Blambangan Journal of Community Services (BJCS)
https://blambangan-scholar.com/index.php/BJCS
Vol. 1 No. 2 (2023): December

e-ISSN 3026-2771
p-ISSN 3026-1554

Opportunities for Prebiotic Beverage Products (Kombucha Tea) to Maintain Health among Adolescents of Shofa Marwa Islamic Boarding School

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Abstract

The Shofa Marwa Islamic boarding school is a famous Islamic boarding school in the Pakusari Jember sub-district which has great opportunities for them to gain knowledge related to the health sector. Kombucha drink is a fermented drink that increases the levels of short-chain fatty acid-producing bacteria (SCFAs) reduces the number of gram-negative and pathogenic bacteria and induces interesting curative effects in diabetic conditions. This activity seeks to improve the level of public health and prevent and overcome health problems independently among teenagers at the Shofa Marwa Islamic boarding school. The problem with the subject here is the lack of knowledge and skills of participants regarding the use and manufacture of healthy drinks which can help them implement healthy patterns by starting with simple and high-quality things. Through the method of activity preparation, implementation, and monitoring evaluation stages of this activity, the ability and interest of all participants in the activity are demonstrated, which is demonstrated by the training results of all groups being able to produce prebiotic drink products that are ready for consumption. This is a great opportunity for them to gain knowledge related to the field of Health that can be applied to daily life at the cottage.

Keywords: kombucha tea, prebiotics, shofa marwa, islamic boarding school

Introduction

The Shofa Marwa Islamic boarding school is a famous Islamic boarding school in the Pakusari Jember sub-district, which consists of separate female and male Islamic boarding schools with educational backgrounds ranging from elementary to high school that are included in the youth category. This is a great opportunity for them to gain knowledge related to the health sector that can be applied to daily life at the cottage.

The drink Kombucha is a slightly sweet and sour non-alcoholic fermented drink that is consumed throughout the world and has gained significant popularity among an increasingly health-conscious society (Chakravorty et al., 2019). Kombucha consists of various natural compounds such as sugar, ethanol, organic acids, and a complex microbial community composed of bacteria and yeast **(***symbiotic culture of bacteria and yeast***;** SCOBY) (Vargas et al., 2021). As a fermented drink, the basic solution used is expected to have an ideal sucrose content. Fermentation is caused by microbial activity by a consortium of yeast and bacteria, where the yeast in the system first converts the available carbon source into ethanol, which is then converted into acid by the bacteria (Jayabalan et al., 2014).

A study conducted by Xu et al. (2022) found that consumption of kombucha for 4 weeks increased levels of short-chain fatty acid-producing bacteria (SCFAs) as well as reducing the number of gram-negative and pathogenic bacteria. Other studies show that kombucha induces interesting curative effects in diabetic conditions, especially in terms of attenuating oxidative stress-mediated tissue damage and liver-kidney complications, along with antilipidemic effects.

Nonhuman subject literature suggests that kombucha's health benefits come from the tea and fermented products, including glucuronic acid, acetic acid, polyphenols, and B-complex vitamins, including folic acid. Reported health benefits from in vitro and in vivo studies include antimicrobial benefits, liver and digestive function, immune stimulation, detoxification, antioxidant and anti-tumor properties, health prophylaxis, and restorative effects through immune stimulation; inhibiting the development of cancer, cardiovascular disease, diabetes, and neurodegenerative diseases; and normalizing central nervous system function. To date, the biological activity of kombucha has been studied in mice, rabbits, ducks, dogs, pigs, cows, chickens, and human peripheral blood lymphocytes (Kapp & Sumner, 2019).

Based on the information above, this activity is an effort to improve the level of public health and prevent and overcome health problems independently among teenagers at the Shofa Marwa Islamic boarding school. This activity was carried out over 3 days. Where participation from participants is really needed to create something sustainable throughout the activity process.

Identification of Problems

There are several things that make the applicant interested in holding community service activities at the Shofa Marwa Islamic boarding school, namely: (1) The majority of residents in this area have an education level of elementary and middle school graduates, while those with high school graduates are still low. With this level of education, there may be limitations in mastering and managing technology (Aka, 2017). (2) Lack of knowledge and skills of participants regarding the use and manufacture of health drinks that can help them implement healthy patterns by starting with simple and high-quality things. (3) Participants' interest in gaining new knowledge to support welfare in the health sector through information obtained during the activity, considering the great curiosity among teenagers regarding the prebiotic drink product kombucha tea.

Implementation Methodology

The target population of this Community Health Center is teenagers between middle and high school, which is located at the Shofa Marwa Islamic Boarding School, Pakusari District, Jember Regency. The planned stages of the community service program are as follows:

1. Survey of the location of the Shofa Marwa Islamic boarding school in the first month, by reviewing the location of the PKM which will be carried out in the first month by prioritizing approaches to related parties, in this case through the owner of the Shofa Marwa Islamic boarding school. After an agreement has been reached, it continues with the signing of the cooperation contract that has previously been prepared. It is hoped that with this collaboration, activities can run synergistically and sustainably in the future.
2. 2. At the next meeting, joint discussions were held with related parties regarding the planned activities to be carried out, then began implementing the ideas that had been previously designed. At this meeting, problems will be discussed and identified related to health conditions in Islamic boarding schools, the economy, and the condition of participants who will be given PKM. At the same time discussing the objectives and final outcome of this activity, apart from that, we also plan activities for the following year so that this activity continues according to the roadmap for a maximum of 5 years of planning.
3. In the second month, partners are provided with educational provisions and prospects about kombucha tea as a prebiotic drink product that is made independently by partners so that it can be developed into an independent business later. The first day's activities began with education about material on developing prospects for making kombucha tea as a prebiotic drink product. Then the second day continued with practical training in making kombucha tea as a prebiotic drink product that is already available. The following are the tools and materials used in the process of making kombucha tea:
    a) Tools: Stainless steel pan, stove, beaker glass, stirrer, pH meter, filter, white cloth, measuring cup, scales;
    b) Ingredients: Kombucha Culture (obtained from www.wikikombucha.com), granulated sugar (Gulaku Brand), green tea, Kombucha H vinegar.
    c) Work procedures
        1) Boil 1000 ml of distilled water for 10 minutes;
        2) Add sugar (10% w/v), then stir until the sugar is completely dissolved;

3) Add green tea leaves (5% w/v). The tea solution is then filtered, separated from the dregs and cooled to room temperature; The tea solution is placed in a measuring cup;
4) Add kombucha culture (10% w/v) to the tea solution;
5) The tea solution container to which the kombucha culture has been added is tightly closed with a clean, sterilized cloth (a cloth is used to prevent contamination by foreign materials, but air can still enter);
6) Ferment at room temperature.

4. Evaluation of activities

   After the program implementation is complete, an evaluation will be carried out by looking at the results of the products that have been made by the participants themselves. One independent visit by the PKM committee team in one of the partner activities to apply the knowledge gained to the activity agenda, as well as evaluating the results of previous activities to see whether there was progress or just stopped at one activity. This evaluation is carried out to continue to establish cooperation in the following year related to the knowledge that has been previously obtained.

Results and Discussion

The process of making kombucha drinks is relatively easy and practical (de Miranda et al., 2022). The kombucha consortium that will be fermented with a SCOBY is prepared by adding a small portion of the SCOBY biofilm to the solution which is the basic ingredient, along with a starter solution or broth containing 10 – 15% of the fermentation of the previous drink. The broth plays a role in providing pH balance and reducing the number of unwanted damaging microorganisms.

Fermentation is usually carried out in a glass vessel covered with a clean cloth and incubation is carried out at room temperature (25 – 30°C) for 7 – 12 days. This is because the antioxidant activity of kombucha will increase significantly, especially after going through the 7th day of fermentation (Chakravorty et al., 2019). Study conducted by de Miranda et al. (2022) also found that the ethanol content of kombucha fermented for 12 – 14 days ranged from 0.11 – 0.4%; which is lower than the alcohol limit in food and drinks implemented by the Indonesian Ulema Council (Majelis Ulama Indonesia/MUI), namely 0.5%, so kombucha is classified as safe.

The planned stages of the community service program are as follows:

1. Preparation phase

a. Coordinate with the head of the Islamic boarding school regarding the technical implementation of activities. Before carrying out the activity, we coordinated with the implementing committee to discuss technical implementation activities.
b. Prepare rundowns, materials and training activities.
c. Prepare the activity location in the Shofa Marwa Islamic boarding school classroom

2. Hold Implementation

Activities will be carried out from July to August 2023. The form of activity is providing material in the form of presentations and carrying out activities. In the second month, partners were provided with educational provisions and prospects about kombucha tea as a prebiotic drink product that was made independently by partners so that it could be developed into an independent business in the future. The activities on the first day began with a pre-test created by the committee which was then announced to the participants, followed by education regarding material on developing prospects for making kombucha tea as a prebiotic drink product. Then the second day continued with practical training in making kombucha tea as a prebiotic drink product that is already available.

(A) (B)

Figure 1. (A) Preparing green tea for Scoby growth; (B) It is a starter for growing new Scoby as a fermented drink in green tea

3. Monitoring and Evaluation stage

Monitoring and evaluation of training activities on making kombucha tea was carried out on August 13 2023, by means of guidance from field lecturers and demonstrations carried

out by the team. This activity began with filling in material about the prebiotic drink kombucha tea, then continued with checking the fermentation results of kombucha tea which had been fermented for approximately 21 days. Student members were also asked to help check the kombucha tea harvest. With the explanation we have provided, it is hoped that the students of the Shofa Marwa Islamic boarding school will be able to understand the meaning of the material provided by the team. And it is also hoped that it can help the community around the Shofa Marwa Islamic boarding school to start improving the quality of health and also has the opportunity to become a home business. After the training was completed, the team distributed souvenirs to the activity participants in the form of kombucha tea starter kits. We hope that the students at the Shofa Marwa Islamic boarding school can produce this kombucha tea themselves.

(A) (B)

Figure 2. (A) Evaluate fermentation results, (B) Distinguishing successful Scoby from failed ones

From the fermentation results, the scoby grows, which is characterized by the presence of soda-like foam after 7-10 days, then forms a plate (Dody Riswanto, 2022). However, there was a failure in the fermentation process, which was indicated by the presence of mold (fungus) on the thin Scoby, which hampered the growth of the Scoby in the container with the orange lid, while the Scoby with the red lid developed well, as seen from the white and thickened color of the Scoby. This occurs due to cross contamination from the container or lid of the fermentation container which has not been sterilized first. Another cause is a lack of dust or dirty air entering the container (Dody Riswanto, 2021).

The finished scoby can be consumed directly for its fermented water, consumption of fermented water from kombucha can be done with approximately 15 ml 2-3 times a day. This is very optimal for use for several prophylactic and therapeutic treatments. Therefore, this kombucha tea drink can be used as an alternative probiotic drink which is a rich source

of bioactive compounds including organic acids, vitamins, probiotics, sugars, polyphenols and antioxidants (Suriyapriya, 2023).

Conclusion

This activity was carried out in addition to providing information on opportunities to develop prebiotic health drink products that can be made independently as business opportunities and opportunities to improve health quality. From the evaluation results, it was found that all participants were able to produce kombucha tea products that were ready for consumption. This is a great opportunity for them to gain knowledge related to the health sector that can be applied to daily life in Islamic boarding schools.

Acknowledgment

Thanks are addressed to the University of dr. Soebandi for the internal grant that has been given to support this Community Service activity.

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