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ESTUTI: ETHNOMEDICINE AND TRANSFORMATION OF ICE CREAM TO PREVENT STUNTING USING FAMILY MEDICINAL PLANTS IN TANGGAMUS

Author:

Diah Kartika Putri[1], Fina Aulika Lestari[2], Taufiki Miftausakina[3], Amalia Siti Nurazizah[4], Adi Saputra[5]

[1-5]Faculty of Health, Aisyah University of Pringsewu, Address Jl. A Yani No. 1 A Tambak Rejo, Wonodadi, Kec. Pringsewu, Kabupaten Pringsewu, Lampung, 35372,Indonesia.
*Corresponding Email: *diahkartika@aisyahuniversity.ac.id*

About the Author

1. 1st Author : Diah Kartika Putri, M.Farm
   Affiliation : Program studi S1 Farmasi, Fakultas Kesehatan, Universitas Aisyah Pringsewu
   Mailing address : Jl. A. Yani 1A Tambahrejo, Kecamatan Gadingrejo Kabupaten Pringsewu, Lampung – Indonesia 35372
   Email of author : *diahkartika@aisyahuniversity.ac.id*
   Orcid ID : https://orcid.org/0000-0003-2568-5483
   Google Scholar URL : https://scholar.google.com/citations?user=NAGJdDwAAAAJ&hl=en
   Phone number : 085367349199
   2nd Author : Fina Aulika Lestari, M.Pd
   Affiliation : Program studi S1 Farmasi, Fakultas Kesehatan, Universitas Aisyah Pringsewu
   Mailing address : Jl. A. Yani 1A Tambahrejo, Kecamatan Gadingrejo Kabupaten Pringsewu, Lampung – Indonesia 35372
   Email of author : finaaulika38@gmail.com
   Orcid ID : https://orcid.org/0000-0001-5033-7742
   Google Scholar URL : https://scholar.google.com/citations?user=AMJoX80AAAAJ&hl=id&oi=ao
   Phone number : 082269277748
   3nd Author : Taufiki Miftausakina
   Affiliation : Program studi S1 Farmasi, Fakultas Kesehatan, Universitas Aisyah Pringsewu
   Mailing address : Jl. A. Yani 1A Tambahrejo, Kecamatan Gadingrejo Kabupaten Pringsewu, Lampung – Indonesia 35372
   Email of author : nasakina21@gmail.com
   Orcid ID : https://orcid.org/0009-0005-6136-5163
   Google Scholar URL : https://scholar.google.com/citations?user=KdeiHWAAAAAJ&hl=id&authuser=1
   Phone number : 089624443969
   4nd Author : Amalia Siti Nurazizah
   Affiliation : Program studi S1 Farmasi, Fakultas Kesehatan, Universitas Aisyah Pringsewu
   Mailing address : Jl. A. Yani 1A Tambahrejo, Kecamatan Gadingrejo Kabupaten Pringsewu, Lampung – Indonesia 35372
   Email of author : amaliazizah710@gmail.com
   Orcid ID : https://orcid.org/0009-0005-6136-5163

Google Scholar URL :-
Phone number : 085788662145
5nd Author : Adi Saputra
Affiliation : Program studi S1 Farmasi, Fakultas Kesehatan, Universitas Aisyah Pringsewu
Mailing address : Jl. A. Yani 1A Tambahrejo, Kecamatan Gadingrejo Kabupaten Pringsewu, Lampung – Indonesia 35372
Email of author : adisaputra14921@gmail.com
Orcid ID : https://orcid.org/0009-0005-0595-1213
Google Scholar URL :-
Phone number : 085809860277

ABSTRACT

The stunting prevalence rate for Lampung Province based on the 2022 SSGI averages 15.2% and Tanggamus Regency is ranked fourth with the highest stunting prevalence, namely 20.4%. This research aims to use TOGA as a spearhead for treating stunting in toddlers using Moringa leaves and ginger rhizomes (Curcuma xanthorriza Robx). Moringa leaves (Moringa Oleifera Lam.) can be used as a potential alternative source of protein and calcium to meet children's nutritional needs. The ESTUTI formulation is divided into 3 formulations with differences in Moringa leaf extract and ginger, namely 25gr/100ml water, 50gr/100ml water, and 75gr/100ml water. Tests in this research include organoleptic tests, hedonic tests and melting point tests. The results show that the most preferred "ESTUTI" formulation is F1 with the formula Moringa leaves: ginger 25gr/100ml water. The combination of ginger and Moringa leaves is rich in nutritional value as an anti-stunting agent which the community responded well to during outreach. So it is hoped that it will be able to provide information on snacks as functional foods that have new qualities and qualities as anti-stunting by utilizing plants that grow abundantly around and developing the community's innovation and entrepreneurship experience.

Keywords: Curcuma xanthorriza; Ethnomedicine; Formulation; Ice cream; *Moringa oleifera Lam*; Stunting

ABSTRAK

Angka prevalensi stunting Provinsi Lampung berdasarkan SSGI 2022 rata-rata sebesar 15,2% dandi Kabupaten Tanggamus menduduki peringkat keempat dengan prevalensistunting tertinggi yaitu 20,4%. Survei Status Gizi Indonesia (SSGI) memberikan gambaran status gizi balita (stunting, wasting, underweight,overweight). Angka stunting menurut SSGI mengalami penurunan dari 24,4%pada tahun 2021 menjadi 21,6% pada tahun 2022. Perlu penurunan 3,8% pertahun untuk mencapai target 14% pada tahun 2024. Jumlah anak stunting diIndonesia pada tahun 2022 sebanyak 4.558.899 anak. Tujuan penelitian ini yaitu untuk memanfaatkan TOGA sebagai tombak penanganan stunting pada balita dengan daun kelor dan rimpang temulawak (Curcuma xanthorriza Robx). Daun kelor (Moringa oleifera Lam.) dapat dijadikan sebagai alternatif sumber protein dan kalsium yang potensial untuk mencukupi kebutuhan gizi anak. Formulasi ESTUTI dibagi menjadi 3 formulasi dengan perbedaan pada ekstrak daun kelor dan temulawak yaitu 25gr/100ml air, 50gr/100ml air dan 75gr/100ml air. Pengujian pada penelitian ini meliputi uji organoleptik, uji hedonik dan uji titik leleh. Hasil menunjukkan bahwa formulasi "ESTUTI" paling banyak disukai yaitu F1 dengan formula daun kelor:temulawak 25gr/100ml air. Produk kombinasi temulawak dan daun kelor kaya akan nilai gizi sebagai anti stunting yang direspon baik oleh masyarakat ketika dilakukan penyuluhan. Sehingga diharapkan mampu memberikan informasi jajanan sebagai pangan fungsional yang memiliki mutu dan kualitas baru sebagai anti stunting dengan memanfaatkan tanaman yang banyak tumbuh di sekitar dan mengembangkan pengalaman berinovasi dan berwirausaha masyarakat.

Kata kunci: Daun kelor; Es krim; Etnomedisin; Formulasi; Stunting; Temulawak

INTRODUCTION

One of the health problems that exists in society is stunting. Stunting is one of the nutritional problems that Indonesia is focused on (Tarigan *et al*., 2023).Stunting must be accompanied by catch-up growth in children so as not to cause growth disorders in children (Swari *et al*., 2023). The Indonesian Nutritional Status Survey (SSGI) provides an overview of the nutritional status of

toddlers (*stunting, wasting, underweight,overweight*). The stunting rate according to SSGI has decreased from 24.4% in 2021 to 21,6% in 2022. A reduction of 3,8% per year is needed to reach the target of 14% in 2024. The number of stunted children in Indonesia in 2022 will be 4.558.899 children (SSGI, 2023). The stunting prevalence rate for Lampung Province based on the 2022 SSGI averages 15.2% and Tanggamus Regency is ranked fourth with the highest stunting prevalence, namely 20,4%.(Pemerintah Daerah Lampung, 2023).

The high prevalence of stunting is a priority for solving the problem by focusing on Eleven Specific Stunting Interventions in the period before birth and children aged 6-23 months. Stunting prevention is much more effective than stunting treatment (SSGI, 2023). Local food sources that are abundant around us and have high nutritional content can be utilized to provide adequate nutrition for children. Family medicinal plants (TOGA) that can be planted and cared for in the home garden to be used to maintain health are very diverse, some of which are well known from the rhizome type and can be used for daily health including red ginger (*Zingiber officinale L*), turmeric (*Curcuma domestica*), and ginger (*Curcuma xanthorriza Roxb*) (Mamay et al., 2023).

The use of TOGA can be a spearhead for handling stunting in toddlers, one of which is using Moringa leaves and ginger rhizomes. Moringa leaves (*Moringa oleifera Lam*.) can be used as a potential alternative source of protein and calcium to meet children's nutritional needs (Tarigan et al., 2023). Moringa leaves are reported to prevent malnutrition in pregnant or breastfeeding women and their children. Moringa leaves contain many vitamins, minerals, amino acids, anti-inflammatory nutrients, beta-carotene, antioxidants, omega-3, and 6 fatty acids (Muflihatin et al., 2021). The high content of iron and protein in Moringa leaves has the potential to be used as a supplement for children (Swari et al., 2023). The research "Analysis of Protein, Calcium and Acceptability of Ice Cream with the Addition of Moringa Leaf Flour (*Moringa oleifera*)" has noted that from the results of the Hedonic Scale Test, the recommended treatment group for ice cream with the addition of Moringa leaf flour is the addition of Moringa leaf flour of 25 gram, because it is the group most accepted by the panelists in terms of aroma, taste and texture. Apart from that, ice cream with the addition of 25 grams of Moringa leaf flour has a calcium content that follows the 2017 Indonesian Food Composition Table (TKPI) and meets the quality requirements for ice cream characteristics based on SNI 01-3713-1995 (Tarigan et al., 2023).

Curcuma xanthorriza commonly known as ginger contains curcumin which functions to increase appetite (Sulastri and Frianto, 2023). Consuming ginger is also expected to increase appetite so that the intake of nutritious substances entering the body will also increase. Likewise with Moringa leaves. As a food ingredient, Moringa leaves can also be mixed with other ingredients to become composite flour which has adequate protein and energy content to be used as a basic ingredient for calorie protein (TKTP) diet products, namely a diet that contains energy and protein above normal requirements. So, with proper processing of ginger plants and Moringa leaves, it can provide an alternative complementary food for stunted children so that they have adequate nutrition (Nugraha et al., 2023). However, it is less popular because ginger has a bitter taste (Sulastri dan Frianto, 2023). The transformation of the combination of ginger rhizomes and Moringa leaves into ice cream can cover up the unpleasant taste of these two plants. Ice cream is also very popular with children, so this transformation is a brilliant idea for treating stunting. Apart from that, it is hoped that this activity will improve community skills in using family medicinal plants to improve the quality of health, especially nutrition in children.It is hoped that this research will be able to produce a product that we are promoting under the name "ESTUTI" ginger and moringa leaf ice cream which is rich in nutritional value as anti-stunting, able to provide information on snacks as a functional food that has new qualities and qualities as anti-stunting by utilizing many plants. growing around us and developing experiences of innovation and entrepreneurship.

METHOD

The instruments used in this research were a mixer (Miyako), spoon, tissue, sieve, bowl, ice cream scoop, measuring cup, scale (Goto Kyla Kitchen Scale), chopper (Philips HR 2057), freezer, and knife.

Table 1.ESTUTI formulation

Bahan	F1	F2	F3
Full cream milk	1000ml	1000ml	1000ml
Sp Quick	8,5gr	8,5gr	8,5gr
Stabilizer (base 2000)	300mg	300mg	300mg
Sugar	200gr	200gr	200gr
Powdered creamer	60gr	60gr	60gr
Curcuma xanthorriza	25gr/100ml water	50gr/100ml water	75gr/100mlwater
Salt	400mg	400mg	400mg
Moringa oleifera Lam	25gr/100ml water	50gr/100ml water	75gr/100ml water
Maizena	60gr	60gr	60gr
Egg yolk	1 butir	1 butir	1 butir
Esen vanily	2gr	2gr	2gr

Research procedures

Making ice cream is done with three mixtures, as follows:

1. Ginger that has been dissolved in water
2. Moringa leaves that have been dissolved in water
3. Mix all ingredients into one mixer dough for 5 minutes

Mix the three mixtures into one dough then mix for 10 minutes. All raw material components are mixed in a container and then homogenized using a mixer for 5 minutes, frozen in the freezer for ±12 hours. The frozen dough is then mixed in the mixer for a frothing process for 2 minutes until the mixture becomes creamy, and frozen again in the freezer for ± 24 hours.

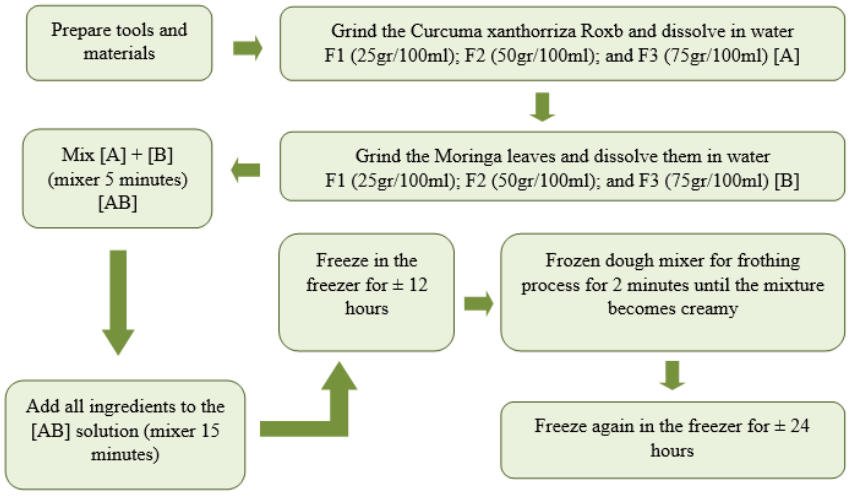


Figure 1. Procedure for making ESTUTI

After the procedure is completed, testing is carried out in the form of:

Organoleptic testing

Organoleptic/sensory testing is a method of testing using human senses as the main tool for assessing product quality. Assessment using this sensory tool includes specifications for the quality of appearance, smell, taste, and consistency/texture as well as several other factors needed to assess the product (SNI, 2006). In principle, there are 3 types of organoleptic tests, namely descriptive tests, difference tests, and affective tests. Discriminative tests consist of two types, namely difference tests and sensitivity tests. Discrimination testing is a useful analytical tool for sensory testing. This test is used to determine the perceived differences between two products which can be further confirmed through descriptive tests to identify the basis of the differences or vice versa, the product is not considered to be the correct form, and action is taken; for example, alternative ingredients can be used in food products. Organoleptic tests carried out include testing color, aroma, taste, and texture.

Hedonic testing

The hedonic test is a test in organoleptic sensory analysis that is used to determine the magnitude of the difference in quality between several similar products by providing an assessment or score on certain properties of a product and to determine the level of liking of a product. This level of liking is called a hedonic scale, for example very like, like, somewhat like, somewhat dislike, dislike, really dislike, and so on. The liking test is used to measure liking, usually within a certain period of acceptance or preference. The hedonic test uses quite a large number of respondents. The principle of the hedonic test is that panelists are asked for their responses regarding their likes or dislikes for the commodity being assessed, even responses with levels of likes or dislikes in the form of a hedonic scale. In analysis, the hedonic scale is transformed into a numerical scale with numbers increasing according to the level of liking. With this numerical data statistical analysis can be carried out. Applications in the food sector in the food sector for this hedonic test are used in marketing, namely to obtain consumer opinions about new products, this is necessary to find out whether or not further improvements are needed to a new product before it is marketed, as well as to find out which products are most liked by people. consumer.

Health education

Counseling regarding ESTUTI: anti-stunting ice cream was conducted in Pekon Datarajan, Ulu Belu District, Tanggamus Regency, Lampung on July 13 2024 to 80 mothers who have children under five. The tools used in this counseling are leaflets that contain the meaning of stunting, TOGA, the benefits of Moringa leaves and ginger as anti-stunting, tools and materials used in the process of making ESTUTI, and how to make it.

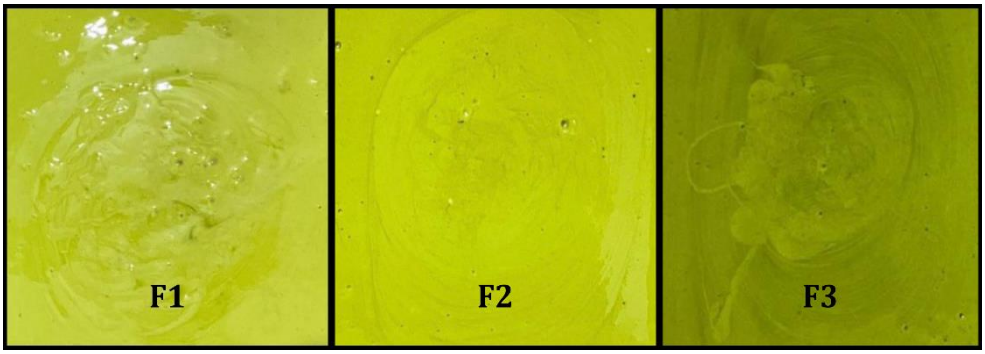
RESULTS AND DISCUSSION

Stunting is a nutritional problem in children caused by prolonged malnutrition, characterized by low height and stunted brain development. If this condition is not handled, it will result in human resources not being optimal and also have an impact on the emergence of disease in the future. Stunting is caused by multiple factors, namely economic, social, environmental, health and nutrition (Fitriani *et al.*, 2023). The transformation of ice cream by using Moringa leaves and ginger is carried out with the hope of overcoming the problem of stunting cases and the lack of maximum use of Moringa leaves and ginger as a prevention of stunting. So far, Moringa leaves have only been used as a vegetable, there has been no innovation in processing Moringa combined with ginger to overcome stunting. Therefore, the team formulated an innovation of moringa and ginger to overcome stunting in the form of moringa ice cream which was named "ESTUTI" as branding for

our team's innovative product. Table 1 shows that the ESTUTI formulation is divided into 3 formulations with differences in Moringa leaf extract and ginger, namely 25gr/100ml water, 50gr/100ml water, and 75gr/100ml water.

ESTUTI formulation

The results of the ESTUTI formulation combining Moringa leaf extract and ginger can be seen in Figure 2. The results show that the preparation is green in color, has the aroma of ginger and tastes quite sweet.



Information: F1 (Formula 1 25gr/100ml air); F2 (Formula 2 50gr/100ml air); F3 (Formula 3 75gr/100ml)

Figure 2. ESTUTI formulation results

Pengujian Organoleptik

The following are the results of organoleptic testing.

Table 2. Organoleptic test results

Formulation	Color	Aroma	Flavor
F1	Light green	Special comedy is not too strong	Sweet
F2	Light green	The comedy special is strong enough	Sweet, slightly bitter
F3	Dark green	Special *Curcuma xanthorriza* is strong	Bitter

Color

Color can improve and provide attractiveness to a food product. Color is a very important component in determining the quality or degree of acceptability of a food ingredient, even though the aroma and texture are very good, if the color is less attractive or gives the impression of deviating from the color it should be, the food product will appear unfit for consumption. Determining the quality of a food ingredient generally depends on color, because color appears first. Color is the main characteristic of a product. Nearly 60% of acceptance of a product is determined by color. The color of a product can cause someone to accept or reject the product. comfort or discomfort, it can even affect appetite. Color has an important role in food acceptance, apart from that, color is also used as an indicator of whether the mixing method or processing method is good or not, which is characterized by the presence of a uniform and even color.

The color of the ice cream produced is influenced by the chlorophyll content or green pigment found in green vegetables (Maharani et al., 2024). Moringa leaves contain many antioxidant

elements. Specific dyes (pigments) in Moringa leaves, such as carotenoids, lutein, α-carotene, β-carotene, xan-tin, and chlorophyll have the potential to act as antioxidants. The high vitamin content such as vitamins C, E, and A are strong antioxidants (Wijayanti, 2016).

Aroma

Aroma is the smell of a food product, odor itself is a response when volatile compounds from a food enter the nasal cavity and are felt by the olfactory system. Volatile compounds enter the nose when humans breathe or inhale them, but can also enter from the back of the throat while a person eats. Aroma compounds can be found in food, wine, spices, perfume, fragrance oils, and essential oils. In addition, aroma compounds play an important role in the production of flavorings, which are used in the food service industry, to enhance the taste and generally increase the appeal of the food product. Aroma is a flavor (taste) that indicates a pleasant or delicious smell. Aroma is a parameter that is difficult to measure, so it usually gives rise to different opinions in assessing the quality of aroma. This is because each person has a different sense of smell, although each person can distinguish aromas, each person has a different level of preference.

The aroma of the resulting ice cream is influenced by a sharp and distinctive languid aroma. This pleasant aroma is because Moringa leaves and ginger contains essential oils and lipoxidase enzymes. Furthermore, the processing and cooking process results in a decrease in aroma because the aroma easily evaporates. This is because the higher the addition of Moringa leaves and ginger to the resulting ice cream, it gives a pleasant aroma. This may be influenced by the enzymes found in Moringa or ginger which undergo a cooling or freezing process so that they can stop the enzyme from working (Wijayanti, 2016).

Taste

The taste of food is a combination of taste and smell. Manufacturers use certain flavors to produce the taste that consumers want. Taste really influences consumers' preferences for ice cream and can even be said to be the main determining factor. Thickening agents can reduce the sweetness of sugar and change the taste of ice cream. Taste is a sensory response to nervous stimulation such as sweet, bitter, sour to the sense of taste and so on. Taste is the most dominant factor in a product. Even though the value of several other parameters looks good, if the taste is not liked by consumers then the product is rejected. According to Soekarto, there are four basic types of taste recognized by humans, namely salty, sour, sweet, and bitter.

The taste of the ice cream produced is influenced by different amounts of milk, ginger and Moringa leaves. Moringa leaves have a distinctive taste because of the tannin content in them. Tannin is often found in nature in every part of plants, especially plants in tropical areas in the leaves and bark. Tannins can cause an astringent taste because when consumed, cross-links are formed between the tannins and proteins or glycoproteins in the oral cavity, causing a dry and wrinkled feeling. The tannin content in Moringa leaves is 1,4%. Meanwhile, ginger has a bitter and spicy taste (Wijayanti, 2016; Yuniarsih dan Sulastri, 2023, Teresia Rosmala Dewi *et al*., 2021).

Texture

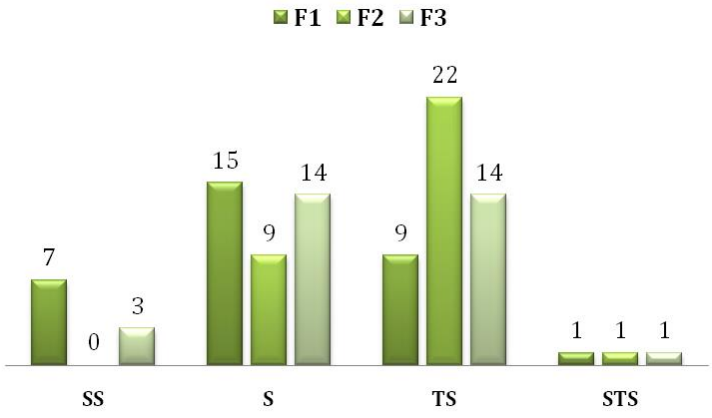
Texture is a characteristic of a material as a result of a combination of several physical properties which include size, shape, quantity, and elements of material formation which can be perceived by the senses of touch and taste, including the senses of the mouth and sight. Food texture is the result of a tactile sense response to physical stimulation when contact occurs between parts of the oral cavity and food. The texture of a food product includes the viscosity/viscosity used for homogeneous Newtonian fluids, non-Newtonian fluids or heterogeneous fluids, solid products, and semi-solid products. Texture is one of the factors that influences the panelists' level of acceptance of

the product. Texture is a sensation of pressure that can be observed by looking and feeling when bitten, chewed, swallowed, or touched with your fingers.

The soft texture of ice cream is influenced by the amount of fat contained in the ice cream ingredients. A good source of fat (cream) will get good quality ice cream. The type of fat contained in milk cream has a fairly wide melting point range, namely between 40ºC to -40ºC so you always get the combination of liquid fat and solid fat needed to produce a soft ice cream texture. Milk fat provides soft properties because it inhibits the formation of large ice crystals during the freezing process. During the ice cream freezing process, the fat emulsion contained in the ice cream mixture will become unstable due to the entry of air during stirring, the formation of ice crystallization, and the mechanical pressure of the mixing or stirring tool. This process is needed to get a soft ice cream texture. There was a slight difference in the texture of the ice cream in each treatment due to the different number of Moringa leaves. The fiber content in Moringa leaves per 100 grams is 0.90 grams(Wijayanti, 2016).

Hedonic Testing

The hedonic test is a test in organoleptic sensory analysis that is used to determine the magnitude of the difference in quality between several similar products by providing an assessment or score on certain properties of a product and to determine the level of liking of a product. This level of liking is called a hedonic scale, for example very like, like, somewhat like, somewhat dislike, dislike, really dislike, and so on. The determination of the best Moringa ice cream product is based on an assessment by the panelists and an effectiveness test by looking at the highest average value. Of the three formulations (see Figure 2), panelists preferred the color, taste, texture, and aroma of formulation 1. Of the 32 panelists, 15 panelists preferred formulation 1 because the distinctive aroma of Moringa leaves and ginger is not too strong and the taste is sweet with a favorite is like.



Description: SS (Very Liked); S (Like); TS (Dislike); STS (Very Disliked)
Figure 3. Results of hedonic test measurements

Melting Point Testing

The results of the melting speed time test for moringa and ginger ice cream showed that the average melting speed time for ice cream was 7.81 minutes. The results in Table 3 show that F1 takes longer to melt compared to F2 and F3. Good ice cream will withstand room temperature better when served(Wijayanti, 2016).

Table 3. Melting point testing

Melting Point		
F1	**F2**	**F3**
8,30 minutes	8 minutes	7,15 minutes

Melting of ice cream is caused by a decrease in the freezing point of the ice cream. The time it takes for ice cream to melt is greatly influenced by the composition of the ingredients used in making ice cream. Moringa leaves contain protein which can function to inhibit the speed of melting and also contain fat which functions to provide shape and density, as well as providing good melting properties. Apart from that, the protein contained in it also functions in stabilizing the fat emulsion after the homogenization process and produces a soft ice cream texture. The fat content in ice cream can also result in longer melting times.
Wijayanti (2016), that the use of ingredients, especially protein, solids, and stabilizers that are not enough and when the homogenization process is not appropriate, will cause the fat to spread less evenly, making the texture rough and containing lots of rough and sharp ice crystals which will cause the ice cream to melt quickly. room temperature.

Counseling on "ESTUTI" Ice Cream as a Prevention of Stunting

The outreach to the community which was carried out in Pekon Datarajan, Ulubelu District, Tanggamus Regency, began with a location survey and obtaining a permit to the sub-district, and the sub-district responded well. Carrying out this activity by conducting outreach involving women, posyandu cadres, was chosen based on the distance between posyandu that are close to each other to make it easier to carry out outreach to the community. Posyandu cadres were taught how to make ESTUTI ice cream products with Moringa leaves and ginger. The products chosen as raw materials were Moringa leaves and ginger because they have several health benefits. This product is made by eliminating the bitter and unpleasant taste of ginger or Moringa leaves, with two flavors, namely sugar and milk, so that children still like it. Making products using natural ingredients found in the yard.
Moringa leaves are described as having more vitamin C than oranges, higher potassium than bananas, more vitamin A than carrots, more calcium than milk, and higher protein content than yogurt (Cahyaningsih et al., 2025). *Moringa oleifera* (moringa leaves) contain various nutrients that can support children's growth and development, as well as maternal health. *Moringa oleifera* contains some amino acids consisting of arginine, histidine, lysine, tryptophan, phenylalanine, methionine, threonine, leucine, isoleucine, as well as valine, and calcium which can influence the production of the hormone prolactin. Moringa leaf extract 2 grams for 30 days can increase the weight of toddlers (Wahidah et al., 2023). Apart from Moringa leaves, ginger also has various benefits, including increasing appetite, helping digestion, and treating gallbladder inflammation, stomach inflammation, and kidney disorders. This research has succeeded in changing the public's perception of rhizome plants that were previously neglected into local resources to support community health and economy (Rosyidah et al., 2024). This transformation of "ESTUTI" ice cream can be used as a stunting prevention ice cream that children like to increase their appetite. So, it can help the government in reducing the stunting rate, especially in Tanggamus Regency.

CONCLUSIONS

Making "ESTUTI" ice cream is the most popular in F1 with the formula Moringa leaves: ginger which is 25gr/100ml water. The combination of ginger and Moringa leaves is rich in nutritional value as an anti-stunting agent which the community responded well to during outreach. So it is hoped that it will be able to provide information on snacks as functional foods that have new qualities and qualities as anti-stunting by utilizing plants that grow widely in the area and developing the community's experience of innovation and entrepreneurship.

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CONFLICT OF INTEREST

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