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Education and Training on Making Probiotic Drinks to Help Improve Health and Immunity in Bantarsari Village

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Abstract: Infectious diseases are still a global problem, including in Indonesia. Immunity is an important factor in preventing infectious diseases. Probiotics are living organisms that are able to provide beneficial effects for maintaining health, namely being able to maintain the health of the digestive tract so that the body's immunity becomes better. The purpose of this community service is to provide information and increase knowledge about the role of probiotics in helping improve health and body immunity to mothers who live in Bantarsari Village, Rancabungur District, Bogor Regency. The method used is initial *pretest* followed by providing education about probiotics, giving brochures about probiotics, demonstrating the manufacture of probiotics and closing with *post test* to see the final ability of the participants. The result of the community service activity is an increase in the knowledge of the participant mothers about the importance of probiotics, types of probiotics and an increase in the ability to make probiotic drinks. The activity went well and was attended by the target group community and followed by village officials.

Keywords: immunity; health; probiotics

1. INTRODUCTION

Probiotics is a term that refers to microorganisms that provide benefits to humans and animals. These microorganisms play a role in the intestinal microbial balance and also play an important role in maintaining health. More probiotic microorganisms come from the genus*Lactobacillus* and*Bifidobacterium* but can also come from the genus*Bacillus*, *Pediococcus* and some yeasts (Soccol, 2010).

The introduction of antibiotics is a revolution in the world of health. This is because the use of antibiotics increases life expectancy, quality of life and decreases*mortality rate*. However, the main drawback of using antibiotics is killing good bacteria as well as harmful bad bacteria so that the body's ecosystem is disrupted,

causing adverse effects in the body such as superinfection, antibiotic resistance and including*antibiotic-associated diarrhea* (AAD) (Elizabeth and Susan, 2010). Subsequent studies have shown that treatment for diarrhea can use probiotic consumption and this has started to increase since 1999 (Lynne and McFarland, 2009). In addition, probiotics are also used in the treatment of various gastrointestinal diseases such as*Clostridium difficile colitis* (CDC), infectious diarrhea,*inflammatory bowel disease* (IBD) and*irritable bowel syndrome* (IBS) (Elizabeth and Susan, 2010).

According to*Food and Agriculture Organization* (FAO) and*World Health Organization* (WHO) probiotics are microorganisms that live in the body*host* in sufficient quantities to confer a health benefit on*host.* The mechanism by which probiotics have an impact on the gut microbiota or enhance immune function. An effective probiotic must meet several criteria, namely providing a beneficial effect on*host*, non-pathogenic and non-toxic, contains a large number of living cells, is able to survive and carry out metabolic activities in the intestine, remains alive during storage and when used, has good sensory properties, and is isolated from*host*. probiotic bacteria (*Lactobacillus* and*Bifidobacterium*) works anaerobically to produce lactic acid resulting in a decrease in the pH of the digestive tract which inhibits the development and growth of pathogenic bacteria (Collin Hill et al, 2014).

The performance of probiotics in increasing the body's resistance can be through several mechanisms, namely probiotic products suppress the amount, metabolism and production of toxins by intestinal bacteria, as competitors (*competitor*) for the pathogenic strain to bind to the adhesion receptor so that the pathogenic strain is unable to form colonies, colonized intestinal microorganisms compete more efficiently against*It's hard* related to*monomeric glucose, N-acetyl-glucosamine* and salicylic acid and stimulate macrophage activity against several different bacterial species (Djunaedi, 2007).

Hao et al (2015) also described the mechanism of action of other probiotics in maintaining the immune system, namely by means of*strain* Certain probiotic bacteria play a role in the balance of intestinal microflora, inhibiting the colonization of pathogenic bacteria in the intestine.*Strain* Certain probiotic bacteria also influence the regulation of some immune responses*innate*The natural barrier which is the initial defense in the intestinal wall is increasing the proliferation of intra-epithelial leukocytes in the intestinal wall, increasing the

activity (phagocytosis) of macrophages, also increasing immunoglobulin A (IgA) upon contact with antigens in the intestine. The benefits of this defense have been sufficiently studied in pathogenic bacterial infections in the gastrointestinal tract, eg*H. pylori*, *It's hard*, *S. typhi* those with diarrhea. Its effect on diarrhea due to intestinal pathogens is well established, but its effect on acute respiratory infections, especially in adults and the elderly, is still unproven.

Currently probiotic food products are available in many types and continue to grow. Probiotic products on the market are generally divided into two major groups, namely milk-based products (*dairy*) such as fermented milk, cheese, ice cream,*buttermilk*, powdered milk, and yogurt. And products*non-dairy* in the form of products made from soybeans, made from vegetables, nutritious snacks (*nutrition bars*), cereals, and a variety of juices are appropriate ways to provide probiotics to consumers.

Factors to be considered in evaluating the effectiveness of the merger*strain* probiotics in these products, in addition to safety, also includes product compatibility with microorganisms and maintenance of viability through food processing, packaging and storage conditions. The pH of the product is a significant factor in determining the survival and growth of probiotics, which is one reason why soft cheese appears to have a number of advantages over yogurt as a means of making viable probiotics for the digestive tract. Today technological innovations provide ways to address the stability and quality issues of probiotics. Microencapsulation technology has been developed to protect bacteria from damage caused by the external environment. With this technology, manufacturers can provide consumers with several artificial products that contain dry forms of probiotic bacteria. In addition, probiotic spores are available in the market and offer advantages over processing. At the same time, the potential of*lantibiotics* yag produced by*bifidobacteria* being explored for food applications (Kechagia et al, 2012).

Yogurt is very rich in dietary minerals and it is reported that 100 g of low-fat yogurt contains 18 mg of calcium, 17 mg of magnesium, 234 mg of potassium, 144 mg of phosphorus and 0.9 mg of zinc. The mineral concentration in yogurt is almost 50% higher than milk. In addition, it ferments with bacteria*Lactobacillus bulgaricus* (LAB) produces yogurt in an acidic environment that can increase*bioavailability* mineral. Low pH maintains calcium and magnesium in ionic form, so that it has the potential to absorb greater amounts of

calcium and magnesium in the intestine and can increase the amount of solubility of ligand-bound zinc which can facilitate transport to the intestinal wall, thereby increasing zinc absorption. However, the effect of high luminal pH in improving the calcium and magnesium status of yogurt needs to be determined through*live*. Yogurt is a good source of B vitamins, a 100 g serving of plain, low-fat yogurt contains 0.21 mg riboflavin, 0.11 mg niacin, 0.05 mg vitamin B-6 and 0.56 mg vitamin B-12. However, pasteurization fermentation, and other production processes can affect the vitamin content. For Greek-style yogurt, process*straining* can lead to loss of micronutrients, especially water-soluble vitamins. The choice of bacterial strain can affect the integrity of the vitamins, as some LABs require vitamins for their growth. Hence the commercial process incorporates*strain* different bacteria to reduce the problem of vitamin deficiency, with the aim of strengthening the amount of vitamins in the final yogurt product. Yogurt is also a source of essential amino acids and generally contains higher levels of protein when compared to milk. The proteolytic activity of bacterial cultures in yogurt allows several*pre-digestion* from milk proteins, and produce large amounts of free amino acids which allow for better protein digestion. (El Abbadi et al, 2014).

The benefit of consuming probiotics is to increase the defense of non-specific immunity. Probiotics of a kind*Lactobaccillus casei* and*Lactobacilus bulgaricus* known to increase macrophage production and activate phagocytes in both human and rat studies. The process of phagocytosis is the initial response of the body's defense system before the body forms antibodies. Phagocytes will get rid of toxic agents that enter the body. The results showed that the provision of fermented milk products containing*Lactobaccillus* in patients with atopic dermatitis and allergies to cow's milk showed a decrease in the frequency of diarrhea (Widyaningsih, 2011).

Community service activities are part of the Tri Dharma of Higher Education, in this case the community service carried out by the Pakuan University Pharmacy team of lecturers aims to provide information and increase knowledge about the role of probiotics in helping to improve health and body immunity in Bantarsari Village, Rancabungur District, Bogor Regency so that can improve public health status and it is hoped that the community can produce probiotic drinks independently and become a source of income for the community.

2. METHOD

Preparation phase

At the preparatory stage carried out is the activity preparation agenda started by holding a coordination meeting by the chief executive, all team members including students involved in community service activities (PKM). At this stage, determining community targets, observing service locations, deciding on service ideas to be given, making proposals and discussing with related village officials. The educational theme is making probiotic healthy drinks for residents in Bantarsari Village, Bogor, especially for mothers. Furthermore, a collaboration was made with Bantarsari Village as a partner location as the legality of the availability of partner locations for PKM activities.

Implementation Level

The PKM activity was held on January 14 2023 in Bantarsari Village, Bogor Regency. PKM activities begin with filling*pre-test* to see participants' initial knowledge about probiotics. Furthermore, the presentation of probiotic material using the lecture method about the importance of probiotics for health, accompanied by the provision of probiotic brochures so that information about probiotics can also be read at home, then a demonstration of making yogurt drink as a probiotic drink is easy to make. The activity was closed by filling out a questionnaire*post test* to see the final knowledge of the participants. Material delivered by apt. Nanda Asyura Rizkiyani, M.Farm as a representative of the team involved. The expected result of this PKM activity is increasing knowledge about probiotic drinks for the people of Bantarsari Village, especially mothers to improve the quality of family health and be able to make probiotics in a simple way at home. With increased knowledge and skills in making probiotic drinks, it can also become a home-based business idea so that it can provide economic value for the participants.

The material presented is: 1. Definition and role of probiotics in the body, 2. Requirements for probiotics, 3. Types and benefits of probiotics, 4.How it works and tips on choosing a good probiotic drink. During the presentation of the material, the participants involved participated enthusiastically with the many questions asked by the participants residents of Bantarsari Village, totaling 24 people. From the results*pre-test* and*post-*

test analysis was carried out using *microsoft excel* and interpreted descriptively. The results of the analysis can be seen from the table in the discussion section.

Reporting Stage

PKM activities are reported by making official minutes signed by representatives of the Bantarsari village head and the PKM committee as well as making a final activity report for the Pharmacy Study Program at Pakuan University. Activity reporting is also carried out for making scientific publications in the form of PKM journals published in the PKM FMIPA Pakuan University Journal.

3. RESULT AND DISCUSSION

The pandemic condition in Indonesia requires people to maintain a healthy body from the outside and inside. In addition to clean and healthy living behavior activities (PHBS), people are also required to maintain health from within the body by consuming balanced nutrition and adding health drinks. Healthy food and drink will help boost the body's immune system. A strong immune system will be able to help fight the source of disease from the outside environment. One of the health drinks that contain microorganisms that can help boost the body's immunity is yogurt. Yogurt contains probiotics which in the community are often referred to as "good bacteria". The main benefits of these bacteria are maintaining the balance of the intestinal flora in the digestive tract, increasing immunity and preventing the attack of microorganisms and the growth of unwanted cells. Therefore consuming probiotic drinks is one of the important things in maintaining health in the community. Besides the price is quite affordable, the manufacture is also quite easy.

Education and training on making probiotic drinks to increase knowledge about health and immunity in Bantarsari Village, Rancabungur District, Bogor Regency is a series of Higher Education Tridharma activities carried out in order to increase the ability and knowledge of the community in maintaining health. This activity aims to make the community, especially in Bantarsari Village, gain new skills that have never been obtained before, so that they can provide knowledge about making health drink products that act as probiotics. Educational knowledge about the benefits of probiotics in the body is delivered through lectures and questions

and answers followed by training on making probiotic drinks, namely a simple yogurt drink. Yogurt drinks are made using simple and economical ingredients that are easy to find in the local environment.

Evaluation in the form of*pre test* and*post test* that has been given to the community to get an overview of the knowledge obtained after this activity. Analysis results*pre test* and*post test* shows an increase in knowledge about the types of foods that include probiotics, namely yogurt, kefir, pickles, yakult, cheese, kombucha, kimchi, sauerkrauft, miso and natto. Results*pre test* show that participants still have little knowledge about kefir, pickles, kombucha, kimchi,*pickled,* miso and natto as probiotic foods because these terms are still foreign. And after being given education, results*post test* showed a significant increase regarding the terms of the probiotic food. This can be seen from the results of the analysis listed in Figure 1.

Natto is a product of fermented soybeans which is commonly made by Asian people*fine bacteria* regular consumption of Natto can prevent various diseases including osteoporosis (Edward R, et all, 2003). Kimchi is a traditional fermented food made by Korea, made from mustard greens and uses lactic acid bacteria (Patra et all, 2016).The most important ingredient in kimchi for health is lactic acid bacteria such as*Leuconostoc mesenteroides, Lactobacillus brevis, Lactobacillus plantarum, Pediococcus cerevisiae, Streptococcus faecalis, Enterococcus faecalis, Pediococcus pentosaceous, Weissella koreanisdan Lactobacillus plantarum* (Arini, 2017).

Kefir is a probiotic drink that is not much different from yogurt, using milk as a base and lactobacillus bacteria, the difference between the two is in the sour taste, kefir has a more sour taste so it is less popular than yogurt. The presence of kefir and yogurt fermented products makes milk easier to digest (Rahmani et all, 2023).*Sauerkraut* is a term that originates from Germany. This term is popularly used internationally and is defined as "sour cabbage". This fermented product is widely consumed in European and American countries. Even though it means sour cabbage, salt is used in the manufacturing process so that people often refer to it as sauerkraut. Whereas*Pickle* (pickles) are the result of processing vegetables or fruit with the addition of salt in the process, preserved with acid, with or without the addition of sugar or spices as seasonings (Anggraeni et all, 2021).

Meanwhile, kombucha is a refreshing and healthy beverage product that has a slightly sweet and sour taste, which is produced through a 7-21 day fermentation process from a solution of tea and sugar using various bacterial cultures (*Acetobacter xylinum, A. xylinoides, Bacterium gluconicum) dan jamur (Saccharomyces cerevisiae, S. ludwigii, Zygosaccharomyces bailii, Z. rouxii, Schizosaccharomyces pombe, Torulaspora delbrueckii, Brettanomyces bruxellensis, B. lambicus, B. custersii, Candida sp., or Pichia making films*) known as SCOBY (*symbiotic culture of bacteria and yeast*) (Priyono, 2021)

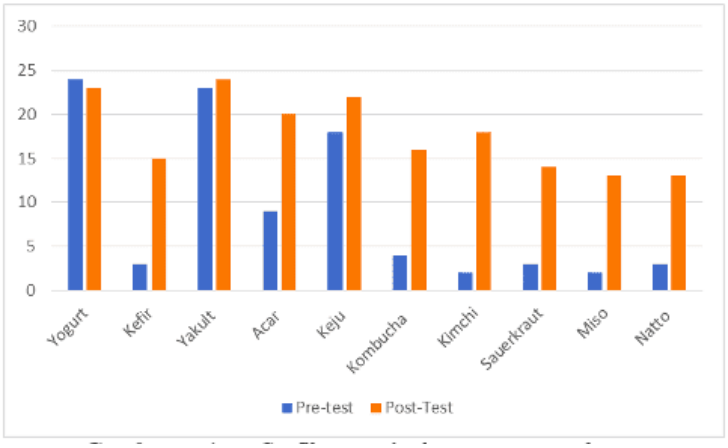

Figure 1. Graph of increasing community knowledge about the types of probiotic products.

Prior to education, only 12 participants knew that probiotics could increase endurance, 5 participants knew probiotics could prevent diarrhea, only 7 participants knew probiotics could help absorb nutrients into the body and none of the participants knew probiotics could cause itchy rash. After being given education, the result was that the participants had better knowledge, which can be seen from the significant increase in ability in the questions above. Can be seen in Figure 2.

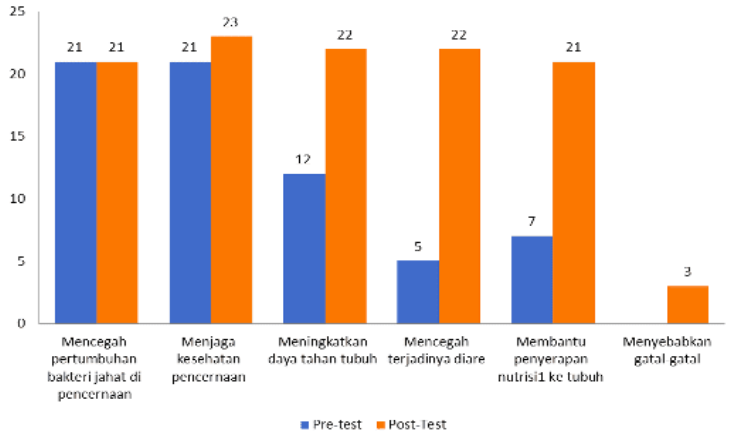

Figure 2. Graph of increasing participants' (community) knowledge of the benefits of probiotics before and after delivering the material.

Figure 3 shows an increase in public knowledge about the types of probiotics, it can be seen that there are several types of probiotics that are often consumed but the public does not know that these products are included in the type of probiotics. Therefore, it is necessary to educate the public about probiotics so that people know more about the types, roles and benefits of probiotics for health.

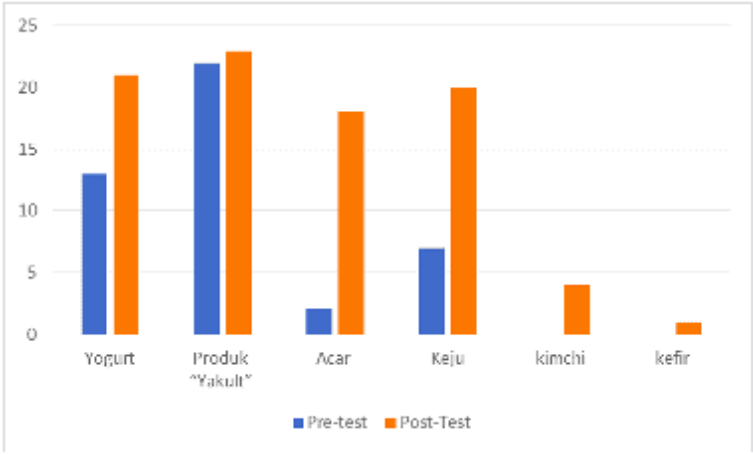

Figure 3. Graph of increasing knowledge of the types of probiotics that are often consumed by the public.

This PKM activity was also accompanied by a demonstration of making a probiotic drink in the form of yogurt which has a thick texture or better known as*Greek Yoghurt*. The Greek yogurt type was chosen because the consistency of the product is thicker, has a lower sugar content so it is safe for long-term consumption (Saras, 2023). The aim is to make it easier for people to obtain and consume probiotic products and to provide opportunities for home-based businesses to produce yogurt. Yogurt production is guided by a team representative using UHT milk and yogurt ingredients*plain* which is used as the main ingredient for the development of yogurt. These ingredients can be obtained easily at the nearest supermarkets and minimarkets at economical prices. Yogurt is made by adding yogurt to heated UHT milk, then stirring until well blended. After making sure that all the yogurt is evenly mixed, the product is put into a 60 ml bottle and closed tightly, then incubated for 24 hours to allow for the proliferation of bacteria in the product that has been made, and then it can be served in conditions or pre-refrigerated according to individual tastes. respectively.

Figure 4. Yoghut making training process is simple

Figure 4 is documentation of training activities for making a simple probiotic drink, namely yogurt. The training was also followed by discussions and questions and answers by speakers and participants. The preparation of raw materials to packaging was also explained to the participants so that people could follow the making of this yoghurt at their respective homes. The results of the product for making the yogurt drink were also distributed to the participants along with the guide material for making it. The results of this training can also be used as a household business in the community because of the large health benefits and economical manufacturing costs, so that it can improve the economy, especially the people in the Bantarsari Village area.

4. CONCLUSION

Community service activities in the form of outreach and training in making yogurt as a probiotic drink to improve health and body immunity for residents of Bantarsari Village take placewell. Public understanding of the benefits of yogurt and how to make yogurt has increased. The author's suggestion for the results of this PKM is that this activity can be continued with assistance in the production and marketing of yogurt products as a probiotic drink so that it can help increase the income of the people of Bantarsari Village.

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