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Consumer Preferences towards Formulated Elderly Milk Based on Sensory Attribute: A Preliminary Study

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Abstract

A preliminary study was conducted to identify the consumer preference for formulated elderly milk based on their sensory attribute. Consumers are more informed about the product's advantages these days, particularly concerning the elderly population. It is necessary to conduct research on the different formulations of elderly milk functional food in order to enhance milk production and quality assurance. The sensory evaluation is used to analyse the differences in characteristics between the two different samples of elderly milk. At the Central Location Test (CLT), a structured questionnaire was carried out with 51 consumer panels (age 40 and above) that had been selected using the convenience sampling method. Descriptive analysis and an independent t-test were utilised in the data analysis process. According to the findings of the descriptive analysis, the vast majority of the respondents only drink milk when it's needed. When compared to the other samples, the findings of an independent t-test based on the perceptions of the respondents indicated that they desired the elderly milk attributes that were present in Sample B. In a nutshell, the findings offer a rock-solid foundation for understanding the sensory characteristics of elderly milk, which is milk that is preferred by customers to be used in product development and quality assurance processes by food processors and marketers.

Keywords: Consumer Preferences, Sensory Attributes, Sensory Evaluation, Elderly Milk

Introduction

In order to keep up a healthy way of life, it is absolutely necessary for a living person to adopt a diet that is both varied and well-balanced in their daily routine. Milk drinking was recommended by the Malaysian Dietary Guidelines (2010) as a way of gaining all of the necessary nutrients for a healthier body. Figure 1.1 is a depiction of the Malaysian Food Pyramid for the year 2020, the milk and milk product food group should be consumed in moderation, with no more than two servings per day being recommended. The following is a list of the most important recommendations regarding milk: 1) drink milk and other products made from milk on a daily basis, and 2) switch to unsweetened liquid or powdered milk instead of sweetened condensed milk and sweetened condensed milk filled with added sugar.

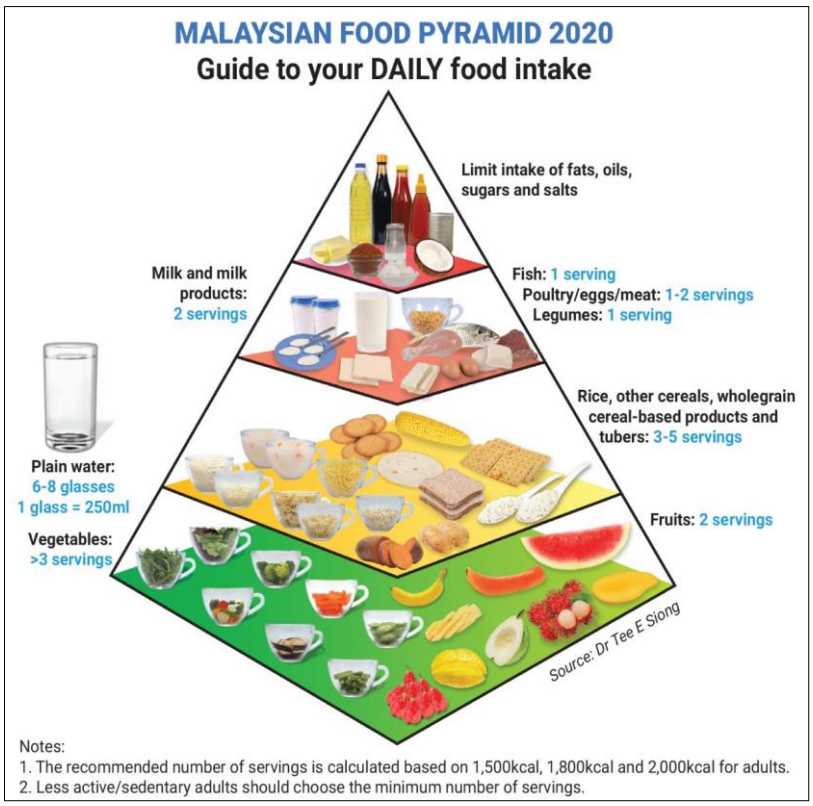

Figure 1.1: Malaysian Food Pyramid 2020
Source: Ministry of Health Malaysia (2020)

In spite of this, many people in Malaysia are still not aware of the myriad of positive effects that consuming milk and other dairy products can have on one's health. Leiu, Chin, Mohd Shariff, Arumugam, and Chan (2020) found a correlation between low levels of vitamin D and a high percentage of body fat as well as low consumption of milk and milk products in postmenopausal Chinese women. According to the findings of another study conducted by Von Goh et al (2020), the food habit pattern for milk and milk products that was surveyed by the Malaysian Adult Nutrition Survey in 2003 and 2014 revealed that milk and milk products are not commonly consumed by Malaysians. According to the same research conducted by Norimah et al (2008), milk and milk products were not consumed in sufficient quantities by Malaysian adults to meet the recommendation of the Food Pyramid, which is 1-3 servings per day, but they consumed 0.14 servings per day.

In addition, the consumption of milk and milk products was lower than the number of servings that are recommended for a healthy diet. This was due to the fact that Malaysians consumed only 0.1 to 0.2 servings of milk, yoghurt, and cheese on a daily basis on average when compared to the consumption of the other food groups. This played a part in Malaysians having a calcium intake that was below average (Lee & Muda, 2019). It is clear that there is a need for assistance, either formal or informal, among the elderly population, and particularly among the "old" elderly (those aged 80 and up). Loss of general strength and pliability associated with ageing makes simple activities like washing and grocery shopping more challenging, and in the worst cases, degenerative diseases make it impossible for elderly person to care for themselves.

Figure 1.2: Current Population Estimates, Malaysia, 2022
Source: Department of Statistic Malaysia (2022)

Figure 1.2 shows each year, a greater proportion of Malaysia's population is comprised of people in their later years. the percentage of the population that was aged 15 to 64 years (the working age population) rose from 69.4 percent in 2021 to 69.5 percent in 2022. The shifts in the population's age structure are depicted in the Figure 1.3. When compared to the year 2010, the proportion of elderly people living in the world will have increased by the year 2040. Both the male and female populations demonstrated that there was an increase in the total population.

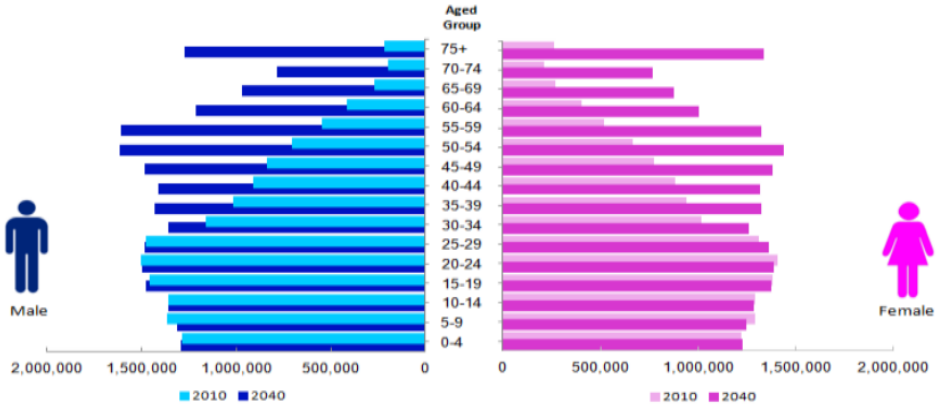

Figure 1.3: Population Projection Malaysia, 2010-2040
Source: Department of Statistic Malaysia (2017)

The consumption of milk, in terms of the requirements for formula milk, in order to slow down the general weakening and loss of suppleness. By the year 2035, it is anticipated that Malaysia will have a population that is predominantly elderly. One of the growing concerns brought about by this shift in demographics is that of malnutrition among the elderly. As people get older, their nutritional priorities typically shift to focus on meeting and minimising increased nutrient needs with fewer energy requirements while also preventing lean muscle loss. This is common during the transition into older years (Amarya, Singh, & Sabharwal, 2015). When it comes to senior citizens, malnutrition can result in protein-energy malnutrition, sarcopenia, and cachexia.

Inadequate food consumption is the root cause of malnutrition in the elderly population. This can be caused by a variety of factors, including financial constraints, empty nest syndrome, a decline in sensory function, problems with oral health, problems with gastrointestinal health, polypharmacy, and many others. Then, these factors link to the difficulty of obtaining food, poor appetite, and impaired ingestion, digestion, and absorption that will manifest malnutrition among the elderly (Agarwal et al., 2013; Volkert, 2013; Agarwal et al., 2013; Volkert, 2013). In this country, continuing efforts are required to develop a more effective model for the delivery of health care and a more resilient health system in order to reduce the prevalence of malnutrition among the elderly population (Gendeh et al., 2016).

One of the growing concerns regarding the elderly is their lack of appetite. According to Khan (1981), "a person chooses food rather than nutrients for his or her diet" (p.129). At this individual level, the choice is a function of multiple interrelated aspects of personality as well as mental health. The vast majority of studies conducted in this field have focused on the evolution of food preferences in adult populations as a whole. While much of this research is applicable to older adults as well, there is a need to clarify the nature of the relationship between these psychological aspects and food selection. Their sensory judgement, which is based on the attribute of the product, plays a role in the selection of food. Product evaluation and preference are primarily formed through consideration of various product attributes. For instance, customers may evaluate different brands of infant formula based on a variety of characteristics. As a result, sensory evaluation is an essential method for determining how humans react to different foods.

"A scientific discipline used to evoke, measure, analyse, and interpret reaction to those characteristics of foods and materials as they are perceived by the senses of sight, smell, touch, taste, and hearing," is how one definition of sensory evaluation or sensory science reads (Stone & Sidel, 2004). The consumer goods industry places significant importance on the field of sensory science. When evaluating a product, the primary criteria that are used to determine a consumer's sensory and hedonic responses are the product's properties, including its visual appearance, texture, and flavour. In fluid milk research and investigations into predicting and preserving acceptable milk quality, the most recent mainstream sensory approaches have been applied, as stated by (Schiano et al., 2017). Furthermore, since the product was examined by a panel of consumers' preferences, the outcomes could be regarded as a representation of the preference of a large section of the population that can be used to predict the market position for a product (Ismail et al., 2022).

Each use of milk requires a sensory evaluation to determine its effectiveness. Because fluid milk and its typical sensory profile are so well known all over the world, it is imperative that one has a comprehensive understanding of milk's sensory properties. Raw milk's flavour and aroma may be altered as a result of issues that arise during the handling or production phase before the milk is processed. These issues can be discovered before the milk is even processed. According to Schiano et al (2017), sensory evaluation is a parameter that can only be tested by humans. Within the construction of selected testing procedures and parameters, there is a series of tools or tests that can have either a subjective or an objective application. Because of this, one of the most important strategies for determining the quality of a product is the ongoing assessment of the sensory characteristics of the food. As a result, the quantitative science of sensory evaluation requires the collection of numerical data in order to establish the connection between the attributes of a product and how it is experienced by consumers (Hashmi et al., 2007).

Material and Method

In this study, the target number of respondents was age group 40 and above at Center Location Test (CLT). The Central Location Test (CLT) is the best approach and cost-effective option for the current study (Schiano et al., 2017). The study was conducted at EMZI-UiTM Nanoparticles Colloids & Interface, Industrial Research Laboratory (Nano-Core), UiTM Cawangan Pulau Pinang. A structured questionnaire consisting of close-ended questions was constructed for this study. It contained two sections, namely Section A (consumer perception and acceptance toward sensory characteristics) and Section B (socio-demographic profile). Data were collected from a total of 51 untrained panels interviewed face-to-face.

Two samples were used for the sensory evaluation and consumer testing. There were two new formulations of elderly milk samples. The samples were prepared in warm water and labeled as Sample A and Sample B. Prior to the interview session, the definition of sensory attributes for fluid milk had been described by the researcher to the respondent. A straightforward explanation is imperative to enable the respondent to understand the attributes of milk.

In this study, sensory evaluation was used to obtain information on sensory characteristics for different types of elderly milk samples based on consumer's perception. Preference or hedonic test, is used to measure consumers' preference or degree of liking or disliking a product. The purpose of the test is to evaluate consumer's preferences for different types of milk samples with specific characteristics. Since the introduction of hedonic scaling methods in the 1940s, evaluating consumer acceptance is essential to ensure the acceptability of various fluid milk products and treatments. Consumer tests may be constructed in various ways with fluid milk but, central location tests (CLT) are the most frequently used. Moreover, administering consumer evaluations to untrained populations represents the true consumer base of a product.

Previous studies by Schiano et al (2017) on the hedonic qualities of fluid milk have attempted to extrapolate consumer preferences from trained panelists; however, the lack of trained panelists to expect or predict the preferences of consumer populations is well documented. Consumers or untrained panelists are usually used to complete hedonic tests where they are asked to indicate their preferences (Lawless & Heymann, 2010). It is unlikely that the untrained panelists are able to differentiate the small differences between the products, but they can indicate what products are acceptable and provide the consumer perspective (Morin et al., 2018). Practical uses of consumer tests include examining the

effects of various processing methodologies, flavor additions or fortifications, and shelf life of fluid milk to maintain adequate consumer acceptance and lead to new product development.

The questions were constructed to evaluate the consumers' preference for elderly milk based on their perception. The objective of this section was to determine the significant difference in consumers' preferences for different types of elderly milk samples. A 7-point hedonic scale is a suitable approach to match and compare samples to determine consumers'

preference of likes and dislikes toward elderly milk samples. In this study, the preference rating for elderly milk is based on the 7-point hedonic scale ranging from "1 = strongly dislike to 7 = strongly like". The respondents were asked to choose and mark one of the 7 alternatives for each characteristic. The standardization of an equal interval scale allows respondents to measure the acceptability of different milk samples.

Data was analyzed using descriptive analysis and independent t-test. The descriptive analysis was used to explain consumers' socio-demographic profile and general information about elderly milk. Frequency distribution and percentage were used to summarize the importance of each category in the socio-demographic profile and other information about elderly milk. The independent t-test is used to identify the significant difference between two samples of elderly milk that consist of 5 sensory attributes which are appearance, odour, texture, taste, and sweetness.

Findings

Respondents' socio-demographic profile

Figure 1.4 shows the socio-demographic profiles of the respondents. According to the graf below, majority of the respondents showed 76.47% of the age of 40 years old and above, while 50 years old and above is 13,73% and 60 years old and above is 9.80%. The gender of respondents in this study comprised of 70.59% (36 respondents) female, whereas male made up of 29.41% (15 respondents) in Figure 1.5.

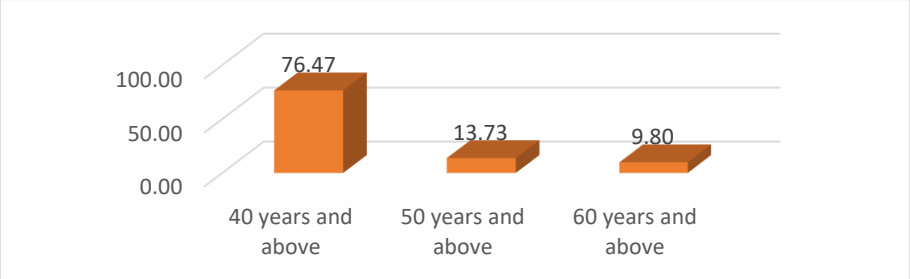

Figure 1.4: Age (%)

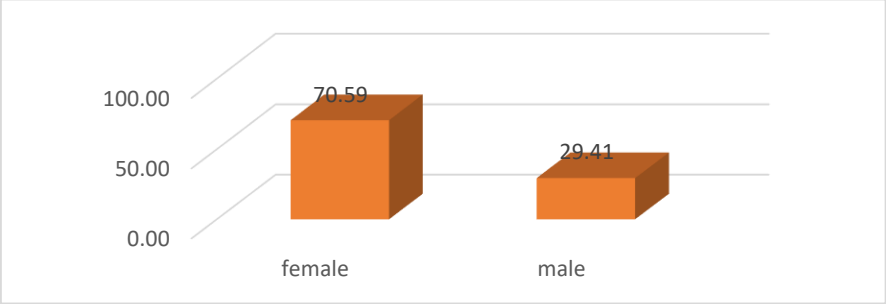

Figure 1.5: Gender (%)

In Figure 1.6 depicted the majority of the respondents (45.10%) were drink the milk when needed only, while others drink occasionally and daily by 29.41% and 25.49% respectively.

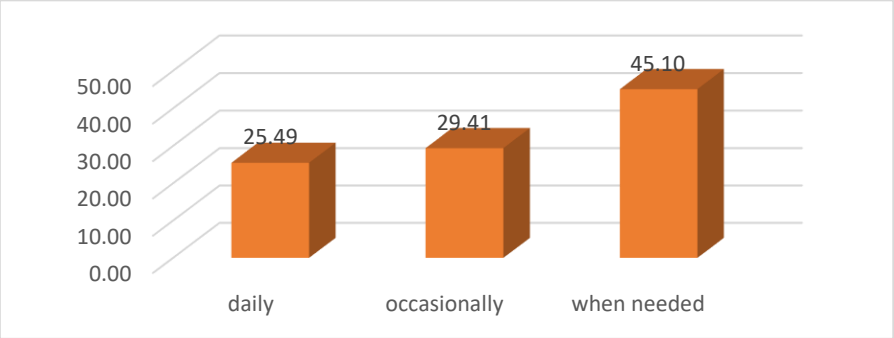

Figure 1.6: Consumption of milk (%)

Sensory characteristics for elderly milk samples based on respondent's perception

An independent t-test was used to determine any statistically significance between the means of two samples of elderly milk with five different sensory characteristics, namely appearance, odour, texture, taste, and sweeteness. Table 1.1 summarizes the mean scores of sensory characteristics between two samples of elderly milk based on the respondent's perception based on respondent's level of score. Sample B showed the highest between the samples, indicating the most preferred by the respondents which is slightly like to moderately like (Table 1.2).

Table 1.1
Level of score

Scale						
1	2	3	4	5	6	7
Strongly dislike	Moderately dislike	Slightly dislike	Neither like nor dislike	Slightly like	Moderately like	Strongly like

Table 1.2
Mean score

Attribute	Sample A	Sample B
Appearance	5.726	5.980
Texture	5.529	5.667
Odour	5.510	5.510
Sweetness	5.628	5.628
Taste	5.412	5.686

The table above was defined in a spider web chart (Figure 1.7) below that shows respondent preferences between the two samples where the orange-colored outer layer of the web indicates sample B as the most preferred sample. It showed that sample B with all attributes positioned on the outermost layer characterizing the milk is the most preferred by the respondents compared to sample A.

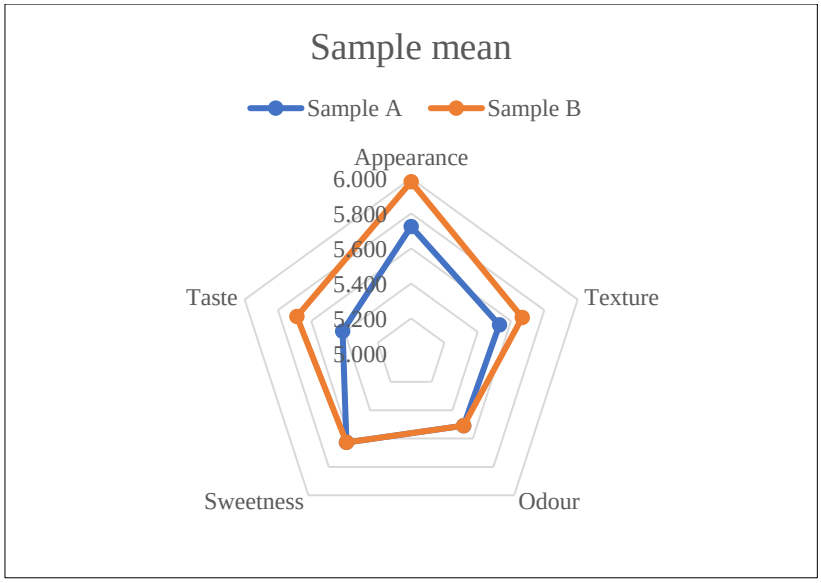

Figure 1.7: Mean score based on spider web

Conclusion

The findings demonstrate that elderly milk that has been fed with a new formulation of diet ingredients is acceptable to consumers. The milk sample that was labeled as B based on research, possesses favorable sensory attributes compared to other samples. The preference test showed that sample B received positive responses in all sensory attributes evaluated (appearance, odour, texture, taste, and flavor). The present study has provided the foundation for product optimization from a sensory point of view with a high potential for success in consumer marketing and the development of elderly milk to fulfill the demand for milk consumption for the elderly. In other words, this helps the producer to discover which qualities of the product need to be developed and emphasized.

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