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Acceptance and Protein Content of Skim Milk Avocado Velva with the Addition of Green Beans as an Alternative Snack for Stunting Toddler

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ABSTRACT
Stunting is a chronic malnutrition condition caused by toddlers' food intake being insufficient to meet their nutritional needs. Efforts made to overcome stunting in-clude providing additional food. Avocados are a local food source that is rich in nutrients. Milk is a good source of animal protein and calcium. An alternative source of vegetable protein that is high in protein and iron content is green beans. The objectives of this research are Identifying the acceptability and protein con-tent of "Velva Avocado Skimmed Milk with the Addition of Green Beans" as an alternative snack for toddlers to prevent stunting. True experimental research was conducted with a control group and two groups that received treatment. The or-ganoleptic tests were conducted on 25 panelists. Indicators included color, taste, flavor and texture. Velva formulations average distribution is F0(3.76), F1(3.79) and F2(3.59). The most preferred formula was F1 (100 grams of avocado, 75 grams of skim milk, and 25 grams of green beans). Provides a protein content of 2.96 g/recipe.

Keywords: Proteins, Velva, Avocado, Skim Milk, Green Bean, Stunting

INTRODUCTION

Stunting is a condition when toddlers experience growth delays, so they have a smaller height than their peers[1]. Stunting is measured with reference to length or height that is below -2 (SD) of child growth according to WHO standards. It is a chronic nutritional problem that is influenced by factors such as socioeconomic conditions, the nutritional status of the mother during pregnancy, and inadequate nutritional intake in the child[2]. Stunting is one of the world's greatest nutritional problems, occurring primarily in developing countries and characterized by chronic growth and developmental deficits in children[3].

According to data from the World Health Organization (WHO), the global stunting rate reached 22% in 2020 or around 149.2 million children. The prevalence of stunting in Indonesia is around 30.8 percent, according to the 2018 Basic Health Survey[4]. However, based on the Indonesian Nutrition Status Survey in 2022, the prevalence of stunting in 2022 is around 21.6% in Indonesia and 19.2% in Java[5]. This is still far from the WHO target of reducing stunting by 2024. The stunting prevalence is 14%.

Some of the factors that contribute to stunting in toddlerhood, include inadequate food intake, low birth weight (LBW), family economic conditions, parental education level, paternal unemployment, and exclusive breastfeeding practices[6, 7].

The incidence of stunting in toddlers is due to the quality of macronutrient intake. Protein deficiency can slow bone growth and development and lead to decreased calcium levels in the bones[8].

Providing Supplementary Food is an activity of providing additional food in the form of biscuits that are ensured to be safe and of high quality, and pay attention to the nutritional values that are important for toddlers who are targeted[9]. Providing Supplementary Food provided for toddlers aims to be able to answer the nutritional

needs of children and toddlers, especially in children who have stunting[10]. Providing Supplementary Food can fulfill nutritional needs, so that weight according to age can be achieved. Providing Supplementary Food in the form of food products that are rich in nutrients and that are healthy[11]. Providing Supplementary Food can be homemade using energy- and protein-rich ingredients that are easy to find in the community and inexpensive.

Avocados contain unsaturated fats and are higher in fiber. Avocado has a texture and consistency that is suitable as a first food for babies. Its content helps meet the nutritional needs of toddlers and should be included in complementary food recommendations as well as transitional foods for the future[12]. Milk is one of the most commonly consumed sources of animal protein, which contains calcium in addition to fish and other marine foods. Giving skim milk as much as 200 grams per week for 3 months increases prealbumin levels by 0.3 ± 4.5 mg/dl[13]. In addition to animal protein, the body also needs vegetable protein. Green beans are a source of nutrients, especially vegetable protein. The content of green beans is quite high in complete composition. Based on the amount, protein is the second major constituent after carbohydrates. This protein consists of amino acids. Green beans have a fairly high protein digestibility (81%)[14].

Velva is a frozen product similar to ice cream. Its advantage lies in the low-fat content and more fiber and vitamins from natural fruits than ice cream. The protein and fiber content of fruits in velva products offers many benefits for toddlers[15].

Based on the above data, the problem of nutrition, especially stunting in Indonesia, must be a major concern. Due to the high impact of stunting on future generations, comprehensive nutritional improvement is needed. Therefore, researchers are interested in making processed skim milk avocado velva products with the addition of green beans. Due to the low protein and natural fiber content of the fruit, this velva is expected to be an alternative snack for toddlers to prevent stunting.

RESEARCH METHOD

This study is a true experimental study because there are two groups of subjects: one control group and two groups that receive treatment, which aims to produce optimal organoleptic results. The preparation of avocado velva was carried out at the Food Ingredient Science Laboratory and organoleptic testing was carried out at the Taste Test Laboratory of the Nutrition Department of the Surabaya Health Polytechnic, Jalan Pucang Jajar Selatan Number. 24B. Protein content testing was carried out at the Laboratory of PT Saraswanti Indo Genetech Surabaya. The research was conducted in October 2023 - May 2024. There was one control group and two treatment groups. Table 1 shows the avocado velva formulation.

Table 1. Avocado Velva Formulation

Materials	Avocado Velva Formulation		
	F0 (control)	F1	F2
Avocado	125	100	100
Skim milk	75	75	50
Green beans	-	25	50
Mineral water	100	100	100
Carboxymethyl cellulose (CMC)	3	3	3
Sugar	40	40	40
Salt	¼	¼	¼
Vanili	½	½	½

Source: primary data, 2024

The organoleptic test was conducted on 25 moderately trained panelists. Moderately trained panelists are those who have been given explanations to recognize certain characteristics, they were selected from a limited circle. Before the organoleptic test was conducted, highly deviant data was pre-processed and not used in the analysis[16]. The assessment was expressed on a hedonic scale with the

criteria: (1=very dislike, 2=dislike, 3=neutral, 4=like, 5=very like). In this study, each formulation of Avocado Velva Skim Milk was hedonically tested using 4 indicators: color, taste, aroma and texture.

These results were analyzed using the Kruskal-Wallis test to determine the presence of significant differences between the groups tested and the Mann-Whitney test to determine the most preferred product based on the comparison of the two groups.

RESULT AND DISCUSSION

Table 2. Characteristics of Avocado Velva Formulation

Indicator	F0 (avocado : skim milk = 125 : 75)	F1 (avocado : skim milk: green beans = 100 : 75 : 25)	F2 (avocado : skim milk: green beans = 100 : 50 : 50)
Color	Avocado green	Avocado green is a slight light	Young avocado green
Aroma	Typical of avocado	Typical avocado and slight green bean odor	Typical avocado and green bean odor
Texture	Smooth	Smooth and there is a slight green bean texture	Smooth and enough texture of green beans
Taste	Typical avocado and overly sweet	Typical avocado and a hint of green bean flavor	Typical avocado and dominant green bean flavor

Source: primary data, 2024

Table 2 describes the characteristics of avocado velva formulations. F0 produces an avocado green color with a distinctive avocado aroma and taste, but is too sweet, smooth texture. F1 produces a slightly light avocado, green color with a typical avocado aroma and a slight green bean smell, the taste is typical of avocado and there is a slight green bean taste, smooth texture and there is a slight green bean texture. F2 produces a light avocado, green color with a typical avocado aroma and green bean odor, the taste is typical of avocado and dominant green bean flavor, fine textured, and there is enough green bean texture.

Table 3. Average Avocado Velva Distribution

	Formulation		
Indicator	**F0 (control)**	**F1**	**F2**
Color	3.84	3.96	3.88
Aroma	3.64	3.8	3.72
Texture	3.76	3.44	3.12
Taste	3.8	3.96	3.64
Average	**3.76**	**3.79**	**3.59**

Source: primary data, 2024

In table 3, the average skim milk avocado velva with the addition of green beans was obtained using organoleptic evaluation. This assessment assesses three formulations with indicators of color, aroma, texture, and taste in skim milk avocado velva. Velva that respondents liked was formulation 1 (F1) with an average score of 3.79.

Table 4. The Results Kruskal-Wallis Avocado Velva Formulation

No	Indicator	Kruskal Wallis Test Values
1	Color	0.731
2	Aroma	0.738
3	Texture	0.005
4	Taste	0.410

Source: primary data, 2024

Based on the data provided, Kruskal-Wallis analysis showed that the three skimmed milk avocado velva formulations with the addition of green beans had a p-value > 0.05 for color, aroma, and taste indicators. This means that the true null hypothesis (H0) is accepted. This indicates that there is no significant difference in terms of color, aroma, or taste among the various formulations. However, the results of the texture indicator showed a p-value <0.05 so that H0 was rejected. This proves that the Skim Milk Avocado Velva formulation with the addition of green beans makes a

difference in texture. Therefore, the Mann-Whitney test is required for further analysis.

Table 5. Test Results of Mann Whitney Avocado Velva Formulation

No	Indicator	Mann Whitney Test Values		
		F0 : F1	F0 : F2	F1 : F2
1	Texture	0.142	0.001	0.099

Source: primary data, 2024

Based on the table, the analysis of the Mann-Whitney test shows that there is no significant difference (P > 0.05) in the level of liking of the texture of skimmed milk avocado velva with the addition of green beans between F0 and F1, as well as between F1 and F2. However, there was a significant difference (P < 0.05) in preferring the following textures of skimmed milk avocado velva with the addition of green beans between F0 and F2.

Table 6. Protein Content of Avocado Velva

Product code	Protein content / 100g	Weight (g)	URT	Protein (g) / recipe
F0 (125 : 75)	1.14 g	160	2 cups es krim	1.8
F1 (100 : 75 : 25)	1.85 g	160	2 cups es krim	2.96

Source: primary data, 2024

Based on the table above, the protein content per recipe served in 2 cups (160g) is as follows: for code F0, the protein content is 1.8 g/recipe, while for code F1, the protein content is 2.96 g/recipe.

Each respondent was asked to give their personal response regarding the level of liking for the skimmed milk avocado velva product with the addition of green beans. The level of liking is evaluated using a hedonic scale, which measures the level of satisfaction. In this study, hedonic tests were conducted on samples with four indicators: color, aroma, texture, and taste.

Color is the first factor that is noticed visually to assess the attractiveness of a product. If the appearance is unattractive, consumers usually do not like it even though the product has high nutritional content and good taste[17]. Color plays an important role in the acceptance process of a food product, which is a characteristic of the product that can be perceived as a physical property that is objective and subjective[18]. The color of F1 velva which added 25 grams of green beans, was most liked by panelists and the color of F0 velva was not liked at all. Panelists preferred the velva added with 25 grams of green beans because the color was more similar to avocado green, which is slightly light.

Aroma is a sensory attribute that can describe the flavor of a product when it has not been consumed. In addition, the aroma can determine the composition of the ingredients used[19]. The importance of aroma testing as a critical indicator is because it helps consumers in quickly assessing the product[20]. The aroma most favored by panelists was F1, velva with the addition of 25 grams of green beans. While the aroma of F0, velva without the addition of green beans at all, received the lowest rating. The addition of fewer green beans reduced the overpowering aroma of the velva.

Texture is an assessment attribute that can affect the acceptance of researchers[21]. Texture is the sensation of pressure that can be felt with fingers or with the mouth (when biting, chewing, and swallowing)[22]. The texture that became the panelists' favorite was F0 velva without the addition of green beans and F2 was the least preferred formulation, namely with the addition of 50 grams of green beans. This can be influenced by the texture of green beans, which is still felt. In contrast to the addition of 25 grams where the texture of green beans is slightly felt so that it is still good to enjoy.

Taste is an aspect of food evaluation

that involves the gustatory sense, the tongue. Taste can be identified and differentiated by the taste buds located on the papillae of the tongue[23]. The flavor caused by food comes from the food itself, or during the process[24]. Panelists most liked the taste of F1, which is velva with 25 grams of green beans added. While the taste of F2, namely velva with the addition of 50 grams of green beans, was the least preferred, due to the dominance of the strong taste of green beans.

It is expected that skim milk avocado velva containing green beans can increase the nutritional value of protein in any formulation as Mung Beans are a rich source of protein. The aim is to develop a new functional food product as an alternative snack that can help prevent stunting in toddlers.

The results of the analysis of protein content using the Kjedahl Titrimetric method[25]. Shows that skim milk avocado velva has a protein content of 1.14%. In formulation F0 with a ratio of 125: 75. The protein content was 1.84%. In the F1 formulation with the addition of green beans in a ratio of 100:75:25.

According to the U.S. Centers for Disease Control and Prevention (CDC) infants at the age of 12 months or 1 year should usually be given 90 grams of snacks such as Velva or ice cream.In this study, giving skim milk avocado velva with the addition of green peas two cups per day was considered sufficient to meet the daily protein needs of infants given during morning snack and afternoon snack.

CONCLUSION

The results of this research and experimentation obtained the following conclusions. Based on the orgenoleptic test, velva avocado skim milk with the addition of green beans, is most favored by panelists, is F1 with the formulation of avocado : skim milk : green beans = 100 : 75 : 25. The highest protein content in code F1 with avocado formulation: skim milk: green beans = 100 : 75 : 25, which is 1.85% per 100g. Each 1 serving of code F1 has a KE content of 1.69 kcal/g and a PER of 22.5%.

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