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Acceptability and Protein Content of Skim Milk Avocado Velva with the Addition of Mung beans as an Alternative Snack for Stunted Children

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ABSTRACT

Stunting is a chronic malnutrition condition that occurs when food intake is insufficient and disease infections occur. This research aimed to identify the acceptability and protein content of Velva avocado skimmed milk with the addition of mung beans as an alternative snack for children to prevent stunting. This study is a true experimental with one control formula and two treatment formulas. Avocado Velva is made in a laboratory, and the hedonic test was conducted by 25 moderately trained panelists using color, taste, aroma, and texture indicators. Meanwhile, protein testing with Kjedahl Titrimetric method was carried out at the Saraswanti Indo Genetech Surabaya laboratory. The data were analyzed using the Kruskal-Wallis and Mann-Whitney tests. The most preferred formula was F1 (100 grams of avocado, 75 grams of skim milk, and 25 grams of mung beans). Provides a protein content of 2.96 g/recipe. A significant difference was found in texture (p=0.005). Protein content in F1 was highest at 2.96 g/recipe. The nutritional value and good acceptability of Velva F1 has the potential to be a nutritious snack alternative to help prevent stunting in children.

INTRODUCTION

Stunting is a condition when children experience growth delays, so they have a smaller height than their peers (1). Stunting is measured with reference to length or height by age 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). Some of the factors that contribute to stunting in childrenhood, include inadequate food intake, low birth weight (LBW), family economic conditions, parental education level, paternal unemployment, and exclusive breastfeeding practices (4,5).

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 (6). 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 (7). This is still far from the WHO target of reducing stunting by 2024. The stunting prevalence is 14%.

Stunting can cause physical growth and impaired cognitive development, such as decreased learning ability and concentration (8). Stunted children are more susceptible to death, infectious diseases, and the risk of chronic diseases in adulthood such as diabetes and hypertension (9)(10). The long-term impact also includes a decline in productivity and income, thus negatively impacting the country's economy (11).

The incidence of stunting in children 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 (12).Supplementary Food Giving (PMT) is an activity to provide additional food that has high nutritional value, is safe to consume, and can be made from local food ingredients that are easy to obtain. The purpose of PMT is to help suffice children's nutritional needs, especially those who are stunted, so that their growth and development is age-appropriate (13)(14).

One approach to prevent stunting is through the intake of protein-rich foods. 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 children and should be included in complementary food recommendations as well as transitional foods for the future (15). 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 (16). In addition to animal protein, the body also needs vegetable protein. Mung beans are a source of nutrients, especially vegetable protein. The content of mung 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. Mung beans have a fairly high protein digestibility (81%) (17).

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 children (18).

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 mung beans. Due to the low protein and natural fiber content of the fruit, this Velva is expected to be an alternative snack for children to prevent stunting.

MATERIALS AND METHODS

This research are Identifying the acceptability and protein content of Velva avocado skimmed milk with the addition of mung beans as an alternative snack for children to prevent stunting. This study is a true experimental study because there are two groups of subjects: one control formula and

two formulas that receive treatment, which aims to produce optimal hedonic results. The preparation of avocado Velva was carried out at the Food Ingredient Science Laboratory and hedonic 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 with Kjedahl Titrimetric method 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
Mung 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 hedonic test was conducted on 25 moderately trained panelists. Moderately trained panelists are do not have any specific training in sensory evaluation, but has been given basic briefing or training on the sensory attributes to be assessed. Before the hedonic test was conducted, highly deviant data was pre-processed and not used in the analysis (19). 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.

RESULTS

Table 2. Characteristics of Avocado Velva Formulation

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

Source : primary data, 2024

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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 mung bean smell, the taste is typical of avocado and there is a slight mung bean taste, smooth texture and there is a slight mung bean texture. F2 produces a light avocado, green color with a typical avocado aroma and mung bean odor, the taste is typical of avocado and dominant mung bean flavor, fine textured, and there is enough mung bean texture.

Table 3. Average Avocado Velva Distribution

No	Indicator	Formulation		
		F0 (control)	F1	F2
1	Color	3.84	3.96	3.88
2	Aroma	3.64	3.8	3.72
3	Texture	3.76	3.44	3.12
4	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 mung beans was obtained using hedonic 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 mung 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 mung 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 mung 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 mung 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 F0, the protein content is 1.8 g/recipe, while for F1, the protein content is 2.96 g/recipe.

DISCUSSION

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 mung 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 visual factor that assesses the appeal of a product. Although nutritious and tasty, products with less attractive appearance tend to be disliked. Color plays an important role in acceptance because it can be assessed objectively or subjectively (20). The color of F1 Velva which added 25 grams of mung beans, was most liked by panelists and the color of F0 Velva was not liked at all, because the color of F1 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 (21). The importance of aroma testing as a critical indicator is because it helps consumers in quickly assessing the product (22). The aroma most favored by panelists was F1, Velva with the addition of 25 grams of mung beans. While the aroma of F0, Velva without the addition of mung beans at all, received the lowest rating. The addition of fewer mung beans reduced the overpowering aroma of the Velva.

Texture is an assessment attribute that can affect the acceptance of researchers (23). Texture is the sensation of pressure that can be felt with fingers or with the mouth (when biting, chewing, and swallowing) (24). The texture that became the panelists' favorite was F0 Velva without the addition of mung beans and F2 was the least preferred formulation, namely with the addition of 50 grams of

mung beans. This can be influenced by the texture of mung beans, which is still felt. In contrast to the addition of 25 grams where the texture of mung 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 (25). The flavor caused by food comes from the food itself, or during the process (26). Panelists most liked the taste of F1, which is Velva with 25 grams of mung beans added. While the taste of F2, namely Velva with the addition of 50 grams of mung beans, was the least preferred, due to the dominance of the strong taste of mung beans.

The results of the Kruskal-Wallis test showed that the texture indicator had a p-value of 0.005. This means that there is a significant difference in texture between the three formulations of skimmed milk avocado Velva with the addition of mung beans. This was made clear by the Mann-Whitney follow-up test, which showed that a significant difference occurred between F0 (without mung beans) and F2 (with 50 grams of mung beans), while between F0 and F1 and F1 and F2 showed no significant difference.

This difference can be explained by the characteristics of mung beans themselves. In F2, a greater amount of mung beans tends to leave a coarser texture or feel denser when consumed. In contrast, F1 which only added 25 grams of mung beans still had a fairly smooth texture and was not too intrusive, so it was still liked by the panelists. While F0, which does not contain mung beans, provides the softest texture and is a favorite in terms of texture. Texture plays a key role in frozen products like Velva, where a soft, easy-to-melt sensation is preferred. The F1 formulation strikes a good balance between the added nutrition from mung beans and a texture that remains enjoyable to consume.

The results of the analysis of protein content using the Kjedahl Titrimetric method (27). 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 mung beans in a ratio of 100:75:25.

According to the U.S. Centers for Disease Control and Prevention (CDC), infants aged 12 months are generally recommended to consume around 90 grams of snacks, such as Velva or ice cream. Based on the 2019 Indonesian Recommended Dietary Allowance (28), the daily protein requirement for a 12-month-old child is 15 grams. The Velva developed in this study provides approximately 22.2% of the daily protein requirement, making it suitable as a nutritious snack. Consuming two cups of skim milk avocado Velva with added mung beans per served as a morning and afternoon snack—is considered adequate to help meet protein needs, offering potential as a functional snack to support stunting prevention in children.

This research has several limitations. First, it only tested three variations of avocado Velva formulations, so it has not explored other potentially more optimal combinations of ingredients. Second, the acceptance test was conducted by panelists without special training, so the results did not necessarily reflect the children's tastes as the main target. Third, nutritional analysis focuses only on proteins, without assessing other essential substances such as fiber, fat, vitamins, and iron. In addition, limited research time can affect the quality of the raw materials used.

In its implementation, there are several potential biases. Panelists who have been briefed in advance may judge based on certain expectations. The quality of ingredients such as avocado, skim milk, and mung beans can vary and affect the results. Protein tests are only performed once in one laboratory without a comparator, so their accuracy is limited. In addition, the shape of the product that resembles ice cream can affect the panelists perception of taste and texture.

CONCLUSION

Based on organoleptic testing, the F1 formulation (avocado: skim milk: mung bean = 100:75:25) was the most favored due to its balanced sensory profile. Statistically, texture was the only attribute showing a significant difference (p=0.005), particularly between F0 and F2, indicating that mung bean quantity affects mouthfeel. Protein analysis confirmed that F1 contains 2.96 g of protein per 160 g serving, meeting 22.2% of a toddler’s daily requirement. Therefore, the F1 formulation is feasible as a nutritious and acceptable PMT snack for stunted toddlers and holds promise for community-level stunting intervention programs.

SUGGESTION

This study highlights the potential of skim milk–avocado Velva with mung bean as a supplementary food (PMT) to support stunting prevention in toddlers. For future application, it is recommended that sensory acceptability tests be expanded to include toddlers as direct consumers to ensure product relevance. Further nutritional analysis should include fat, fiber, vitamins, and minerals to present a more comprehensive nutritional profile. It is also suggested that training programs be developed for health workers and posyandu cadres to enable local production and distribution. Finally, replicating this research with different formulations and broader panelist demographics is needed to validate results and explore other locally available protein sources.

REFERENCES

1. Maineny A, Muliani M, Sakti PM, Pont AV. UPAYA PENCEGAHAN STUNTING MELALUI KALENDER PINTAR BAYI SEHAT (KAPAS) 1000 HARI PERTAMA KEHIDUPAN. JMM (Jurnal Masy Mandiri). 2022;6(4).
2. Asnidar A, Haerani H, Sriyanah N, Suswani A. Determinants of Stunting in Pre-School-Aged Children in Ujung Bulu Subdistrict. Proc Int Conf Nurs Heal Sci [Internet]. 2022 May 28;3(1):291–8. Available from: https://jurnal.globalhealthsciencegroup.com/index.php/PICNHS/article/view/1233

3. Nugroho MR, Sasongko RN, Kristiawan M. Faktor-faktor yang Mempengaruhi Kejadian Stunting pada Anak Usia Dini di Indonesia. J Obs J Pendidik Anak Usia Dini [Internet]. 2021 Mar 19;5(2). Available from: https://obsesi.or.id/index.php/obsesi/article/view/1169
4. Kesehatan JI, Husada S. LITERATUR REVIEW Berat Badan Lahir Rendah dengan Kejadian Stunting pada Anak. Low Birth Weight with Stunting Child. 2019;10(2):311–5.
5. Febriani ADB, Daud D, Rauf S, Nawing HD, Ganda IJ, Salekede SB, et al. Risk Factors and Nutritional Profiles Associated with Stunting in Children. Pediatr Gastroenterol Hepatol Nutr [Internet]. 2020;23(5):457. Available from: https://pghn.org/DOIx.php?id=10.5223/pghn.2020.23.5.457
6. Kemenkes RI, Kementrian Kesehatan RI 2018, Indonesia KK. Data Informasi Kesehatan Indonesia 2018. Profil Kesehat Indones. 2018;53(9).
7. Kemenkes. Hasil Survei Status Gizi Indonesia (SSGI) 2022. Kemenkes. 2022.
8. Laily LA, Indarjo S. Literature Review: Dampak Stunting terhadap Pertumbuhan dan Perkembangan Anak. HIGEIA (Journal Public Heal Res Dev. 2023 Jul;7(3):354–64.
9. Eko S, Raswanti Irawan I, Widodo Y, Nurhidayati N, Chandra Iwansyah A, Riset Kesehatan Masyarakat dan Gizi P, et al. Faktor Risiko Stunting Balita 0-23 Bulan Di Indonesia (Risk Factors of Stunting in Children Aged 0-23 Months in Indonesia). Penel Gizi Makan. 2022;45(2):101–10.
10. Kurniati H, Djuwita R, Istiqfani M. Literature Review: Stunting Saat Balita sebagai Salah Satu Faktor Risiko Penyakit Tidak Menular di Masa Depan. J Epidemiol Kesehat Indones. 2023 Jan;6(2).
11. Nusantara JM, Imeldawati R, Kesehatan FI, Pumpungan M, Timur J. Dampak Terjadinya Stunting terhadap Perkembangan Kognitif Anak : Literature Review. 2025;(1).
12. Sari YW, Wirjatmadi B, Setyaningtyas SW. Hubungan Tingkat Kecukupan Zat Gizi Makro , Personal Hygiene Ibu , Sanitasi Lingkungan Dan Diare Dengan Kejadian Stunting Balita Usia 24-59 Bulan. J Kesehat Masy. 2020;11(2(2020)).
13. Khoeroh H, Handayani OWK, Indriyanti DR. EVALUASI PENATALAKSANAAN GIZI BALITA STUNTING DI WILAYAH KERJA PUSKESMAS SIRAMPOG. Unnes J Public Heal. 2017;6(3).
14. Rahayu RP. GAMBARAN PERTUMBUHAN ANAK BALITA STUNTING PESERTA PROGRAM PEMBERIAN MAKANAN TAMBAHAN (PMT) DI DESA PADANG TUALANG KABUPATEN LANGKAT TAHUN 2018-2019. Skripsi. 2020;
15. Comerford K, Ayoob K, Murray R, Atkinson S. The Role of Avocados in Complementary and Transitional Feeding. Nutrients [Internet]. 2016 May 21;8(5):316. Available from: https://www.mdpi.com/2072-6643/8/5/316
16. Rochmah S, Yani A, Aminarista A. Kadar Protein dan Daya Terima Silky Pudding yang Disubstitusi Susu Kambing dan Susu Skim Sebagai Alternatif Makanan Tambahan Balita Stunting. J Holist Heal Sci [Internet]. 2019 Jan 7;2(2):72–7. Available from: http://jhhs.stikesholistic.ac.id/index.php/jhhs/article/view/29
17. Margaritha Sustanti, Kalsum U, Siregar N. The Effect of Giving PMT Combination of Mung Bean Porridge and Boiled Eggs on Changes in Weight and Height of Stunting Toddlers at the Barong Tongkok Health Center. Formosa J Sci Technol [Internet]. 2023 Feb 28;2(2):655–70. Available from: https://journal.formosapublisher.org/index.php/fjst/article/view/2641
18. Rulianto Utomo A, Dwi Budianta T, Fionna Evania Harianto E, Anastasia G, Christian Widayu G, Alexander Wiradinata R. Effect of Kappa-Carrageenan Concentration on Physical Properties of Carrot Pineapple Velva. Yanase E, Tewfik I, Radu S, editors. E3S Web Conf [Internet]. 2022 Mar 25;344:04006. Available from: https://www.e3s-conferences.org/10.1051/e3sconf/202234404006
19. Abubakar A, Frima CA, Silvia V, Fitri CA, Hanum Z, Mariana E. Quality and Organoleptic Test Of Beef Nuggets with Tempeh Flour Substitution. IOP Conf Ser Earth Environ Sci [Internet]. 2023 May 1;1183(1):012067. Available from: https://iopscience.iop.org/article/10.1088/1755-1315/1183/1/012067
20. Kurnianto MF, Wijaya R, Handayani AM, Hariono B, Brilliantina A. Organoleptic and Chemical

Properties Test On Cookies Made From Mocaf and Oyster Mushroom Flour. IOP Conf Ser Earth Environ Sci [Internet]. 2022 Feb 1;980(1):012047. Available from: https://iopscience.iop.org/article/10.1088/1755-1315/980/1/012047
21. Agustina R, Fadhil R, Mustaqimah. Organoleptic Test Using The Hedonic and Descriptive Methods To Determine The Quality Of Pliek U. IOP Conf Ser Earth Environ Sci. 2021;644(1).
22. Sirajuddin S, Masni M, Salam A. The Level of Preference of Instant Rice Bran Milk Products Innovation with Various Flavor Variants as Functional Food. Open Access Maced J Med Sci [Internet]. 2021 Jul 4;9(A):567–71. Available from: https://oamjms.eu/index.php/mjms/article/view/6469
23. Evynurachma, Dwi Hendriani, Rosalin Ariefah Putri. ORGANOLEPTIC TEST AND ANALYSIS OF IRON (FE) ICE CREAM WITH MORINGA LEAF JUICE. Int J Islam Educ Res Multicult. 2023;5(2).
24. Afriza R, Yuska D, Yuniarti E. Moringa Oleifera Addition to Puding on Organoleptic Test and Nutritional Content. J Ilm Kesehat [Internet]. 2023 Apr 30;5(1):170–80. Available from: http://salnesia.id/jika/article/view/399
25. Herawati J. Instant Powder Organoleptic Test Of Some Variety of Ginger as a Functional Food Source. SSRN Electron J [Internet]. 2021; Available from: https://www.ssrn.com/abstract=3795769
26. Sucita T, Andi Nilawati U, Latifah R, Mardiana A, Prihantono, Andi A. Organoleptic test Smoothies Ambon Banana fruit (Musa Acuminata) and Cantaloupe (Cucumis Melo var. cantaloupe). IOP Conf Ser Earth Environ Sci. 2023;1230(1).
27. Al Kausar R, Suryani A. Penetapan Kadar Protein Kulit Pisang Kepok (Musa acuminata balbisiana colla) dan Kulit Pisang Tanduk (Musa corniculata) dengan Metode Kjeldahl. J Anal Farm. 2022;7(2).
28. Kemenkes RI. Angka Kecukupan Gizi Mayarakat Indonesia. Permenkes Nomor 28 Tahun 2019. 2019;Nomor 65(879):2004–6.