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Consumer Perceptions of Commercial Plant-based Milk Alternative Products in Indonesia

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ABSTRACT

There has been a noticeable shift in consumer preferences from animal-derived milk to plant-based milk alternatives (PBMA). Many scientific studies state that animal milk cannot be replaced by PBMA in term of nutrition. However, not all consumers are aware of this. Therefore, this study aimed to evaluate consumers' perceptions of PBMA. The research was conducted through a regulatory review of PBMA and an online survey using purposive sampling method with 385 PBMA consumers in Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek) area. Primary data were collected through a respondent survey employing a Likert scale, and analyzed using the Wilcoxon signed-rank test. National Agency of Drug and Food Control (BPOM) categorizes PBMA as a fruit and vegetable-based drink product and therefore prohibited from using the term 'milk' on its label to prevent consumer confusion with animal-derived milk. There was a misperception of respondents towards PBMA. Out of the seven perceptions tested, five were found to be misperceptions, specifically those related to energy, high fat content, source of protein, source of calcium, and causes of allergy. These misperceptions were likely due to respondents' limited exposure to information about the nutritional content of PBMA. In addition, PBMA were also a relatively new product, and information about it has not been widely disseminated.

1. Introduction

Milk is considered as a food which comes from mammals and it functions as a source of nutrition for newborn mammals. Furthermore, it has very complete components considering that newborn mammals are vulnerable and they require dense nutrition in order to support their growth and development (Chalupa *et al*., 2018). Currently, milk, especially cow's milk, is consumed by billions of people around the world. Milk contains macro and micro nutrients (especially calcium, magnesium, potassium, zinc, and phosphorus) which are also very important for the growth and development of the human body. Protein in milk is a protein with high biological value since it has all the essential amino acids; besides, it has high digestibility (Atunes *et al*., 2023). In addition to its nutritional content, milk has bioactive compounds (bioactive peptides, antioxidants, specific proteins, oligosaccharides, organic acids, conjugated linoleic acid, and others) so that it has functional effects on human health (Park, 2009; Gorska *et al*., 2019; Park (2021). Animal milk contains short-chain fatty acids, which are absent in plant-based products (Park & Haenlein, 2017).

Apart from the aforementioned benefits, cow's milk also has its disadvantages. Milk is presumed to be a contributing factor in digestive issues for sensitive individuals. Milk is one of the allergens that can trigger various allergic reactions. The lactose in milk is also difficult to digest for consumers with lactose intolerant (Romulo 2022). Lactose intolerant is a symptom caused by decreased of lactase enzyme activity (Kaskous, 2021). The disadvantages of animal-based milk have led to a shift in consumption from animal-based milk to plant-based milk alternatives (PBMA). This shift in consumption patterns was driven by vegan and vegetarian communities, who promote the use of PBMA for various reasons, including healthy lifestyle, environmental awareness, and animal welfare (Jansen *et al*., 2016).

PBMA refers to a liquid extract derived from cereals, nuts, legumes, or seeds, formulated to resemble cow’s milk in appearance and consistency (Acquah et al., 2023). These beverages are naturally free from lactose and cholesterol, making them a commonly perceived healthier alternative to dairy milk. Whereas, when compared to dairy milk, PBMA may be deficient in key nutrients like calcium and vitamin D, which can affect consumers' willingness to modify their diets to incorporate more plant-based milk options (Alcorta et al., 2021).

The pros and cons of replacing cow's milk with PBMA have become an interesting issue. Consumer perception of PBMA will determine their consumption decision of the product. Several studies have compared perceptions of nutritional content of dairy milk and milk alternatives in other countries, such as Australia (Bus & Worsley, 2003) and Canada (Prejet, 2018). However, no such research has been conducted in Indonesia. Misperceptions about PBMA may lead consumers to believe that PBMA can fully replace the nutritional value of dairy milk. This study aimed to analyze consumer perception of PBMA in comparison to dairy milk in the Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek) region. The Jabodetabek area was selected due to its diverse population, representing people from all over Indonesia.

2. Methods

2.1. Regulatory Review and Market Survey for PBMA Products

The regulatory review was conducted using the regulations issued by the governmental authority responsible for processed food, namely the National Agency of Drug and Food

Control (BPOM). A survey of PBMA products available in markets across the Jabodetabek area was carried out. For each surveyed product, the composition and nutritional information stated on the label were documented.

2.2. Survey on Consumer Perception

The validity test was performed by comparing the R-calculated value with the R-table value (from the simple correlation coefficient table). If R-table < R-calculated, the questionnaire was considered to correlate with the total score and was thus deemed valid at a 5.00% significance level. The reliability test was conducted using Cronbach's Alpha. A questionnaire item was considered reliable if the Cronbach's Alpha value exceeds 0.60. Validity and reliability test were conducted according to Indrasti & Siliyya (2021).

The survey was conducted using a purposive sampling method through an online form. The questionnaire included questions on respondent profiles and consumer perceptions. The respondent profile questions covered aspects such as gender, age, education, occupation, marital status, and income. The consumer perception section consisted of comparative questions regarding the nutritional content of PBMA and animal-based milk. The inclusion criteria for respondents were 1) lived in Jabodetabek area, 2) 15-65 years, 3) consuming PBMA for a minimum of three months, and 4) willing to participate by completing the questionnaire.

The population was considered unknown, as the exact number of PBMA consumers in the Jabodetabek area had not been previously studied. The required sample size was determined using the formula by Lemeshow et al. (1990), with a 95% significance level, resulting in a total of 385 respondents to ensure representative data. Data of consumer perception was obtained through a survey using a Likert scale with five levels score: 1) strongly disagree, 2) disagree, 3) neutral, 4) agree, and 5) strongly agree. Data were ordinal, requiring non-parametric statistical tests. Furthermore, data were analysed using descriptive analysis, Wilcoxon Signed Rank (version 26, IBM).

3. Results and Discussion

3.1. Results

Indonesian government has regulated PBMA through KepKa BPOM no. 70 year 2025 about Food Categories. PBMA is classified under food categories 06.8.1 (soy-based beverages), 14.1.4.2 (flavoured non-carbonated water-based beverages, including punches and ades), and 14.1.5 (coffee, coffee substitutes, tea, herbal infusions, and hot cereal and grain-based beverages, excluding chocolate).

Product survey on nutritional value between commercial PBMAs and animal milk was conducted in Jabodetabek market as a factual comparison. The nutritional content comparison of several PBMAs and cow milk was presented in Table 1.

The validity test was conducted on 45 respondents with a confidence level of 99% (α = 0.01). The results of the validity test shown that each question in questioner has R-count value in range of 0.453-0.822 and it was higher than R-table (0.380). The questionnaire has the Cronbach's alpha coefficient value of 0.619 for perception of animal milk questions and of 0.711 for PBMA product perception questions. Since it was greater than 0,60 so that the research questionnaire was declared reliable.

The respondents of this study were 385 PBMA product consumers in Jabodetabek. Distribution of respondents was taken according to population in each region as shown in Figure 1. Demography of respondent was characterized based on gender, age, education, occupation, and monthly income (Table 2).

Table 1 The nutritional content of commercial PBMA products and cow's milk (per 100 mL, plain or original flavor, based on nutrition value information on labels)

Product	Energy (kcal)	Fat (g)	Protein (g)	Cholesterol (mg)	Calcium (mg)
Almond m*lk	100	6	2	0	n
Oat m*lk	65	3	0,5	0	120
Soybean m*lk	75	3,7	3,3	0	n
Cashew m*lk	58,82	2,65	0,59	0	212
Unsweetened almond m*lk	16,49	1,4	0,6	0	120
Unsweetened soybean m*lk	30	1,6	2,5	0	n
Almond-Oat-Soybean m*lk	63	1,6	2,7	0	n
Almond-Pine m*lk	65	2,5	2,5	0	0
Black sesame-Soybean m*lk	65	3	3	0	0
Cow's milk	60	3,2	3,2	10	168

n: data not available on label

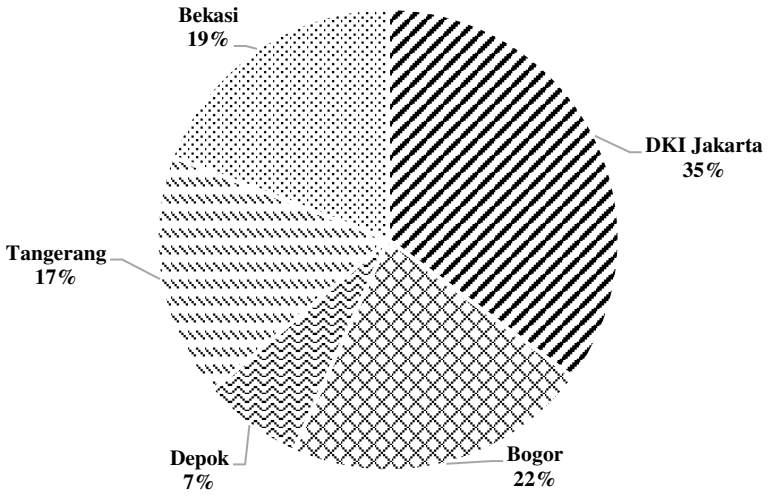

Figure 1 Distribution of respondents in Jabodetabek area

Table 2 Respondent characteristics

Category	Respondent characteristics	Percentage
Gender	Male	36
	Female	64
Age Range	< 17 years old	1
	17-25 years old	74
	26-35 years old	21
	36-45 years old	3
	46-55 years old	1
Occupation	Students or college students	68
	Civil Servant Apparatus (ASN)	2
	Private employees	23
	Entrepreneurs	5
	Housewives	1
	Others	1
Education	High School	31
	Diploma (D3)	13
	Bachelor's degree or equivalent	54
	Postgraduate (Master or PhD)	2
Marital Status	Married	23
	Single	77
Monthly Income (Rp)	< IDR 500,000	29
	IDR 500,001 to 1,500,000	25
	IDR 1,501,000 to 3,000,000	27
	IDR 3,000,001 to 5,000,000	11
	> IDR 5,000,000	8

In this study, respondents' perceptions of PBMA product were compared to respondents' perceptions of animal milk. The results of respondents' perceptions were presented in Table 3.

Table 3 Result on consumer perception test

Perception	PBMA - Animal milk			Sig
	Negative Rank[1]	Positive Rank[2]	Ties	
High calorie products	59	6	320	0,000*
High cholesterol products	224	80	81	0,000*
High fat products	217	116	52	0,000*
Good source of protein	91	78	216	0,188
Good source of calcium	113	69	203	0,135
Causes digestive problems	286	31	68	0,000*
Causes allergies	162	136	87	0,030*

Note: *significantly different, [1]associated with animal milk, [2]associated with PBMA

Among the seven perceptions evaluated, two were statistically not significant different. To illustrate the trends associated with these perceptions, the corresponding survey data are presented in Figure 2A for the perception of a *good source of protein*, while Figure 2B presents the results for the perception of a *good source of calcium*.

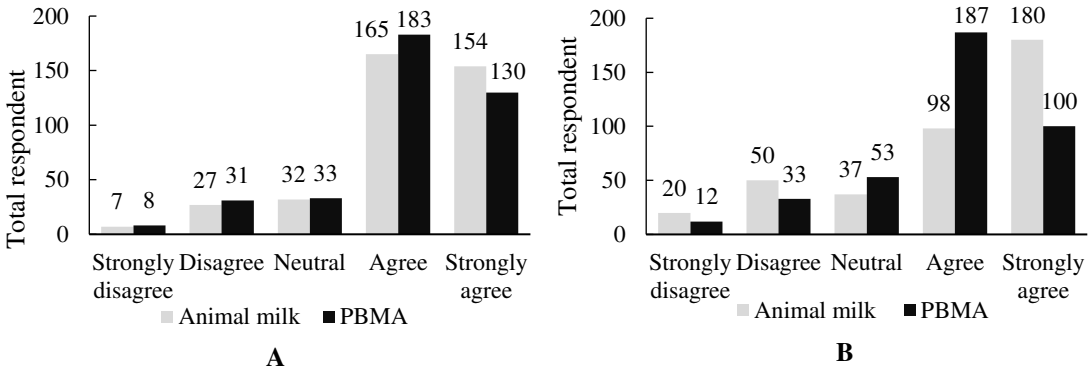

Figure 2 Comparison of good protein source (A) and good calcium source (B) perceptions between animal milk and PBMA product

The correlation of respondent characteristics with PBMA product perception was calculated by using the chi-square correlation method. The result is shown in Table 4.

Table 4 Correlation of respondent characteristics and PBMA product perception

Parameter	Asymptotic significance value
Domicile	0,523
Age	0,000*
Gender	0,550
Marital status	0,337
Education	0,859
Income	0,002*

Note: *significantly different

3.2. Discussion

Milk is defined as the liquid secreted by the udder of cows, buffaloes, horses, goats, sheep, and other milk-producing livestock, either in fresh form or processed through pasteurization, ultra-high temperature (UHT), or sterilization (BPOM, 2023). Based on this definition, PBMA cannot be referred to as milk, as it is a beverage made from plant-based sources, not from mammalian animals. Since PBMA products are not considered milk, it classified into several categories, including 06.8.1, 14.1.4.2, and 14.1.5 as PerBPOM no. 13 year 2023 about Food Categories. PBMA products classified under category 06.8.1 is soy-based beverages. Products classified under category 14.1.4.2 are non-carbonated beverages, including fruit and vegetable juice-based drinks, such as almond beverages. Meanwhile, products classified under category 14.1.5 include mung bean extract beverages and cereal-based beverages.

Several PBMA products available in Indonesia that have been approved by BPOM are registered as beverages without using the term "milk". In addition, BPOM prohibits the use of the term "milk" for these products to prevent consumer misperception and to ensure that marketed products comply with established standards and accurate labeling information (BPOM, 2023). However, for marketing purposes, the term "milk" for plant-based products is still frequently used on packaging and in marketing materials. Manufacturers often labelled them as "m*lk, particularly in well-established products such as soy milk. This has led consumers to mistakenly perceive PBMA as equivalent to animal-based milk.

Based on a market survey conducted in the Jabodetabek area, nine types of PBMA products with various brands were identified, including those made from a single plant-based ingredient as well as mixed sources. According to the nutritional information provided on the labels, all PBMA products stated that they contain no cholesterol. The fat and protein contents of PBMA ranged from 1.4–6 g/100 ml and 0.5–3.3 g/100 ml, respectively. Some PBMA products contained calcium. For those that did list calcium content, it was generally derived from added calcium fortification indicated in the ingredient list. As comparison, nutritional value of commercial pure dairy milk was identified. The cow's milk contains 3.2 g/100 mL of fat, 3.2 g/100 mL of protein, 10 mg/100 mL cholesterol, and 168 mg/100 mL calcium.

The questionnaire was tested for validity and reliability before being distributed to respondents. The validity test was conducted to assess the ability of the questionnaire as a measurement tool in evaluating the intended object and to determine the feasibility of questionnaire items in defining a variable (Sugiyono 2010). The validity of each questionnaire item was tested using a correlation technique, which assesses the relationship between the score of each item and the total score (sum of all questionnaire item scores). An instrument is considered valid if the correlation coefficient (Pearson correlation) was positive and the probability value of the correlation exceeds the predetermined significance level (Widi 2011). The validity test results indicated that the questionnaire was valid due to the R-count values for all questionnaire items ranged from 0.453 to 0.822, exceeding the R-table value of 0.380. The reliability test was performed to evaluate the level of stability when the questionnaire is used repeatedly, ensuring that the resulting data are reliable, consistent, and accurate. Reliability test measures the trustworthiness or accuracy of a measurement. This test indicates the extent to which variations in test results among individuals were due to actual differences in the characteristic being assessed. In this study, reliability testing was conducted using internal consistency reliability, as indicated by the Cronbach's Alpha coefficient. The closer the reliability coefficient was to 1, the more reliable the measurement instrument was. According to Ferguson (2010), a measurement instrument was considered reliable if $\alpha > 0.60$. The questionnaire yielded Cronbach's alpha values of 0.619 for the animal milk perception section and 0.711 for the PBMA product perception section. As both values exceed the threshold of 0.60, the questionnaire was deemed reliable.

Most of the respondents were female (64%), and the rest were male (36%). In terms of age, 74% were between 17 and 25 years old, which falls under Generation Z According to Linnes & Metcalf (2017), generation Z is known for its extensive exposure to the internet and a tendency to make impulsive buying decisions. The majority of respondents were students or college students (68%), followed by private employees (23%). In terms of education, 54% respondents hold a bachelor's degree or equivalent, while 31% have completed high school or its equivalent. Regarding marital status, 77% of respondents are single. As for monthly income, responses varied, but the largest group (29%) reported earning less than IDR 500,000 per month.

Perception is a belief about an object which is produced through exposure, attention, and understanding. Perception will influence consumers in making purchasing decisions (Tsani *et al*., 2018). Analyzing consumer perceptions is essential to identify any potential misperceptions, as PBMA is a newly developed product and not as familiar to consumers as animal milk.

One commonly known drawback of animal milk is its high calorie content, which drives some consumers to seek alternative beverages (Lacroix et al., 2016). In fact, consumers are often willing to pay more for products with lower energy content (Yang & Dharmasena, 2020). To examine this perception, the research data were analyzed using the Wilcoxon Signed-Rank test, as shown in Table 3. The results indicate that 59 respondents associate high-calorie

content with animal milk, 6 respondents with PBMA products, and 320 respondents believe both have similar energy levels. The difference test yielded a significance value of <0.05, indicating a statistically significant difference. This suggests that respondents generally associate high-energy content with animal milk.

However, market surveys show that PBMA products vary widely in energy content, depending on the plant source. As seen in Table 3, most respondents assumed the energy content of cow's milk was higher than that of some PBMA products but lower than others. Its means that animal milk was not always higher in calories. This finding was supported by Vanga & Raghavan (2018), who also concluded that animal milk did not consistently contain more energy than PBMA. Therefore, the perception that animal milk was always high in calories can be considered a misconception

According to data presented in Table 3, there were 224 respondents who associate the perception of high cholesterol products with animal milk, 80 respondents associate the perception of high cholesterol products with PASBN, and 81 respondents have a level of belief that animal milk and PBMA product have the same cholesterol. This indicated that respondents tend to associate high-cholesterol content with animal milk ($p<0.05$). These findings align with product surveys in the market, as shown in Table 2. All types of PBMA products were found to contain no cholesterol. Since PBMA is derived from plant sources, it naturally contains no cholesterol (Silva et al., 2020).

A total of 217 respondents associated the perception of high-fat content with animal milk, 116 respondents associated it with PBMA, and 52 respondents believed that animal milk and PBMA have similar fat content. This suggests that respondents predominantly associate the perception of high-fat content with animal milk. However, as shown in Table 2, market product data indicate that the fat content of animal milk (3.2 g/100 mL) is actually lower than that of certain PBMA products, such as almond-based (6 g/100 mL) and soy-based (3.7 g/100 mL) beverages. Therefore, the perception that animal milk was always high in fat was not supported by the actual nutritional content.

Out of the total respondents, 91 associated animal milk with being a good source of protein, 78 associated this perception with PBMA, and 216 believed that both products serve as good protein sources. This implies that consumers do not have a clear preference or distinction regarding which product type provides better protein content (p-value of 0.188). While the Wilcoxon Signed-Rank test did not yield statistically significant results, Figure 2A shows that 183 respondents agreed and 130 strongly agreed that PBMA products are good sources of protein. According to Table 1, the protein content of animal milk was generally higher than that of PBMA products, with the exception of soy-based beverages, which contain 0.1 g more protein per 100 mL. Animal milk was recognized for its high bioavailability, as it contains all essential amino acids—including isoleucine, leucine, threonine, lysine, cysteine, phenylalanine, tyrosine, and valine (Reyes et al., 2023). Consequently, PBMA products may not serve as adequate continuous sources of protein, as prolonged consumption without proper nutritional balance may have negative health implications (Mäkinen et al., 2016). Misperceptions regarding the protein content of PBMA products likely stem from limited consumer knowledge and access to accurate information. This is understandable, considering that PBMA products are relatively new to the Indonesian market.

Based on Table 3, as many as 113 respondents associated the perception of a good source of calcium with animal milk, 69 respondents with PBMA, and 203 respondents believed that both animal milk and PBMA were good sources of calcium. Respondents were unable to clearly distinguish which of the two product types was a better source of calcium (p-value of 0.135). Though the Wilcoxon Signed-Rank test did not show a significant result, Figure 2B reveals that 187 respondents agreed and 100 strongly agreed that PBMA products are good

sources of calcium. This represents a misperception. According to the market survey data presented in Table 1, animal milk—represented by cow's milk—contains 168 mg of calcium per 100 mL. In contrast, the PBMA product with the highest reported calcium content is almond-based milk, containing 212 mg per 100 mL. However, in general, the calcium content of most PBMA products was lower than that of animal milk, and some PBMA products did not disclose their calcium content at all. It was important to note that calcium in PBMA products was typically added through fortification to compensate for losses during processing. Calcium and other micronutrients can be lost as they dissolve in the water used throughout the production process (Silva et al., 2020). Therefore, it can be concluded that animal milk was a reliable natural source of calcium.

Most consumers (286 respondents) perceive that the consumption of animal milk causes digestive problems, 31 respondents associated this issue with PBMA, and 68 respondents believed that both animal milk and PBMA can cause digestive issues. These findings align with scientific evidence indicating that animal milk can indeed cause digestive discomfort in certain individuals. Digestive issues related to animal milk consumption may result from the presence of casein protein and fat globules, which can form clumps in the gastrointestinal tract. These clumps are digested slowly in the small intestine, and the rate of digestion varies among individuals (Van Hekken et al., 2017). Furthermore, some individuals experience lactose intolerance, a condition characterized by symptoms such as bloating, diarrhea, vomiting, and dehydration. This occurs when lactose is not properly absorbed in the small intestine, leading to its accumulation. The undigested lactose is subsequently fermented by gut microbiota, producing gas and organic acids in the lower digestive tract (Fassio et al., 2018).

Digestive problems often linked to animal milk are not only caused by lactose intolerance but also by the presence of allergenic compounds believed to be in the milk. A total of 162 respondents associated animal milk with the perception of being an allergenic product, 136 respondents associated this perception with PBMA, and 87 respondents believed that both animal milk and PBMA can cause allergic reactions. From a chemical composition perspective, it is not only animal milk that contains allergenic compounds. Legumes and nuts used as raw materials for PBMA can also contain allergenic substances (Palupi et al., 2015). Components in milk such as α-lactalbumin, β-lactoglobulin, lactoferrin, αS1-casein, αS2-casein, and β-casein are known to cause allergic responses (Hochwallner et al., 2014). Similarly, allergenic proteins commonly found in nuts and soybeans include 2S albumin, legumin, vicilin, oleosin, and defensin (Maruyama, 2021). Therefore, both animal milk and PBMA products can be considered potential allergenic foods. These misperceptions were likely due to limited exposure to information about the nutritional content of PBMA products. Additionally, since PBMA was relatively new to the market, public discourse and education surrounding it remain limited.

The correlation between respondent characteristics and PBMA product perception was analyzed using the Chi-square method, as presented in Table 4. Respondent characteristics that show a positive correlation with perceptions of PBMA were age and income. As age increases, respondents tend to be more exposed to information, leading to better knowledge about the differences between animal milk and PBMA. Increasing age was also generally accompanied by higher income, suggesting that PBMA purchases were made based on product perception rather than merely following trends.

4. Conclusion

Respondents demonstrated several misperceptions about PBMA products, particularly regarding energy content, fat content, source of protein, source of calcium, and potential to

cause allergies. Perceptions were also influenced by age and income. Further studies are recommended to investigate the drivers of these misconceptions and to gain a clearer understanding of consumer preferences toward PBMA products.

References

Acquah, J. B., Amissah, J. G. N., Affrifah, N. S., Wooster, T. J., & Danquah, A. O. (2023). Consumer perceptions of plant based beverages: The Ghanaian consumer's perspective. *Future Foods*, 7, 100229. https://doi.org/10.1016/j.fufo.2023.100229.

Alcorta, A., Porta, A., Tárrega, A., Alvarez, M. D., & Vaquero, M. P. (2021). Foods for Plant-Based Diets: Challenges and Innovations. *Foods*, 10(2), 293. https://doi.org/10.3390/foods10020293.

Antunes, I. C., Bexiga, R., Pinto, C., Roseiro, L. C., & Quaresma, M. A. G. (2023). Cow's milk in human nutrition and the emergence of plant-based milk alternatives. *Foods*, 12(99), 1-21. https://doi.org/10.3390/foods12010099

[BPOM] National Agency of Food and Drugs Control. (2025). Guidelines for the Classification of Food Category 01.0 Milk and Dairy Products and Their Analogues. Jakarta, BPOM.

[BPOM] National Agency of Food and Drugs Control Regulation Number 13, Year 2023 concerning Food Category. (2023). Jakarta, BPOM.

Bus, A, E, M., & Worsley A. (2003). Consumers' sensory and nutritional perceptions of three types of milk. *Public Health Nutrition*, 6(2), 201-208. https://doi.org/10.1079/PHN2002417

Chalupa-Krebzdak, S., Long, C. J., & Bohrer, B. M. (2018). Nutrient density and nutritional value of milk and plant-based milk alternatives. *International Dairy Journal*, 87, 84-92. https://doi.org/10.1016/j.idairyj.2018.07.018

Fassio, F., Facioni M, S., & Guagnini, F. (2018). Lactose maldigestion, malabsorption, and intolerance: A comprehensive review with a focus on current management and future perspectives. *Nutrients*, 10(11),b1599. https://doi.org/10.3390/nu10111599

Ferguson, E., Matthews, G., & Cox, T. (2010). The appraisal of life events (ALE) scale: reliability and validity. *British Journal of Health Psychology*, 4(2), 97-116. https://doi.org/10.1348/135910799168506

Gorska-Warsewicz, H., Rejman, K., Laskowski, W., & Czeczotko, M. (2019). Milk and dairy products and their nutritional contribution to the average polish diet. *Nutrients*, 11(8), 1171. https://doi.org/10.3390/nu11081771

Hochwallner, H., Schulmeister, U., Swoboda, I., Spitzauer, S., & Valenta, R. (2014). Cow's milk allergy: From allergens to new forms of diagnosis, therapy and prevention. *Methods*, 66, 22-33. https://doi.org/10.1016/j.ymeth.2013.08.005

Indrasti, D., & Siliyya, F. (2021). Atribut minuman teh kemasan siap minum yang memengaruhi persepsi konsumen di kabupaten tegal. Jurnal Mutu Pangan, 8(2), 70-79. https://doi.org/10.29244/jmpi.2021.8.2.70

Janssen, M., Busch, C., Rodiger, M., & Hamm, U. (2016). Motives of consumers following a vegan diet and their attitudes towards animal agriculture. *Appetite*, 105, 643-651. https://doi.org/10.1016/j.appet.2016.06.039

Kaskous, S. (2021). Cow's milk consumption and risk of disease. *Emirates Journal of Food and Agriculture,* 33(1), 1-11. https//doi.org/10.9755/ejfa.2021.v33.i1.2558

Lacroix, M., Desroches, S., Turcotte, M., Guerard, G. P., Paquin, P., Couture, F., & Provencher, V. (2016). Salient beliefs among Canadian adults regarding milk and cheese consumption: A qualitative study based on the theory of planned behaviour. *BMC Nutrition*, 2(48), 1-15. https://doi.org/10.1186/s40795-016-0087-1

Lemeshow, S., Hosmer Jr, D. W., Klar, J., & Lwanga, S. K. (1990). Adequacy of sample size in health study. England: John Wiley & Sons Ltd.

Linnes, C., & Metcalf, B. (2017). Generation and their acceptance of technology. *International Journal of Management and Information Systems*, 21(2), 11-26. https://doi.org/10.19030/ijmis.v21i2.10073

Makinen, O. E., Wanhalinna, V., Zannini, E., & Arendt, E, K. (2016). Foods for special dietary needs: Non-dairy plant-based milk substitutes and fermented dairy-type products. *Food Science and Nutrition*, 56(3), 339-349. https://doi.org/10.1080/10408398.2012.761950

Maruyama, N. (2021). Components of plant-derived food allergens: Structure, diagnostics, and immunotherapy. *Allergology International*, 70(3), 291-302. https://doi.org/10.1016/j.alit.2021.05.001

Palupi, N. S., Sitorus, S. R., & Kusnandar, F. (2015). Perubahan alerginitas protein kacang kedelai dan kacang Bogor akibat pengolahan dengan panas. *Jurnal Teknologi dan Industri Pangan,* 26(2), 222-231. https://doi.org/10.6066/jtip.2015.26.2.222

Park, Y. W., & Haenlein, G. F. W. (2017). Therapeutic, hypo-allergenic and bioactive potentials of goat milk, and manifestations of food allergy, in: *Handbook of milk of non-bovine mammals*. USA: Wiley-Blackwell.

Park, Y. W. (2009). Overview of bioactive components in milk and dairy products, in: *Bioactive components in milk and dairy products*. USA: Wiley-Blackwell,

Park, Y. W. (2021). The impact of plant-based non-dairy alternative milk on the dairy industry. *Food Science of Animal Resources*, 41(1), 8-15. https://doi.org/10.5851/kosfa.2020.e82

Prejet, J. 2018. Comparing consumer perceptions of the health value of dairy milk and plant-based dairy milk alternatives [dissertation]. Canada: University of Manitoba.

Reyes-Jurado, F., Reyes-Soto, N., Davila-Rodriguez, M., Lorenzo-Leal, A. C., Jimenez-Munguia, M. T., Mani-Lopez, E., & Lopez-Malo, A. (2023). Plant-based milk alternatives: types, processes, benefits, and characteristics. *Food Reviews International*, 37(1), 1-32. https://doi.org/10.1080/87559129.2021.1952421

Silva, A. R. A., Silva, M. M. N., & Ribeiro, B. D. (2020). Health issues and technological aspects of plant-based alternative milk. *Food Research International*, 131, 108972. https://doi.org/10.1016/j.foodres.2019.108972

Sugiyono. (2010). Metode penelitian pendidikan pendekatan kuantitatif, kualitatif, dan R&D. Bandung: Alfabeta.

Tsani, A. F. A., Astirani, A. E., Amalia, R., Indraswari, L., Lupitasari, O., & Ayuningtyas, C. E. (2018). Persepsi tentang nutrition claims, perilaku makan, dan body image antara mahasiswi kesehatan dan non-kesehatan. *Jurnal Gizi Klinik Indonesia*, 15(1), 10-15. https://doi.org/10.22146/ijcn.44574

van Hekken, D. L., Tunick, M. H., Ren, D. X., & Tomasula, P. M. (2017). Comparing the effect of homogenization and heat processing on the properties and in vitro digestion of milk from organic and conventional dairy herds. *Journal of Dairy Science*, 100(8), 6042-6052. https://doi.org/10.3168/jds.2016-12089

Vanga, S. K., & Raghavan, V. (2018). How well do plant based alternatives fare nutritionally compared to cow's milk?. *Journal Food Science Technology*, 55(1), 10-20. https://doi.org/10.1007/s13197-017-2915-y

Widi, E. R. (2011). Uji validitas dan reliabilitas dalam penelitian epidemiologi kedokteran gigi. *Stomatognatic*, 8(1), 27-34.

Yang, T., & Dharmasena, S. (2020). Consumers preferences on nutritional attributes of dairy-alternative beverages: Hedonic pricing models. *Food Science & Nutrition*, 8(10), 5362-5378. https://doi.org/10.1002/fsn3.1757