



# Assessing Product Preferences: A Study of 'Kettawa Fresh' Protein-Based Products among Stunted Communities

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**Abstract.** Families with stunted members in the Special Region of Yogyakarta (DIY) face the need for protein-based products to address this nutritional challenge. This study focuses on the development of a protein-based product, specifically "Kettawa Fresh," comprising Ettawa goat milk and various herbal additives, known to enhance protein, zinc, and other essential nutrients. These products aim to support families impacted by stunting in DIY, presenting a potential solution to reduce the prevalence of stunting in the region. The research objectives are twofold: 1) to analyze the product preferences for "Kettawa Fresh" among stunted families in DIY and 2) to examine any significant differences in the sensory attributes of two laboratory-tested products concerning taste, aroma, texture, and color. A quantitative research approach was employed, conducted through a survey. Data sources included primary and secondary data. Non-probability sampling was used to select a total of 40 individuals with stunted family members from each district in DIY, totaling 200 participants. Data analysis was carried out using a hedonic organoleptic preference test. The results of the research indicate that families affected by stunting have a higher preference for "Kettawa Fresh" Product A (with moringa leaves) compared to Product B (without moringa leaves). The hedonic organoleptic test further revealed significant differences in taste, aroma, and texture between the two products. However, there was no significant difference in color preference. Consequently, "Kettawa Fresh" Product A, which includes moringa leaves, is recommended for families affected by stunting in DIY.

**Keywords:** stunting, protein-based products, kettawa fresh, moringa, preference

## 1 Introduction

Stunting is a nutritional status classification based on the height-for-age (HAZ) or length-for-age (LAZ) index, which, in anthropometric terms, falls within the range of  $<-2$  SD to  $-3$  SD (short/stunted) and  $<-3$  SD (very short/severely stunted). Stunting represents a chronic malnutrition problem resulting from prolonged inadequate dietary intake that fails to meet nutritional requirements [1]. The emergence of various malnutrition issues can be attributed to the lack of nutritional resilience, stemming from unmet household food security [2]. According to data from the 2019 Indonesian Child Nutrition Status Survey (SSGBI), the prevalence of stunting in the Special Region of Yogyakarta (DIY) was 21.0 percent, decreasing to 17.3 percent in 2021. Inadequate household food security may result from limited access to food,

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underutilization of available food, and a lack of dietary diversity. Insufficient household food security can lead to reduced food intake, ultimately affecting an individual's nutritional status [3]. This situation is closely related to the insufficient access to and utilization of food resources, particularly for economically disadvantaged families, including pregnant women and toddlers. Ongoing efforts are continually being made to prevent stunting and reduce the prevalence of stunted children.

To combat this issue, research has produced a protein-based food product designed to prevent stunting. This product, named "Kettawa Fresh," is a blend of goat's milk from Ettawa goats, turmeric (*temulawak*), local soybeans, moringa (*kelor*), and various herbal ingredients, specifically targeting the prevention of stunting. As such, the primary objective of this research is to analyze the preferences for "Kettawa Fresh" products among the residents of the Special Region of Yogyakarta.

## **2 Research Methods**

### **2.1 Study location:**

This research was conducted intentionally (purposive) based on specific considerations aligned with the research objectives. The study took place in the Special Region of Yogyakarta, encompassing five regencies and municipalities. According to the Indonesian Child Nutrition Status Survey (SSGBI) data, stunting rates in DIY have fluctuated over the years but consistently remained above 10%. As a result, alternative solutions were deemed necessary to address the stunting issue in each regency/municipality within the Special Region of Yogyakarta.

### **2.2 Research design:**

The research employed a descriptive quantitative research methodology. Quantitative research was chosen due to its alignment with scientific principles that emphasize concreteness, objectivity, measurability, rationality, and systematicity. The descriptive method, in particular, was utilized to ascertain the values of one or more variables used for explaining, predicting, and controlling a phenomenon [4].

### **2.3 Sampling method:**

Non-probability sampling was used for selecting participants. The population for this study consisted of the entire population of the Special Region of Yogyakarta, comprising five regencies and municipalities: Yogyakarta City, Bantul Regency, Sleman Regency, Kulon Progo Regency, and Gunungkidul Regency. Since the exact number of potentially stunted households was unknown, the researchers decided to have a sample size of 200 respondents, with 40 respondents allocated to each regency/municipality. Data collection involved a triangulation approach, encompassing semi-structured interviews with observed respondents, Focus Group Discussions (FGD), direct field observations, as well as statistical and data analysis, and laboratory testing of the "Kettawa Fresh" milk product. Both primary and secondary data were used in this study, with primary data consisting of respondent data and product preference data,

and secondary data obtained from the Indonesian Child Nutrition Status Survey (SSGI) by the Ministry of Health of the Republic of Indonesia for the years 2021-2022.

## 2.4 Data analysis:

Data analysis was carried out using a hedonic preference test. The hedonic test is a sensory organoleptic analysis used to determine the degree of causality differences among various products by assigning ratings or scores to specific attributes of a product. The level of preference is assessed on a hedonic scale [5]. Organoleptic tests involve assessing food products based on liking and preference. Organoleptic tests are sensory tests that rely primarily on the human senses for product evaluation. The sensory organs used in organoleptic tests include sight, smell, taste, and touch [6]. The hedonic scale employed in this study included the following:

**Table 1.** Five-point hedonic scale for sensory evaluation of "Kettawa Fresh" products with moringa leaves and "Kettawa Fresh" products without moringa leaves:

Description	Scale point
Very Liked	5
Liked	4
Neutral	3
Disliked	2
Very Disliked	1

The sensory criteria used in this research were based on panelists' preference levels for taste, aroma, color, and texture of "Kettawa Fresh" products with moringa leaves and "Kettawa Fresh" products without moringa leaves.

## 3 Results and Discussion

### 3.1 Sensory evaluation of "Kettawa Fresh" products with and without moringa leaves

Respondents were asked to provide their feedback regarding their preference for "Kettawa Fresh" products with moringa leaves and "Kettawa Fresh" products without moringa leaves. In addition to indicating whether they liked or disliked the products, respondents also expressed the degree of their preference, which was assessed using a hedonic scale. The results of the organoleptic test are presented below: Tabel 2. Uji Organoleptik dari Dua Jenis Produk "Kettawa Fresh" di Daerah Istimewa Yogyakarta.

**Table 2.** Sensory evaluation results for "Kettawa Fresh" products

Organoleptic Test	Hedonic Scale					Respondent chose "Kettawa Fresh" A
	1	2	3	4	5	
	Very Disliked	Dislike d	Neutral	Liked	Very Liked	
"Kettawa Fresh" A	Respondent (person)					

Taste	7	7	53	84	49	128
Aroma	7	15	50	80	48	
Texture	10	16	74	66	34	
Color	7	11	64	84	34	
<i>"Ketawa Fresh" B</i>	Respondent (person)					
Taste	14	39	46	62	39	72
Aroma	13	29	64	57	37	
Texture	8	30	76	65	21	
Color	8	29	72	55	36	

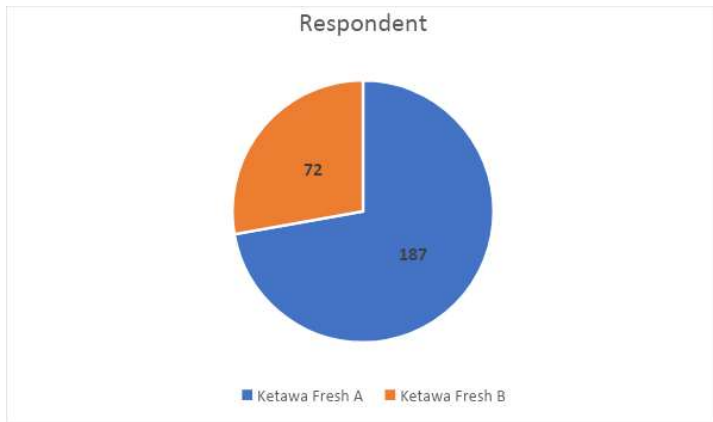
Note:

A = With moringa leaves

B = Without moringa leaves

Based on the data presented in Table 2, it can be observed that a significant number of respondents expressed positive preferences regarding the taste of "Kettawa Fresh" Product A. Specifically, 84 respondents indicated that they liked it, and 49 respondents expressed that they liked it very much. Similarly, "Kettawa Fresh" Product B also garnered favorable responses, with 62 respondents liking it and 39 respondents expressing a strong liking for it. Taste is a crucial determinant of consumer acceptance for any product. It is the sensation perceived by the taste buds on the tongue, encompassing the four primary taste sensations: sweet, bitter, sour, and salty.

The data suggests that more respondents favored the taste of "Kettawa Fresh" Product A compared to Product B. Product B is predominantly sweet in flavor, attributed to the inclusion of herbal ingredients, while Product A offers a less sweet taste due to the addition of moringa leaves. Moringa leaves contain tannins, which can impart a slightly astringent taste [7]. These findings underscore the significance of taste as a key factor influencing product acceptance and consumer preferences. Additionally, it highlights the role of specific ingredients, such as moringa leaves, in shaping the sensory attributes and overall appeal of the "Kettawa Fresh" products. Further research and development efforts may explore ingredient combinations that optimize both nutritional content and taste to enhance product acceptance.



**Fig. 1.** Comparison chart of kettawa milk product preferences

In the sensory evaluation of "Kettawa Fresh" products, it was observed that 80 respondents liked the aroma of "Kettawa Fresh" Product A, with 48 respondents expressing a strong liking for it. For Product B, 57 respondents liked its aroma, and 37 respondents had a strong liking for it. Aroma is a crucial parameter that researchers use in organoleptic testing, involving the sense of smell. The aroma of food and beverages plays a pivotal role in enhancing their overall appeal, as products with enticing and distinctive aromas are more likely to be well-received by consumers. A pleasing aroma typically results from specific ingredients [8]. The addition of moringa leaves to "Kettawa Fresh" products had a notable impact on aroma. Product B, which contained empon-empon, had a stronger aroma compared to Product A. The aroma generated by "Kettawa Fresh" Product A was pleasant and not overly strong, attributed to the inclusion of moringa leaves.

Regarding texture, 74 respondents had a somewhat unfavorable view of the texture of "Kettawa Fresh" Product A, while 66 respondents liked it. For Product B, 76 respondents found the texture somewhat unfavorable, and 65 respondents liked it. Texture pertains to the sensory perception of touch and feel. The textures of "Kettawa Fresh" Products A and B were relatively similar. The increased proportion of moringa leaves tended to result in a less compact texture because moringa leaves contain a higher fiber content than typical vegetables [8].

When it comes to color, 64 respondents found the color of "Kettawa Fresh" Product A somewhat unappealing, while 84 respondents liked it. For Product B, 72 respondents found the color somewhat unappealing, and 55 respondents liked it. "Kettawa Fresh" Product A exhibited a greenish-yellow color, attributable to the moringa leaves. Moringa leaves contain chlorophyll, the green pigment commonly found in leafy greens, contributing a slight greenish hue to "Kettawa Fresh" Product A.

From Table 2, considering the overall components of taste, aroma, texture, and color, it is evident that 128 respondents favored "Kettawa Fresh" products with moringa leaves, whereas 72 respondents preferred "Kettawa Fresh" products without moringa leaves. These preferences reflect the influence of various sensory attributes on consumer choices and underscore the significance of developing products that strike a balance between nutritional benefits and sensory appeal. Further research and development can be tailored to optimize ingredient combinations and achieve a harmonious blend of nutrition and sensory delight.

**Table 3.** Man whitney test results

Parameter	Number of Panelists	Mean $\pm$ St. Dev		Sig
		Kettawa Fresh A	Kettawa Fresh B	
Taste	200	3,81 $\pm$ 0,965 <sup>a</sup>	3,37 $\pm$ 1,200 <sup>b</sup>	0,000
Aroma	200	3,74 $\pm$ 1,020 <sup>a</sup>	3,38 $\pm$ 1,137 <sup>b</sup>	0,001
Color	200	3,49 $\pm$ 1,027 <sup>a</sup>	3,31 $\pm$ 0,983 <sup>a</sup>	0,052
Texture	200	3,64 $\pm$ 0,947 <sup>a</sup>	3,41 $\pm$ 1,067 <sup>b</sup>	0,018

Note :

1=Very disliked,

2=disliked

3=neutral,

4=liked,

5=very liked

a,b,= sharing letters indicate no significant difference at the Mann-Whitney test level of significance ( $\alpha$ ) of 5%

The Mann-Whitney test results for taste, aroma, and texture parameters show  $P < 0.05$ , thus accepting the alternative hypothesis ( $H_a$ ), indicating a statistically significant difference between the two samples, namely, 'Kettawa Fresh' milk A and 'Kettawa Fresh' milk B. However, for the color parameter,  $P > 0.05$ , leading to the acceptance of the null hypothesis ( $H_0$ ), signifying no statistically significant difference between the two samples, 'Kettawa Fresh' milk A and 'Kettawa Fresh' milk B.

## 4 Conclusions

In conclusion, the sensory evaluation of "Kettawa Fresh" products revealed noteworthy findings. Respondents displayed distinct preferences for taste, aroma, and texture between "Kettawa Fresh" milk Product A and Product B, signifying a significant difference. Notably, the inclusion of moringa leaves in Product A resulted in a milder aroma and less sweet taste, contributing to its favorability. In contrast, the prominent aroma of empon-empon in Product B appealed to a segment of respondents. However, concerning color, both products were similarly well-liked, indicating no significant difference. These results underscore the multifaceted nature of sensory preferences and emphasize the importance of aligning nutritional enhancements with sensory attributes for effective product development and consumer acceptance. Further research should explore ingredient combinations to optimize nutrition and sensory appeal for products aimed at addressing nutritional challenges such as stunting.

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