for research is shown in detail in Picture No. 1.



Picture No. 1 The conceptual framework

Methods

In this study, quantitative data were collected in order to be consistent with the objectives mentioned above.

Methodology

This study employed two types of data:

1) Primary Data - the data from interviews using questionnaires among working-age consumers in Bangkok who are aged 22 and above, meat consumers, had an income of 7,501 baht or more and bought food by themselves. In this research, field surveys were collected in Chatuchak area of 100 respondents together with online survey via Google form posting on Facebook and Line of 150 respondents, a total of 250 respondents. During January 2021, due to the coronavirus (COVID-19) epidemic situation in Thailand, it is an obstacle in collecting the field data. However, the researcher had given an indication to the respondents before answering the surveys that they are meat lovers living in Bangkok and there are questions to confirm the group to be meat consumers.

2) Secondary Data - the data from relevant agencies such as the Statistical Office, academic books and related researches.

Sample size

The sample group was meat consumers who live in Bangkok. The goal is to determine whether or not they are willing to try PBM products and, if so, to what extent. We chose to collect data in Bangkok because the Thailand National Statistical Office Thailand (2017, pp. 15-16) found that Bangkok has the highest number of daily meat eaters. Furthermore, the researchers used Cochran's formula (Lotrakun, 2016, p. 46) to calculate the sample size and determined the proportion from a pilot test of 30 consumers. It was discovered that there were 26 meat consumers, or 85.0 percent, which is similar to the Bureau of Statistics' report that meat consumers accounted for 84.5 percent in Bangkok. The sample was therefore calculated as Formula (1)

$$n = \frac{P(1-P)Z^2}{e^2} \qquad (1)$$

When

n = sample size

P = estimated proportion of the population that presents the characteristic (P = 0.85)

Z = level of confidence which is 1.96 at significant level

e = tolerated marginal error is 0.05

After substituting the numbers in the Formula (1), we are able to find the sample size as Formula (3).

$$n = \frac{0.85(1-0.85)(1.96)^2}{(0.05)^2} \quad (2)$$

$$n = 196 \quad (3)$$

In order to conduct a reliable research analysis, a total of 250 surveys were collected.

Tools used to collect the information

In this research, the questionnaire was chosen as a survey tool and had been certified for research ethics COE No. COE63/252 from the Research Standard Department and Kasetsart University Development Institution consists of three part as follows:

Part 1 Meat Consumption Behaviour was a question about the kind of meat chosen for a burger as a nominal scale (meat, chicken or beef); the consumption of beef as a nominal scale (eating beef or not eating beef) and the amount of spending on food consists of meat as a ratio scale, on which the respondents indicated the number of expenses per meal used to purchase meat-based meals.

Part 2 The willingness to try meat imitation products from the plant (WTC) includes questions about the degree of willingness to try PBM products: 1) Absolutely try 2) Would try 3) Not try 4) Absolutely not try

Pliner and Hobden assessment scale (1992, p.109) was used to measure the level of fear of trying new foods for the food neophobia questions. Furthermore, the researcher has added two questions about Thai food to make it more appealing to Thai customers: "I like to eat bamboo caterpillars" and "I like to eat Thai papaya salad with fermented fish." The level of confidence in the test was tested, and the researcher discovered that all 12 questions had a high level of confidence (Cronbach's Alpha Coefficient = 0.856). The respondents are asked to rate themselves on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) in this section. The questions consist of 1) I am constantly sampling new and different foods (R) 2) I do not trust new food 3) If I do not know what is in the food, I will not try it 4) I like food from different countries (R) 5) I am hesitate to try food from foreign country that I see for the first time. 6) At dinner parties, I will try new food (R) 7) I am afraid to eat things I have never had before 8) I am very particular about the food I will eat 9) I will eat almost anything (R) 10) I don't like to try new ethnic foods 11) I like to eat bamboo caterpillars (R) 12) I like to eat Thai papaya salad with fermented fish (R)

Part 3 Demographics are general information of the respondents such as gender, age, occupation, average income, level of education and place of living.

Statistic Methods for analyzing

1. Descriptive Statistics is a summary statistic that summarises features from measurement of the frequency, mean and standard deviation to describe demographic

characteristics and meat consumption behaviours. The willingness to try PBM products was divided into two groups: Try (Willingness to try level 1 and level 2) and not try (Willingness to try level 3 and 4).

2. Food Neophobia analysis in question number 1) 4) 6) 9) 11) and 12) will reverse the score before calculating food neophobia score (for example, when the respondent answered Scale 5 in the question, the score would be equal to 1 for the calculation). After that, all 12 scores were summed up and averaged for the degree of Food Neophobia. These were then divided into two groups: 1) the group with a higher than average level of Food Neophobia 2) The group with a lower level of Food Neophobia than average.

3. The Two-Step Cluster Analysis is used to segment consumers according to their consumption behaviours using data from selecting a burger, eating beef, expenses used to purchase meat-based food and the willingness to consume plant-based meat (WTC).

4. Inferential Statistic is used to test the hypothesis of differences in Food Neophobia level between the tried and the non-tried eating PBM products. The difference in the level of fear of trying new foods in these consumer groups have been segmented by one-way analysis of variance (One-Way ANOVA) as well as using statistical test $\mathbf{x}^2$ to show the relationship of demographic data and consumer grouping by behaviours.

Results

After obtaining the data from a total of 250 respondents, the researchers cleaned the data for analysis. If the respondents did not complete all the questions or were not under the selection criteria, their responses will be removed. For example, respondents who did not eat meat and/or were under the age of 22 and/or were not of working age will be excluded from the study. As a result, 18 incomplete questionnaires were eliminated, leaving 232 complete data sets to be analysed. The following is the outcome of the research: According to the general information provided by the respondents, 51.3 percent of the total respondents were female, 51.7 percent of the total respondents were 26 years or older, 64.7 percent of the total respondents had an average income of 18,001 baht or more, and 68.1 percent of the total respondents had a bachelor's degree 44.8 percent worked primarily for private companies. They came from all over Thailand, with 30.6 percent hailing from the Bangkok Metropolitan Region and nearly seventy percent (69.4%) hailing from other provinces.

Among the respondents, 57.3 percent of them enjoyed pork burgers, followed by beef burgers of 25.8 percent. While the majority of them were beef eaters by 69.8 and spent the average of 190 baht/meal on buying meat-based food.

The result of an analysis of willingness to try PBM products and Food Neophobia

When only food neophobia was considered, the sample group had an average food neophobia level of 2.6. When looking at those with lower than average and higher than average food neophobia levels, it was discovered that 101 people had a higher-than-average level of food neophobia, with an intra-group mean of 3.2, and 131 people had a lower-than-average level of neophobia, with an intra-group mean of 2.1.

The data were divided into two groups based on the willingness to try PBM products, either tried or not, and it was discovered that 196 consumers were willing to try PBM products, accounting for 84.4 percent, while those who refused to consume accounted for 36 people or 15.6 percent.

When analysing the level of food neophobia between the groups, it was found that those who were willing to try the PBM products had an average fear of 2.3, while those who refused to try them had an average fear of 3.8. Furthermore, comparing the difference in the mean food neophobia level and the willingness to consume the product, it was discovered that the mean food neophobia level of those who refused to try PBM products was statistically significantly higher at 0.01 (F = 267.4; sig = 0.00***). This leads to the conclusion that consumers with a high level of food neophobia are paranoid, suspicious, or increasingly concerned about food. This resulted in the refusal of consumers to try PBM products as opposed to consumers who had a low level of food neophobia. They tend to have a more positive effect on their decisions, which creates a higher tendency for them to try PBM products. (Table No. 1)

Table No. 1 Willingness to try PBM products and level of food neophobia

Level of food neophobia	Willingness to try PBM products			F-Test	Sig.
	Tried $\bar{X}$ (S.D.)	Not tried $\bar{X}$ (S.D.)	Total Average $\bar{X}$ (S.D.)		
1) I am constantly sampling new and different foods. (R)	2.14 (0.88)	3.81 (0.79)	2.40 (1.05)	112.670	0.000***
2) I don't trust new food.	2.44 (0.91)	3.64 (0.93)	2.63 (1.01)	51.310	0.000***
3) If I don't know what is in the food, I won't try it.	2.52 (1.07)	3.97 (0.97)	2.74 (1.18)	57.567	0.000***
4) I like food from different countries. (R)	1.95 (0.83)	3.39 (1.10)	2.17 (1.02)	81.459	0.000***
5) I am hesitate to try food from foreign country that I see for the first time.	2.54 (1.00)	3.89 (0.92)	2.75 (1.02)	56.599	0.000***

Level of food neophobia	Willingness to try PBM products			F-Test	Sig.
	Tried $\bar{X}$ (S.D.)	Not tried $\bar{X}$ (S.D.)	Total Average $\bar{X}$ (S.D.)		
6) At dinner parties, I will try a new food. (R)	2.01 (0.75)	3.50 (1.08)	2.24 (0.98)	102.847	0.000***
7) I am afraid to eat things I have never had before.	2.37 (1.06)	4.03 (0.91)	2.63 (1.19)	77.045	0.000***
8) I am very particular about the food I will eat.	3.26 (1.19)	4.03 (0.91)	3.38 (1.18)	13.728	0.000***
9) I will eat almost anything. (R)	1.96 (0.78)	3.44 (1.05)	2.19 (0.99)	97.219	0.000***
10) I don't like to try new ethnic foods.	2.42 (1.01)	3.89 (1.12)	2.65 (1.15)	62.226	0.000***
11) I like to eat bamboo cater pillars. (R)	2.93 (1.39)	4.44 (0.88)	3.17 (1.44)	39.034	0.000***
12) I like to eat Thai papaya salad with fermented fish. (R)	2.13 (1.21)	4.03 (1.36)	2.43 (1.41)	71.878	0.000***
Total	**2.39 (0.46)**	**3.82 (0.57)**	**2.62 (1.14)**	**267.4**	**0.000*** **

Note: ***significant figure at 0.01

The result of consumer segmentation based on consumption behavior

The consumers were segmented according to their consumption behaviour by Two-Step Cluster Analysis. It was divided into four groups with a Silhouette measure of cohesion and separation of more than 0.5, indicating that the cluster quality level was at a good level. The details are as follows:

1) Meat Lover Group is a group of consumers with the flexibility to eat all types of meat for burgers. Their average purchasing cost for meat-based food is 144.0 baht/time and they would refuse to try PBM products.

2) Pork Lover Group is a group of consumers who favour eating pork burgers while refusing beef burgers. Their average purchasing cost of meat-based food is 175.4 baht/time and they are willing to try the PBM products.

3) Beef Lover Group is a group of consumers who choose to eat beef burgers as well as chicken burgers but absolutely reject eating pork burgers. Their average purchasing cost for meat-based food is 199.1 baht/time and they are willing to try PBM products.

4) Red Meat Lover Group is a group of consumers who can eat beef burgers but would prefer pork burgers. Their average purchasing cost for meat-based products is 211.6 baht/time and they are willing to try PBM products. (Table No. 2)

Table No. 2 The segmentation based on consumption behaviour

Consumer segmentation	Types of burger quantity (percentage)			Consume Beef quantity (percentage)		will try PBM quantity (percentage)	The purchasing cost (average)	Total (person)
	Pork	Beef	Chicken	Not tried	Tried			
Group 1	22(16.5)	11(18.3)	3(7.7)	15(21.4)	21(13.0)	0(0.0)	144.0	36.0
Group 2	41(30.8)	0(0.0)	0(0.0)	41(58.6)	0(0.0)	41(20.9)	175.4	41.0
Group 3	0(0.0)	49(81.7)	36(92.3)	14(20.0)	71(43.8)	85(43.4)	199.1	85.0
Group 4	70(52.6)	0(0.0)	0(0.0)	0(0.0)	70(43.2)	70(35.7)	211.6	70.0
Total	**133(100)**	**60(100)**	**39(100)**	**70(100)**	**162(100)**	**196(100)**	**190.1**	**232.0**

The analysis of demographic data by consumer groups (Customer Profile)

The analysis of demographic data by consumer groups found that

Meat Lover Group is made up of 36 people. The majority were males, aged 25 or younger, who worked for a private company and were originally from Bangkok/Metropolitan Area, with an average income of 18,001 or more.

Pork Lover Group consists of 41 people. The majority were females, aged 25 or younger, with an average income of 18,001 or more, being employees of a private company as well as freelancers, and their domicile was originally from other provinces. Red Meat Lover Group consists of 70 people. The majority were males, aged 26 or older, with an average income of 18,001 or more, were employees of a private company, and their domicile was originally from other provinces.

Gender was found to be statistically significant at the 0.01 level after an analysis of the relationship between consumer group and demographic data. Females were more willing to try PBM products than males, and it was clear that it was mostly males in the Meat Lover Group who were most likely to reject consuming PBM products. A significant level of 0.01 exists for both gender and domicile area. Those who domicile are from the provincial area tend to dare to consume new and different food than those who originally came from Bangkok/ Metropolitan Areas which belong Meat Lover Group. (Table No. 3)

Table No. 3 The demographic data of consumer segmentation based on consumption behaviours

Demographic Characteristics	Consumer segmentation by Cluster Analysis				Total	Statistically Values x^2
	Group 1 frequency (percentage)	Group 2 frequency (percentage)	Group 3 frequency (percentage)	Group 4 frequency (percentage)		
Gender						
Female	14 (38.8)	34 (82.9)	42 (49.4)	29 (41.4)	119 (51.3)	
Male	22 (61.1)	7 (17.1)	43 (50.6)	41 (58.6)	113 (48.7)	**21.5*** **
Total	**36(100.0)**	**41(100.0)**	**85(100.0)**	**70(100.0)**	**232(100.0)**	
Age						
25 years old or younger	21(58.3)	23(56.1)	34(40.0)	34(48.6)	112 (48.3)	
26 years old or older	15(41.6)	18(43.9)	51(60.0)	36(51.4)	120 (51.7)	**4.8**
Total	**36(100.0)**	**41(100.0)**	**85(100.0)**	**70(100.0)**	**232(100.0)**	
Average Income						
7,501-18,000 Baht	8 (22.2)	20 (48.8)	31(36.5)	23 (32.9)	82 (35.3)	
18,001 or higher	28 (77.8)	21 (51.2)	54 (63.5)	47 (67.1)	150 (64.7)	**6.2**
Total	**36(100.0)**	**41(100.0)**	**85(100.0)**	**70(100.0)**	**232(100.0)**	
Education Degree						
Undergraduate or lower	1 (2.8)	5 (12.2)	9 (10.6)	6 (8.6)	21 (9.1)	
Bachelor Degree	28 (77.8)	27 (65.8)	60 (70.6)	43 (61.4)	158 (68.1)	**5.7**
Master Degree or Higher	7(19.4)	9 (21.9)	16 (18.8)	21 (29.2)	53 (22.8)	
Total	**36(100.0)**	**41(100.0)**	**85(100.0)**	**70(100.0)**	**232(100.0)**	
Occupation						
Private company	20 (55.5)	15 (36.5)	33 (38.8)	36 (51.4)	104 (44.8)	

Demographic Characteristics	Consumer segmentation by Cluster Analysis				Total	Statistically Values X^2
	Group 1 frequency (percentage)	Group 2 frequency (percentage)	Group 3 frequency (percentage)	Group 4 frequency (percentage)		
Government agencies & State enterprise	6 (16.7)	11 (26.8)	22 (25.8)	19 (27.1)	58 (25.0)	**7.3**
Freelance	10 (27.8)	15 (36.5)	30 (35.3)	15 (21.4)	70 (30.2)	
Total	**36(100.0)**	**41(100.0)**	**85(100.0)**	**70(100.0)**	**232(100.0)**	
Hometown						
Bangkok/ Metropolitan Area	29(80.5)	7(17.0)	19(22.4)	16(22.8)	71 (30.6)	
Other provinces	7(19.4)	34(82.9)	66(77.6)	54(77.1)	161 (69.4)	**50.5*** **
Total	**36(100.0)**	**41(100.0)**	**85(100.0)**	**70(100.0)**	**232(100.0)**	

Note: *** Significant level at 0.01

The analysis results of the relationship between consumer groups and Food Neophobia

Through the calculation of the average level of food neophobia for all four groups of consumers, it was found that the average levels of food neophobia for the Meat Lover Group, Pork Lover Group, Beef Lover Group, and Red Meat Lover Group were 3.8, 2.4, 2.3, and 2.3, respectively.

For the One-Way Analysis of Variance Test, it was found that the average level of food neophobia among all the groups was statistically significant at 0.01 level (F = 89.4; Sig = 0.000***) Moreover, when testing the difference between the average levels of food neophobia of each consumer pair by Fisher's Least Significant Difference, it was found that the Meat Lover Group has a different result from the rest, which is statistically significant at 0.01 level (Sig = 0.000***) While the average level of food neophobia for the Pork Lover Group, Beef Lover Group, and Red Meat Lover Group was not statistically significant different.

With reference to the Meat Lover Group and their average level of food neophobia, it was shown that the group has the highest fear of trying new foods. That might be the reason why they were most likely to decline consuming PBM products as compared to the Pork Lover Group, Beef Lover Group, and Red Meat Lover Group (Table No. 4).

Table No. 4 Level of Food Neophobia for consumer groups

Consumer Segmentation by their consumption behaviour	Level of Food Neophobia $\bar{X}$ (S.D.)	F-Test	Sig.
Meat Lover Group	3.8 (0.58)	89.4	0.000***
Pork Lover Group	2.4 (0.47)		
Beef Lover Group	2.3 (0.47)		
Red Meat Lover Group	2.3 (0.46)		

Note: *** Significant level at 0.01

Conclusion and Discussion

This study found that 84.4 percent of consumers are willing to try PBM products, and the overall average level of food neophobia is 2.6 points. Furthermore, consumers who are willing to try PBM products have an average level of food neophobia of 2.4 points, whereas those who refuse to consume have an average level of 3.8 points, which is significantly higher. This indicates that the more food neophobia a person has, the more likely they are to refuse or unwilling to try PBM products. To put it another way, consumers who are afraid of trying new foods are afraid of the unknown ingredients in the food and their meticulous selection.

This study is consistent with Hwang, et al. (2020, pp.9-11) research, which found that the higher a consumer's fear of trying new foods (food neophobia), the more likely they are to reject meat imitation products. This would lead to a narrow-minded view of the meat's benefits. Furthermore, there is a link between food neophobia and mistrust of biotechnology in the production of plant-based meat. Consumers are confused and concerned about their food choices as a result of the use of new technologies in the manufacturing process and the different meat from our regular meat.

According to the consumer segmentation by Two-Step Cluster Analysis, consumers were divided into 4 groups as follows: 1) Meat Lover Group 2) Pork Lover Group 3) Beef Lover Group 4) Red Meat Lover Group.

The Meat Lover Group is a group of consumers with the flexibility to consume all types of meat, refuse to try PBM products, and have the highest level of food neophobia. However, their average food expenditure on meat-based food is the lowest compared to other groups. The majority of consumers in this group are males who are originally from Bangkok/Metropolitan Area, and their level of food neophobia shows a distinct difference when compared to other groups. The Pork Lover Group is a group of consumers who favour eating pork and refuse to eat beef. This group has a tendency to try PBM products as the level of food neophobia for the Pork Lover Group is lower than the total average level of food neophobia. The majority of consumers in this group were females who originally lived outside of Bangkok and the metropolitan area (other provinces). The Beef Lover Group is a group of consumers who like beef the most,

and the majority of them are males, originally from other provinces. Their purchasing of meat-based food is higher than the Meat Lover Group's and Pork Lover Group's. This might be due to the price of beef as food. Since the level of food neophobia in this group (2.3 points) is lower than the total average level of food neophobia, their tendency to try PBM products is nearly as high as the Red Meat Lover Group's tendency. The majority of consumers in both groups are originally from other provinces. However, the Red Meat Lover Group has the highest purchasing cost for meat-based food at 211.6 baht/time and mostly consists of male consumers.

The results of this study are related to the study by Faccio and Guiotto (2019, pp. 9-10), which confirmed that personality traits, such as Food Neophobia and attitudes towards food, are critical to the consumer's acceptance or refusal to try new food. To further elaborate, the higher the Food Neophobia level, the greater the tendency to refuse to consume new food. Consumers are concerned about two factors: production technologies and potential health consequences. (Sogari, 2015, pp. 311-316; Bryant, et al., 2019, p. 11)

Therefore, in order to make it easier to understand the differences of consumer groups and their actual needs, it is necessary to divide the consumers according to their behaviour (Consumer Segmentation). It was clear that some consumer groups have higher Food Neophobia than others. For example, a meat lover group was unwilling to try PBM products. Most young consumers are likely to refuse to try PBM products as compared to older consumers, and in accordance with Grasso, et al. (2019) they found that the elderly were more likely to accept plant proteins.

In addition, when testing the relationship between consumer groups and demographic data, it was found that gender was significantly correlated at a 0.01 level, with females being more willing to try PBM products than males. Moreover, after categorising the consumers, it can be seen that among the Meat Lover Group who are most likely to refuse to eat PBM products, most of them are males who originally lived in Bangkok/Metropolitan Area. The relationship between gender and their domicile was statistically significant at the 0.01 level because those who were from other provinces tended to be more willing to try PBM products than those from Bangkok/ Metropolitan Area. In fact, the Meat Lover Group is unwilling to try PBM products as they have high Food Neophobia and most of the consumers in the group are originally from Bangkok/ Metropolitan Area. Compared to those who were willing to try PBM products, they were mostly from other provinces. We can conclude that provincial consumers tend to be more daring in trying new and unknown foods than those who originally lived in Bangkok /Metropolitan Area. To further elaborate, the question about eating bamboo caterpillar found that Bangkok/Metropolitan consumers tend to have higher Food Neophobia than provincial consumers due to the environment, dining culture in the province and family. These influences affect the consumer's decision making, which is related to the research by

Namugayi (2014, pp. 52-60) and Schwantes (2018, pp. 404-405) found that familiarity in household preference and traditional eating culture influences the fear of trying new foods (Food Neophobia) and dietary decisions.

Suggestions

The suggestions are as follows:

1. With a willingness to try proportion as high as 84.4 percent, food entrepreneurs and restaurants should add PBM products to their menus to provide more options for customers.

2. PBM product entrepreneurs should focus on marketing for the Red Meat Lover Group and Beef Lover Group as they have high purchasing costs for meat-based food and a low Food Neophobia level.

3. Due to the restrictions in the distribution area, most of the products are sold only in Bangkok and at leading modern trade department stores. However, the result of the study reveals that those consumers who were originally from other provinces have a higher tendency to try new foods. Thus, the entrepreneurs should expand their distribution area to cover other provinces in order to expand their customer base and increase the sales of PBM products.

Suggestions for Future Research

In order to understand other attitudes that will affect consumption behaviours in the future, the researcher should conduct additional studies on different personality traits such as naturalness bias, including perceptions and attitudes toward food consumption, such as perceptions of health, environmental concerns, and production technologies. Furthermore, more research on alternative proteins made with modern technology, such as cultured meat, could be done. It is widely studied in other countries, but there are only a few studies on this product in Thailand.

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