

# Nutritional Value and Acceptability from Drink Probiotic Yogurt with Sago Flour (Metroxylon Sagu Rottb) with Sexual Dysfunction in Postpartum Women

Mustamir Kamaruddin<sup>1\*</sup>, Anjar Briliannita<sup>1</sup>, Sriyanti<sup>1</sup>, Pika Ayu Rahmadewi<sup>1</sup>, Anwar Mallongi<sup>2</sup>

<sup>1</sup>Poltekkes Kemenkes Sorong, Indonesia

<sup>2</sup>Environmental Health Department, Faculty of Public Health, Hasanuddin University, Makassar, Indonesia

**Corresponding Author:** Mustamir Kamaruddin

**Email:** [iyotamirkha@gmail.com](mailto:iyotamirkha@gmail.com)

## ABSTRACT

Yogurt is one of the products of milk processing which has high nutritional value. Yogurt is a probiotic drink that is very beneficial for the health of the digestive tract because it improves the balance of microflora in the intestines. Yogurt products can be varied by adding basic ingredients, one of which is sago flour. The purpose of this study was to analyze the nutritional value and acceptability of yogurt drinks with the addition of sago flour. This type of research is experimental. The sample used as the research object was yogurt drink with the addition of sago flour with 4 variations. The resulting yogurt drink products were tested for preference level using slightly trained panelists as many as 25 people. The types of variables in this study consisted of independent variables, namely yogurt drink products with the addition of sago flour and the dependent variable, namely nutritional value (energy, protein, fat, carbohydrates) and acceptance (taste, color, aroma, and texture). The instrument used in the study was the hedonic test form. Data processing will be processed using a computer program and TKPI tables to analyze the nutrients from the yogurt drink products and to analyze the acceptance using SPSS version 21. The results showed that the nutritional content of yogurt drinks with the highest addition of sago flour was the P3 sample with 60.85 kcal energy, protein 90.36 grams, fat 30.22 grams and carbohydrates 14.52 grams. While the lowest nutritional value is sample P0 with 4.25 kcal energy, 0.08-gram protein, 0.06-gram fat, 0.78-gram carbohydrate. The results showed that there was an effect of adding sago starch on color, aroma, taste, and texture ( $P < 0.005$ ). The results of this study can be tested in the community so that people know that sago flour can be used in the manufacture of yogurt drinks and people can also consume healthy yogurt drinks.

**Keywords:** Yogurt, Sago Flour, Acceptability, Nutritional Value

## Correspondence:

Mustamir Kamaruddin

Poltekkes Kemenkes Sorong, Indonesia

Email: [iyotamirkha@gmail.com](mailto:iyotamirkha@gmail.com)

## INTRODUCTION

Indonesia has a health development plan to create a competitive nation, by prioritizing the development of quality human resources aimed at increasing awareness, willingness and ability to live healthy. Health development is given to community empowerment, especially improving community behavior and independence in promotive and preventive efforts National Development Plan 2005-2025. Development and improvement of nutrition is carried out in a cross-sectoral manner which includes food production, processing, distribution, to household food consumption with adequate, balanced and safe nutritional content in order to achieve a good nutritional status <sup>(1,2)</sup>.

Sago plants are grown in many regions in Indonesia, such as Papua, West Papua, Sulawesi, Maluku, Riau and Kalimantan. Therefore, sago is very potential to be developed as an alternative food material. In Indonesia, the use of sago flour as a food ingredient has been widely recognized in various forms of products, including papeda, plate sago, sago Tutupala, sago uha, sinoli, bagea, and so on <sup>(3)</sup>.

Sago is a tropical plant that spreads in the lowlands of Southeast Asia and Malanesia, which is located between latitudes 10° N and 100 South Latitude, and up to an altitude of 700 m above sea level. Sago plants are spread throughout almost all parts of Indonesia, especially sago plants are most widely spread on the islands of West Papua and Papua with an area of 510,213 and 4,749,424,

respectively. The distribution area of sago in West Papua Province includes the districts of Fakfak, Kaimana, Manokwari, Raja Ampat, Sorong, South Sorong, Bintuni Bay, and Wondama Bay with an area of 34,485 hectares, 70,765 hectares, 5,868 hectares, 3,052 hectares, 148,004 hectares, respectively, 212,353 Ha, and 5,672 Ha <sup>(4)</sup>.

Sago plants are one of the natural resources that have not been optimally utilized as a potential source of carbohydrates in Indonesia. The low utilization of sago flour is due to the lack of public interest, low knowledge and ability to process sago flour into its follow-up products, as well as the tendency of the community to judge that sago flour is not as superior as some other carbohydrate-producing commodities <sup>(5,6)</sup>.

Yogurt is a probiotic drink that is very beneficial for the health of the digestive tract because it can improve the balance of microflora in the human intestine. Yogurt is great for everyone to consume every day, especially for those with a diet and lactose intolerance. Yogurt is formed from the fermentation of milk by lactic acid bacteria which has a sour taste. This sour taste acts as a preservative because it can prevent the growth of several bacterial species that are less tolerant of acids <sup>(7-10)</sup>.

## MATERIALS AND METHODS

### Research Sites

This research was conducted at the Chemical Laboratory and Food Technology Laboratory of the Nutrition Department of the Health Polytechnic of the Ministry of

Health in Sorong in May - July 2020 while continuing to carry out health protocols in order to prevent Covid-19.

#### Research Design and Variables

The research approach is an experiment with true experimental research designs (true experimental designs). It is said to be true-experiment because it follows all the procedures and conditions of the experiment, especially in variable control, manipulation (treatment) and results testing. The true-experimental model used was the posttest with the control group (posttest only control group design), because the experimental group and the control group were taken randomly so the groups were considered the same before the intervention was carried out.

#### Sample

The sample used as the research object was yogurt with the addition of sago flour. With variations as in Table 1.

#### Data Collection

Data collection was obtained by filling in the favorite level form directly to the panelists based on the available questionnaire which contained statements to explore information about the variables to be analyzed which were closely related to preferences for color, aroma, texture and taste.

The panelists selected were slightly trained panelists, totaling 25 people. The sample in this study is yogurt, which is made the same as yogurt in general, but uses dragon fruit and honey. Then use sago flour as an addition with different variants in each sample. Making yogurt is done by mixing all the ingredients according to the formulation of Table 1.

**Table 1:** Composition of ingredients for making yogurt with the addition of sago flour

| Ingredients         | Yogurt Drink   |                |                |                |
|---------------------|----------------|----------------|----------------|----------------|
|                     | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | P <sub>3</sub> |
| Full Cream Milk     | 200 gr         | 200 gr         | 200 gr         | 200 gr         |
| Yogurt Drink Cimory | 200 gr         | 200 gr         | 200 gr         | 200 gr         |
| Sugar               | 50 gr          | 50 gr          | 50 gr          | 50 gr          |
| Honey               | 10 gr          | 10 gr          | 10 gr          | 10 gr          |
| Sago flour          | 0 gr           | 5 gr           | 10 gr          | 15 gr          |
| Dragon fruit        | 25 gr          | 25 gr          | 25 gr          | 25 gr          |

Source: Primary Data 2020

Yogurt products in this study were made from sago flour, full cream milk, original cimory yogurt drink, sugar, honey and dragon fruit. These ingredients are mixed one by one starting from heating milk, yogurt, sugar and sago flour then mixing honey and dragon fruit by means of a grounded and continuing packaging using a *cup*. Yogurt drinks were served randomly and in stages between samples 0, I, II, and III.

In this research, data testing was carried out using the hedonic test, which includes taste, color, aroma, texture and overall. Yogurt drink weighing 20 ml per pack was served for 25 moderately trained panelists. Panelists are also given plain water which aims to neutralize the taste.

#### Data Analysis

In this research, test and test acceptance a design using completely randomized design (CRD). If there is a

difference, continue with the Man-Whitney test ( $P < 0.05$ ). The nutritional value variables are presented descriptively, obtained from the results of the analysis of nutritional content by calculating and seeing the nutritional content of each ingredient based on data obtained from TKPI (Indonesian Food Composition Table) and DKBM (List of Food Ingredients Composition).

#### RESULTS

Table 2 shows that the color criteria of samples P<sub>0</sub>, P<sub>1</sub>, and P<sub>2</sub> get an average of  $4.28 \pm 1.13$  SD,  $4.68 \pm 0.94$  SD,  $3.48 \pm 0.97$  SD where most of the panelists like the results of yogurt drink products, while the P<sub>3</sub> sample gets the average  $3.52 \pm 0.71$  SD can be said that the panelists did not like it.

**Table 2.** Favorite Level of Yogurt Drinks

| Yogurt Drink Formulations |                 |                 |                 |                 |
|---------------------------|-----------------|-----------------|-----------------|-----------------|
| Criteria                  | P <sub>0</sub>  | P <sub>1</sub>  | P <sub>2</sub>  | P <sub>3</sub>  |
| Color                     | $4.28 \pm 1.13$ | $4.68 \pm 0.94$ | $3.48 \pm 0.96$ | $3.52 \pm 0.71$ |
| Aroma                     | $4.32 \pm 0.85$ | $4.72 \pm 0.54$ | $3.84 \pm 1.02$ | $3.56 \pm 0.86$ |
| Taste                     | $4.72 \pm 0.54$ | $4.84 \pm 0.98$ | $3.48 \pm 1.04$ | $3.04 \pm 0.88$ |
| Texture                   | $4.83 \pm 1.10$ | $4.76 \pm 1.05$ | $2.84 \pm 0.62$ | $2.96 \pm 0.67$ |
| Overall                   | $4.36 \pm 0.90$ | $4.64 \pm 0.63$ | $3.68 \pm 1.10$ | $3.72 \pm 0.84$ |

Source: Primary Data 2020

Table 2 shows that the aroma criteria of samples P<sub>0</sub>, P<sub>1</sub>, P<sub>2</sub>, and P<sub>3</sub> got an average of  $4.32 \pm 0.85$  SD,  $4.72 \pm 0.54$  SD,  $3.84 \pm 1.02$  SD,  $3.56 \pm 0.86$  SD where most of the panelists liked the beverage products a bit. yogurt.

Table 2 shows that the taste criteria of samples P<sub>0</sub> and P<sub>1</sub> got an average of  $4.72 \pm 0.54$  SD,  $4.84 \pm 0.98$  SD where most of the panelists liked the results of yogurt drink products, while the P<sub>2</sub> and P<sub>3</sub> samples got an average of

$3.48 \pm 1.04$  SD. ,  $3.04 \pm 0.88$  SD can be said that the panelists do not like it.

Table 2 shows that the texture criteria of samples P<sub>0</sub> and P<sub>1</sub> got an average of  $4.83 \pm 1.10$  SD,  $4.76 \pm 1.05$  SD where most of the panelists liked the results of yogurt drink products, while the P<sub>2</sub> and P<sub>3</sub> samples got an average of  $2.84 \pm 0.62$  SD,  $2.96 \pm 0.67$  SD, it can be said that the panelists did not like it.

Table 2 also shows that overall, from the P<sub>1</sub> sample got an average of  $4.64 \pm 0.63$  SD, it can be said that the panelists liked the results of yogurt drink products. Meanwhile, the samples (P<sub>0</sub>, P<sub>2</sub> and P<sub>3</sub>) received an average of  $4.36 \pm 0.90$  SD,  $3.68 \pm 1.10$  SD,  $3.72 \pm 0.84$  SD which most of the panelists liked it somewhat.

In table 3, you can see the results of the nutritional content of all yogurt drink samples. The largest value of energy, protein, fat and carbohydrate content in the P<sub>3</sub> yogurt drink with a value of 61.85 kcal, 90.36 gr, 30.22 gr, 14.52 gr.

**Table 3.** Value of Yogurt Nutritional Content Per Sample

| Sample                | Energy (Kkal) | Protein (g) | Fat (g) | Carbohydrate (g) |
|-----------------------|---------------|-------------|---------|------------------|
| Sample P <sub>0</sub> | 4,25          | 0,08        | 0,06    | 0,78             |
| Sample P <sub>1</sub> | 4,75          | 0,36        | 0,22    | 0,82             |
| Sample P <sub>2</sub> | 40,25         | 70,36       | 20,22   | 9,32             |
| Sample P <sub>3</sub> | 61,85         | 90,36       | 30,22   | 14,52            |

Source: Primary Data 2020

The lowest value of energy, protein, fat and carbohydrate content was P<sub>0</sub>, namely 4.25 kcal, 0.08 gr, 0.06 gr, 0.78 gr.

Table 4 shows that the parameters of color, aroma, taste and texture of yogurt drinks have  $P < 0.05$  which indicates that the addition of sago flour is significant.

**Table 4.** Mann-Whitney Test Results

| Criteria | Significant | Information |
|----------|-------------|-------------|
| Color    | .000        | Significant |
| Aroma    | .000        | Significant |
| Taste    | .000        | Significant |
| Texture  | .000        | Significant |

Source: Primary Data 2020

This means that there is a significant effect on each addition of sago flour to the organoleptic properties (color, aroma, taste and texture) of yogurt drinks.

## DISCUSSION

In order for the food served to maintain its quality, the food served must be evaluated. One way is to calculate the consumer's food acceptance. Food acceptability is the percentage of food consumed of the total provided. This acceptance is influenced by several factors, including the appearance of the food when it is served and the taste of the food <sup>(12)</sup>. To find out the results of the panelists' acceptance or level of preference, an organoleptic test was carried out by testing several parameters, such as the organoleptic properties of color, aroma, texture, and taste <sup>(13,14)</sup>.

Yogurt drink with the addition of sago flour with various variations has a significant effect on the criteria for color, aroma, taste, and texture of the resulting yogurt drink. The difference in color is due to the comparison of the composition of the main ingredients in the four treatments too far, resulting in different colors. Good and fresh colors actually have a meaning in the condition of the food, which in turn attracts consumers to choose these foods. It is also not always synonymous with the taste of a particular food <sup>(15)</sup>.

The difference in aroma is due to the composition of the main ingredients in the four treatments that are too far, resulting in different aromas. Aroma is a distinctive fragrance and smell produced by a food and is judged subjective by the sense of smell. The sense of smell is very sensitive to odors and the speed at which odors occur is approximately 0.8 seconds <sup>(16)</sup>. The aroma contained in a food ingredient comes from various mixtures of the constituent ingredients <sup>(17)</sup>. The aroma produced by yogurt is also determined by the combination of the ingredients for making yogurt.

Yogurt has a distinctive sour taste due to the activity of the bacteria *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. The taste of yogurt is caused by chemical compounds produced, namely lactic acid, acetaldehyde, acetic acid and other volatile substances. The growth of *Streptococcus thermophilus* at first will be faster than the growth of the *Lactobacillus bulgaricus*, and give a little sour taste to the milk, but then the *Lactobacillus bulgaricus* will give a stronger sour taste to the milk <sup>(18)</sup>. The taste of food can be recognized and distinguished by the suction buds located on the papilla, namely the red and orange stain on the tongue. Assessment of the texture of a food product is an assessment based on the sense of touch. the texture and consistency of a material will affect the taste caused by the material because it can affect the speed at which the stimulation of the receptor cells and salivary glands occurs. <sup>(19-29)</sup> The sample that produced the highest energy, protein, fat, and carbohydrate content was the P<sub>3</sub> sample, this was because the P<sub>3</sub> sample was given the most added sago starch, which was 15 grams, while the sample that produced the least energy, protein, fat and carbohydrates content is in sample P<sub>0</sub> this is because in sample P<sub>0</sub> is not given the addition of sago starch (0 gr) and as a control group.

## CONCLUSIONS AND SUGGESTIONS

The most preferred sample of the whole is yogurt with the addition of 5 g of sago flour. The results of the organoleptic test showed that the treatment of adding sago flour to yogurt was significant. Which means that there is a real effect on each treatment (sample). From the data obtained, the results of the analysis of nutrient content showed that the more sago starch was added, the greater the nutritional content of yogurt. Yogurt is expected to be a nutritious and safe product as a supplement or snack. The results of this study can be tested in the community so that people know that sago flour can be used in the manufacture of yogurt drinks and

people can also consume healthy yogurt drinks. Further research is needed on the acceptability and nutritional value of yogurt with different formulations with the addition of other local food ingredients.

#### DATA AVAILABILITY

The data used to support the findings of this study are included in the article.

#### CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

#### ACKNOWLEDGMENT

This publication was supported by the Health Polytechnic Ministry of Health, Sorong, Indonesia.

#### REFERENCES

- Rahmat, Hapsara Habib. 2013. *Percepatan Pembangunan Kesehatan di Indonesia*. Cetakan pertama: Mei 2013. Gajah Mada University press: Yogyakarta
- Jafar, N., Indriasari, R., Syam, A., Kurniati, Y. Exploration on adolescent knowledge related metabolic syndrome (METS) Indian Journal of Public Health Research and Development Volume 9, Issue 6, June 2018, Pages 263-266
- Heryani, S, dan Silitonga, R. F. 2017. *Penggunaan Tepung Sagu (Metroxylon sp) Sebagai Bahan baku Kukis Cokelat*. Journal of Agro-based Industry. Vol.34 (No. 2)
- Bintoro HMH, Ahmad F, Nurulhaq MI, Pratama AJ. 2017. *Identifikasi Sagu (Metroxylon Sagu Rottb spp.) di Kabupaten Mimika Provinsi Papua*. Bogor (ID): Digreat Publishing
- Triwiyono, B. (2014), *Modifikasi Tepung Sagu dengan Cara Ekstruksi Menjadi Sagu Flakes untuk Substitusi Tepung Terigu sebagai Bahan Baku Industri Pangan Olahan Kapasitas 1 Ton/Hari di Provinsi Bangka Belitung dan Lampung*. Balai Besar Teknologi Pati, Lampung
- Masni, Sirajuddin, S., Syaharuddin, Syam, A. Influence of a red palm oil emulsion on the level of retinol in the plasma of primary school children in the coastal area of Makassar city., Pakistan Journal of Nutrition Volume 15, Issue 5, 2016, Pages 465-473
- Mallongi, A., Daud, A., Ishak, H., La Ane, R., Birawida, A.B., Ibrahim, E., Selomo, M., Rahman, S.A. Clean water treatment technology with an up-flow slow sand filtration system from a well water source in the tallo district of Makassar. Journal of Environmental Science and Technology, 2017; Volume 10, Issue 1, Pages 44-48
- Bertha Mangallo, Anwar Mallongi, Ishak Musaad, Sartji Taberima., Slow Released Fertilizer of Fe<sup>2+</sup> and Mn<sup>2+</sup> from Composite Micronutrient Chitosan-Silica., Sys Rev Pharm 2020;11(9):494-498
- Gemy Nastity Handayany, Trimaya Cahya Mulat, Eka, Anwar Mallongi. Resistance Test of Some Bacterial Synthetic Calcular Cycinaris Invitro Amoxicillin and Ciprofloxacin Antibiotics in TK II Pelamonia Hospital Makassar, Indonesia. Sys Rev Pharm 2020;11(6):1181-1184
- Syam A, et al. The effect of pumpkin seed flour (Cucurbita moschata Durh) on zinc serum levels in malnourished Wistar rats. Enferm Clin. 2020. <https://doi.org/10.1016/j.enfcli.2019.10.095>
- Amqam, H., Thalib, D., Anwar, D., Sirajuddin, S., Mallongi, A. Human health risk assessment of heavy metals via consumption of fish from Kao Bay. Reviews on Environmental Health. 2020; <https://doi.org/10.1515/reveh-2020-0023>
- Kamaruddin Mustamir, et al. 2020. *Food Management System and Satisfaction Level of Students of Pesantren Tebuireng Jombang, East Java*. Medico-Legal Update An International Journal. Volume 20 Number 3
- Ulfa M, et al. Effect of education media on improvement visual acetate acid inspection at Sudiang community health center. Enferm Clin. 2020. <https://doi.org/10.1016/j.enfcli.2019.10.118>
- Owildan Wisudawan B, et al. Bioaerosol pollution in intensive-care unit of Dr. Wahidin Sudirohusodo Hospital Makassar: Morning and midday assessment. Enferm Clin. 2020. <https://doi.org/10.1016/j.enfcli.2020.02.009>
- Shewfelt, R. 2013. *Pengantar Ilmu Pangan*. Jakarta: Penerbit Buku Kedokteran EGC.
- Winarno F.G. 2004. *Kimia Pangan dan Gizi*. Jakarta: Gramedia Pustaka Utama
- Murni, T., N. Herawati dan Rahmayuni. 2014. *Evaluasi Mutu Kukis Yang Disubstitusi Tepung Sukun (Artocarpus communis) Berbasis Minyak Sawit Merah (MSM), Tepung Temope Dan Tepung Udang Rebon (Acetes erythraeus)*. JOM. 1(1) pangan. Jakarta
- Maisaroh, Y. 2016. *Uji Daya Terima Agar-Agar Dadih Susu Kerbau*. Skripsi Fakultas Kesehatan Masyarakat. Universitas Sumatera Utara
- Palutturi, S., Chu, C., Moon, J.Y., Nam, E.W. A comparative study on healthy city capacity mapping: Indonesia and Korea, Social Sciences (Pakistan) Volume 10, Issue 6, 2015, Pages 848-854
- Jafar, N., Indriasari, R., Syam, A., Kurniati, Y. Exploration on adolescent knowledge related metabolic syndrome (METS)., Indian Journal of Public Health Research and Development., Volume 9, Issue 6, June 2018, Pages 263-266.,
- Ummu Salmah, A., Rahman, R., Wahyu, A. Pakistan Journal of Nutrition Volume 15, Issue 8, 2016, Pages 729-736. Comparative analysis of media exposure and family support complementary to feeding for infants zero to six months of age between working mothers and stay at home mothers with hotelling test T2 approach in Kolaka regency.
- Ade S, et al, 2019. *Pengaruh Substitusi Tepung Kedelai (Glyine Max L.) Terhadap Sifat Organoleptik Soybeans Cookies*. Jurusan Gizi, Poltekkes Kemenkes Mataram. Mataram. Vol 4, No 1.
- Birawida, A.B., Selomo, M., Mallongi, A., Ismita, U.W., Suriah., Health risk assessment of coliform bacteria contamination in the dug well water with qmra to predict public health risk in small island, Makassar. Indian Journal of Public Health Research and Development Volume 9, Issue 10, October 2018, Pages 786-791
- Mallongi, A., Parkpian, P., Pataranawat, P., Chinwetkitvanich, S., Mercury distribution and its potential environmental and health risks in aquatic habitat at artisanal buladu gold mine in Gorontalo Province, Indonesia, Pakistan Journal of Nutrition Volume 14, Issue 12, 2015, Pages 1010-1025

25. Syam, A., Palutturi, S., Djafar, N., Budu, Astuti, N., Thaha, A.R. , Micronutrients, academic performance and concentration of study: A literature review ., International Journal of Applied Business and Economic Research Volume 14, Issue 5, 2016, Pages 2831-2843
26. A Mallongi, D Safiu, H Amqaim, A Syam, M Hatta, T Sutarti, A Muhith, Modelling of SO<sub>2</sub> and CO Pollution Due to Industry PLTD Emission Tello in Makassar Indonesia. Journal of Engineering and Applied Sciences 14 (2), 634-640
27. Masriadi, Azis, R., Sumantri, E., Mallongi, A., Effectiveness of non pharmacologic therapy through surveillance approach to blood pressure degradation in primary hypertension patients, Indonesia., Indian Journal of Public Health Research and Development. Volume 9, Issue 4, April 2018, Pages 249-255
28. Mallongi, A., Puspitasari, A., Ikhtiar, M., Arman, Arsunan, A.A., Analysis of risk on the incidence of scabies Personal Hygiene in Boarding School Darul Arqam Gombara Makassar., Indian Journal of Public Health Research and Development., Volume 9, Issue 4, April 2018, Pages 227-231
29. Posmaningsih, D.A., Aryasih, G.A.M., Hadi, M.C., Marwati, N.M., Mallongi, A. The influence of media booklet in behavior change of waste management in elementary school students, South Denpasar, Bali., Indian Journal of Public Health Research and Development. Volume 9, Issue 8, August 2018, Pages 1506-1511