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Improving the skills of IKBI Women's Group Helvetia Plantation PTPN II through hydroponic vegetable food diversification training

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ABSTRACT

The service partner is a group of women in Ikatan Keluarga Besar Istri (IKBI) PTPN II Helvetia Plantation. Partner has previously succeeded in cultivating vegetables hydroponically, starting from the seeding stage to harvesting in the greenhouse of the Helvetia Plantation. However, the harvested vegetables have not yet undergone further processing. Therefore, this community service aimed to provide education and training on processing hydroponic vegetables into other food products. The method of community service activity was the practice of food processing from hydroponic vegetables by actively involving partner. The service team conducted training on the diversification of hydroponic vegetable food products into spinach chips, water spinach stick crackers, and bok choy's small martabak. The service team also provided training on packaging and labeling of food products produced to improve the appearance of the products so that they look more attractive, maintaining product safety from contamination, and providing product information. The results obtained after the training activity from 20 participants were that 85% (17 participants) understood how to make these food products and 75% (15 participants) were interested in practicing it independently at home. The partner also carried out an organoleptic test of the three food products as panelists and found that the partner liked the color, aroma, taste, and texture of the food products.

Keyword: Diversification, Food, Hydroponic, Training, Vegetables

ABSTRAK

Mitra pengabdian merupakan kelompok ibu dalam Ikatan Keluarga Besar Istri (IKBI) Kebun Helvetia PTPN II. Mitra sebelumnya telah berhasil melakukan budidaya sayuran secara hidroponik yang diawali dari tahap pembibitan sampai pemanenan di rumah kasa Kebun Helvetia. Akan tetapi, sayuran yang dipanen tersebut belum dilakukan pengolahan lebih lanjut. Oleh karena itu, pengabdian masyarakat ini bertujuan memberikan edukasi dan pelatihan pengolahan sayuran hidroponik tersebut menjadi produk pangan lain. Metode kegiatan pengabdian yang dilakukan adalah praktik proses pengolahan sayuran hidroponik dimana mitra ikut aktif berperan. Tim pengabdian melakukan pelatihan diversifikasi produk pangan sayuran hidroponik menjadi keripik bayam, kerupuk gabus kangkung, dan martabak mini pakcoy. Selain itu, tim pengabdian juga memberikan pelatihan pengemasan dan pelabelan produk pangan yang dihasilkan dengan tujuan untuk meningkatkan penampilan produk agar terlihat lebih menarik, menjaga keamanan produk dari kontaminasi, dan memberikan informasi produk. Hasil yang didapatkan setelah kegiatan pelatihan dari 20 peserta adalah 85% (17 peserta) mengerti cara melakukan pembuatan produk pangan tersebut dan 75% (15 orang) tertarik untuk mempraktikkannya secara mandiri di rumah. Uji organoleptik ketiga produk pangan tersebut juga dilakukan oleh mitra sebagai panelis dan didapat bahwa mitra menyukai warna, aroma, rasa, dan tekstur produk pangan tersebut.

Keyword: Diversifikasi, Hidroponik, Pangan, Pelatihan, Sayuran,

1. Introduction

Hydroponics is a growing method that does not use soil as a place for plants to grow, but instead uses water that is filled with nutrients [1]. Hydroponics uses much less water than soil farming because the water is not wasted and is recycled back to cover the root zone so that it is hydrated and the plants obtain the nutrients found in the water [2]. Hydroponic technology has advantages compared to conventional methods, including environmentally friendly, hygienic products, faster plant growth, maintained quality of plant products, and greater production. Vegetables produced through hydroponics are also healthier because plant diseases that originate from the soil can be eradicated efficiently and are tastier and better to consume [3].

Harvested vegetables require post-harvest technology to reduce losses of almost 40% due to improper handling, storage, packaging, and transportation to increase global food security by enriching the world's agricultural economy [4]. Vegetable diversification is one way that can reduce post-harvest losses and can also increase job opportunities, especially in urban or suburban areas. In this diversification process, several factors need to be taken into account, such as the availability of appropriate technology, such as simple and low-cost processing technology at the post-harvest level.

Service partners have cultivated vegetables hydroponically such as spinach, water spinach, and bok choy. Partners currently lack the skills needed to transform these vegetables into other food products. To address this, the service team conducts community service activities aimed at providing training on food diversification using hydroponic vegetables that are safe and healthy for consumption. Food diversification is a variety of foods with the principle of balanced nutrition. It is hoped that this activity will improve partners' skills in processing hydroponic vegetables into various food products, such as spinach chips, water spinach stick crackers, and small martabak made with bok choy.

2. Methods

This service activity was carried out on Jalan Klambir Lima, Hamparan Perak District, Deli Serdang Regency with the service partner being IKBI women's group Helvetia Plantation PTPN II. The community activity participants had a total of 25 participants, all aged between 30 and 50 years. The methods for implementing hydroponic vegetable processing activities were as follows:

a. The community service team presented material about processing hydroponic vegetables into other food products and provided paper on the manufacturing procedures, then continued with a discussion session with partners.
b. The community service team carried out the practice of making spinach chips, water spinach stick crackers and bok choy’s small martabak using hydroponic vegetables harvested from the screen house and partners played an active role in the process of making these food products.
c. The community service team carries out packaging and labeling practices for the food products produced.
d. The service team provided questionnaires to partners to measure the percentage of participants whose skills improved through this training activity and to measure partners' preferences for the food produc ts produced. The organoleptic test conducted was a hedonic test of participants' preferences for the products produced with a rating scale description: 1: Strongly Dislike, 2: Dislike, 3: Rather like, 4: Like, 5: Really Like,

3. Results and Discussion

This community service activity began with providing materials to service partners, namely IKBI women's group Helvetia Plantation PTPN II, totaling 20 participants (Figure 1). The material provided was about how to process hydroponic vegetables into three types of food products, namely spinach chips, water spinach stick crackers, and bok choy’s small martabak. The service team also provided paper containing the necessary materials and procedures for making the product and carried out discussion activities in the form of questions and answers so that it was hoped that partners would understand more about the practical activities of making

the product. After the service partners understand the theory of processing these food products, they continued with practical activities on how to make spinach chips, water spinach stick crackers and bok choy's small martabak.

Figure 1. Presentation of service material to partners.

The community service partners had previously planted spinach, water spinach, and bok choy hydroponically. Spinach is composed of various active compounds, such as flavonoids and other polyphenolic active ingredients which act synergistically as anti-inflammatory, antioxidant and anti-cancer agents [5]. Water spinach contains calcium, iron, sodium, phosphorus, carbohydrates, fiber, and vitamins A and C [6]. Bok choy has high levels of protein and calcium, and a number of vitamins needed by the body such as vitamins A and C [7]. These spinach, water spinach, and bok choy are healthy, but consumption of vegetables in fresh form is less popular, especially among young people. Therefore, the community service team conducted training in implementing diversification of processing of the vegetables that had been planted into new food products as an interesting way to consume vegetables with a different taste experience. Spinach was processed into chips, water spinach was processed into stick crackers and bok choy was processed into small martabak. These products had a longer shelf life than fresh ones when stored at room temperature. In addition, the processing of these vegetables can also increase the economic value of spinach, water spinach, and bok choy in terms of selling price and can also be a reference for partners in starting a business.

Materials and equipment for this hydroponic vegetable food diversification training activity were provided by the service team. Carrying out this training is a means of educating the team to partners about the importance of healthy and nutritious food in terms of proper food processing. Apart from that, the team chose these products to demonstrate because the manufacturing process is simple in terms of materials and tools and does not take a long time and is liked by all groups so that partners who are dominated by mothers can make them themselves for consumption and even sale. Training activities for making food products from hydroponic vegetables can be seen in Figure 2. The flow diagram for making spinach chips, water spinach stick crackers and bok choy's small martabak can be seen in Figures 3, 4, and 5 respectively. The processed hydroponic vegetables are in the form of spinach chips, water spinach stick crackers and bok choy's small martabak can be seen in Figure 6.

Figure 2. Training activities for making food products from hydroponic vegetables.

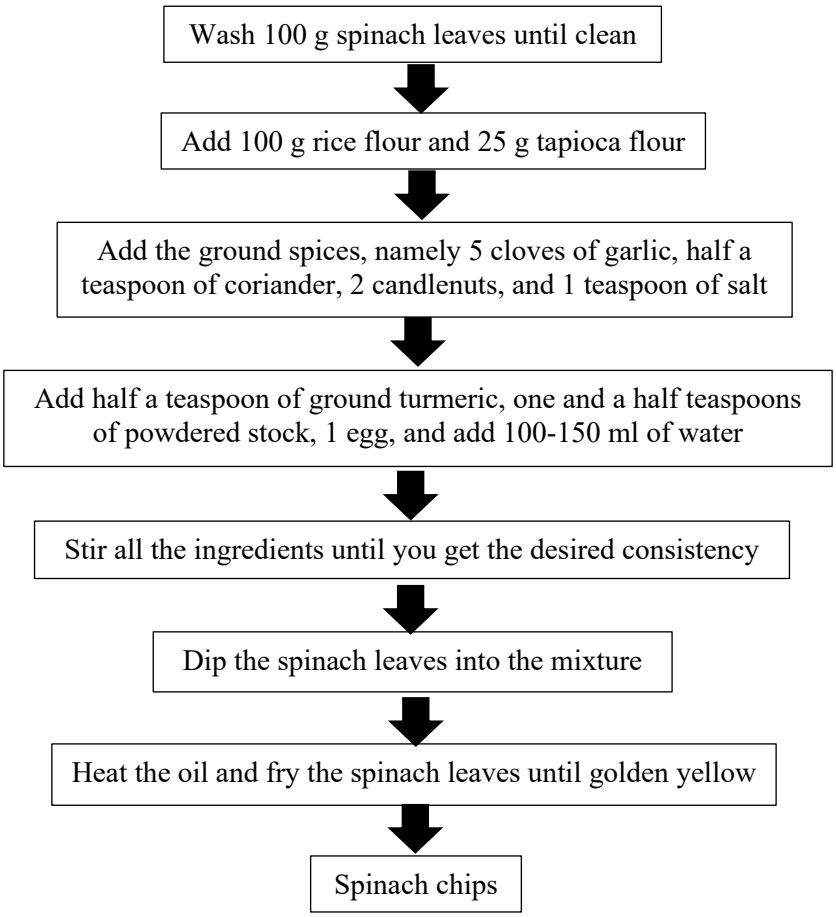

Figure 3. Flow chart for making spinach chips.

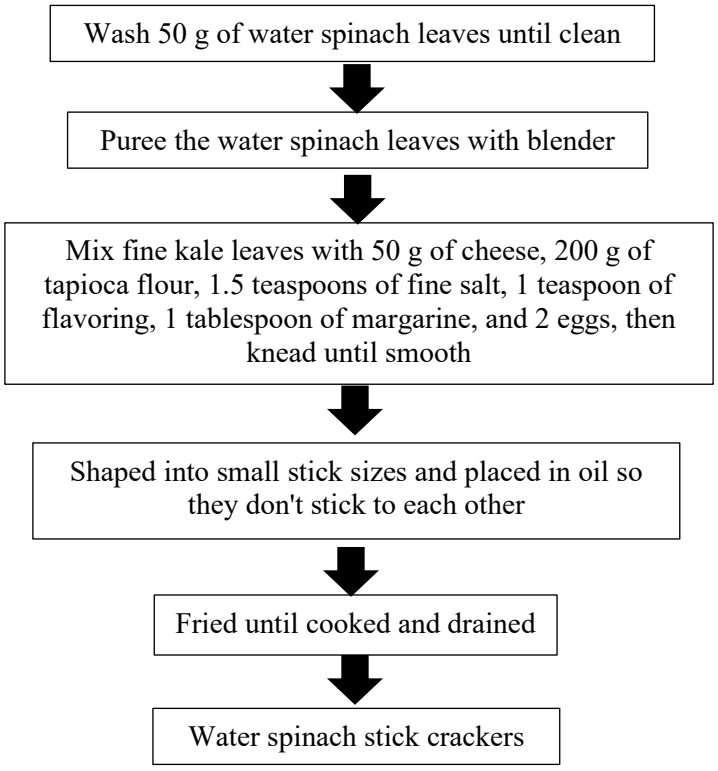

Figure 4. Flow chart for making water spinach stick crackers.

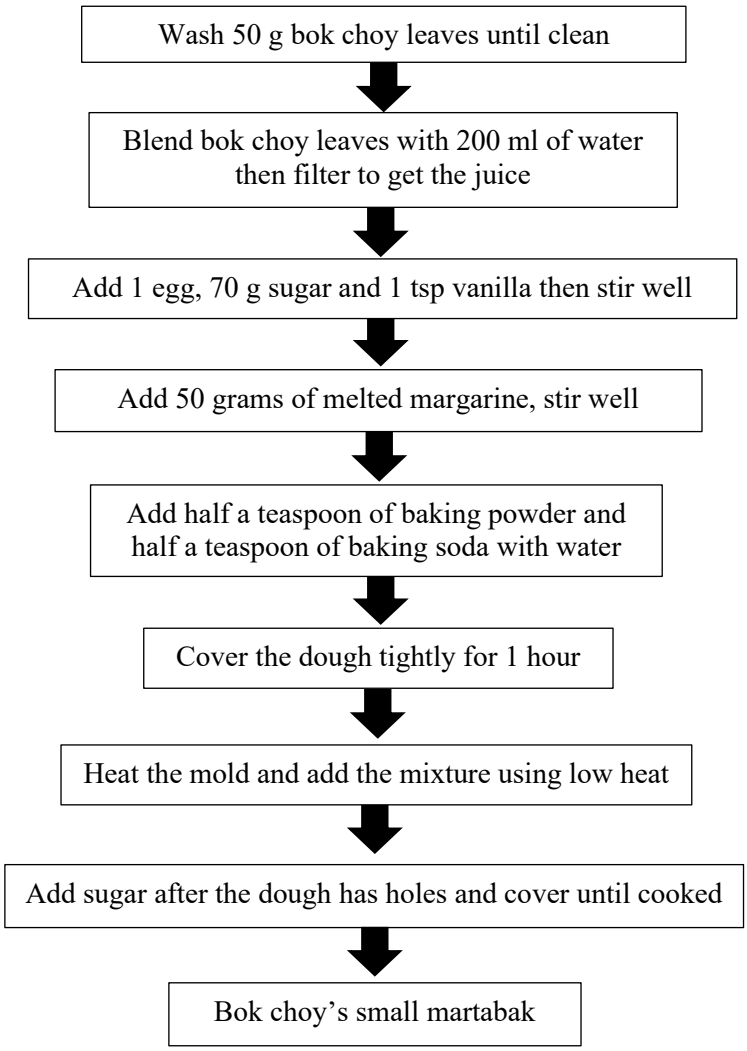

Figure 5. Flow chart for making bok choy's small martabak.

Figure 6. (a) Hydroponic vegetable processing products: spinach chips; (b) water spinach stick crackers and (c) bok choy's small martabak.

After the product manufacturing process was complete, the team also provided packaging and labeling training to partners. Spinach chips and water spinach stick crackers were packaged in standing pouch plastic packaging where this packaging provided innovation in the form of a zip lock which makes it easier for consumers to open and close the product and had no gaps for bacteria so that product quality could be maintained. This packaging is made from Polypropylene (PP) plastic which has a bag-like shape and stands upright making it easy to store without the need to use additional containers and makes it easier to display for potential buyers to see. The price of standing pouch packaging is quite cheap on the market with a more luxurious aesthetic value because it looks eye catching. Bok choy's small martabak wa packaged in clear mica packaging made from PVC (Polyvinylchloride) type plastic. The transparent mica plastic allows potential buyers to see the product. Besides that, another advantage of mica plastic is that it is resistant to water and cold, stiff and not easily dented, so the martabak will remain intact when removed from this packaging, when

compared to Polypropylene (PP) plastic which is not resistant to impacts and scratches, so if impacts or scratches occur continuously or with sufficient force, the PP and the products inside can be damaged.

Spinach chips, water spinach stick crackers and bok choy's small martabak that have been packaged are labeled with information regarding the product composition and net weight of the final product. The packaging label design can be seen in Figure 7. Labeling on packaged products functions as a product identity, namely as a means of communication to consumers and as a medium to convey certain images related to the product to consumers. The training products that have been packaged and labeled can be seen in Figure 8.

(a) (b) (c)

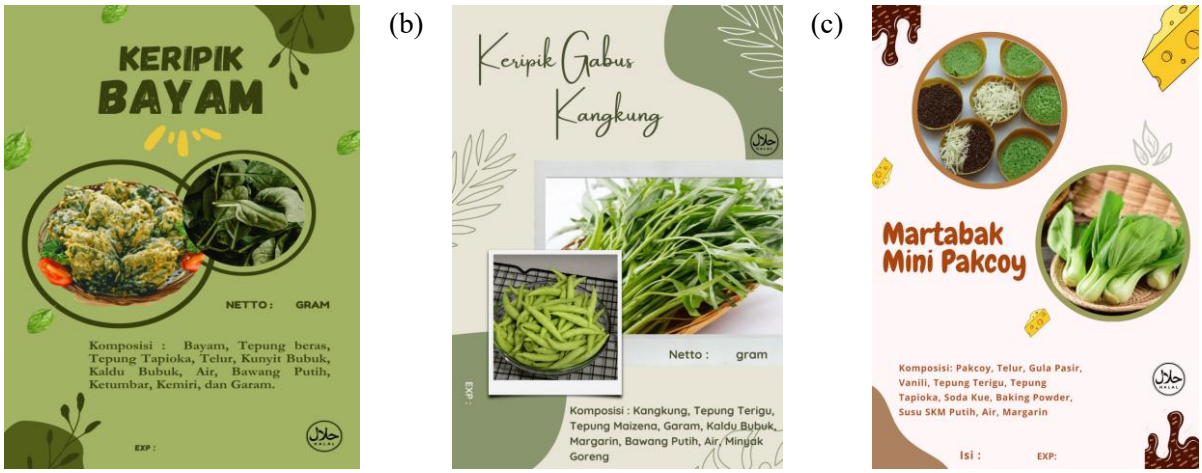

Figure 6. (a) Product label design: spinach chips; (b) water spinach stick crackers and (c) bok choy's small martabak.

Figure 8. Products that have been packaged and labeled.

In this service activity, 20 participants filled out a questionnaire containing questions about the partner's experience and skills before and after this training and measuring the level of preference for the spinach chips, water spinach stick crackers and bok choy's small martabak produced from this training activity. From the results of the questionnaire, before this training was carried out, it was found that as many as 40% of participants had consumed processed products from hydroponic vegetables and 60% of participants had never consumed processed food products from hydroponic vegetables. In addition, 30% had previously made processed food products from hydroponic vegetables and 70% of participants had never previously made processed food products from hydroponic vegetables (Figure 9).

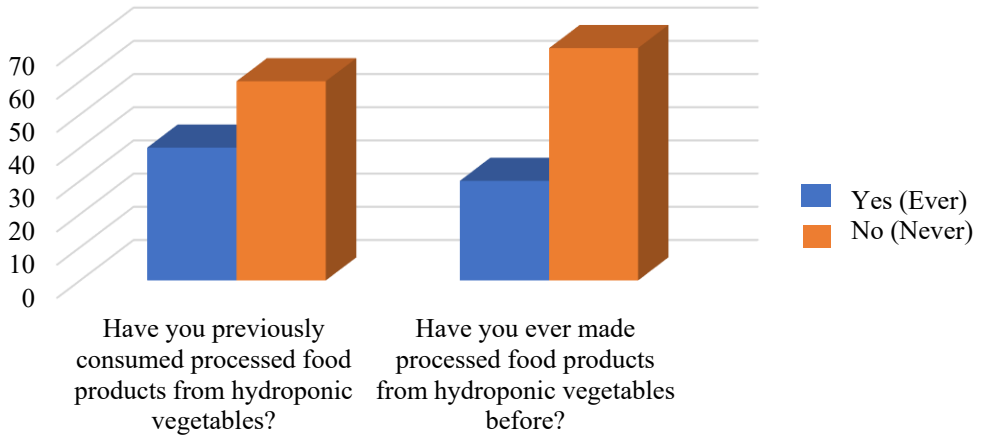

Figure 9. Data on knowledge and skills of service partners before training activities.

After this training activity, as many as 85% of service partners understood how to make spinach chips, water spinach stick crackers, and bok choy's small martabak from hydroponic vegetables, while 10% of participants less understood and 5% of participants did not understand. The service team obtained data on partners' interest in making these food products independently at home, namely 75% of participants were interested in trying them, 20% of participants might make them, and 5% of participants were not interested (Figure 10). The service team held discussions with service partners who were lacking, did not understand and were not interested to ask about the cause and provide solutions.

From the results of the discussion, it was found that the partner's age was over 50 years and the situation was quite busy during the training, which was a factor in not understanding the training well. Service partners who might not be interested were caused by partners who worked so they didn't have time to make the product. Therefore, the service partner provided an explanation back to the partner verbally through the procedure paper that had been provided previously. The results of this data had increased, previously only 30% of participants had made processed hydroponic vegetable products and after the activity it was found that 85% of participants understood how to make food products from hydroponic vegetables and 75% of participants were interested in trying to make them independently at home. Furthermore, the products produced, namely spinach chips, water spinach stick crackers, and bok choy's small martabak were generally liked by service partners in terms of color, aroma, taste and texture (Figure 11).

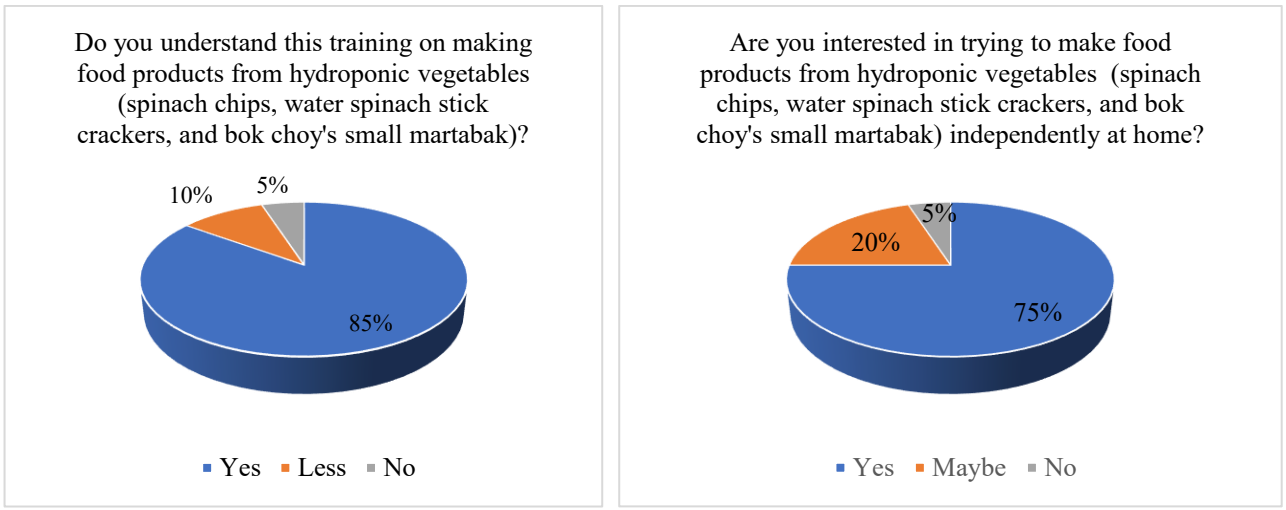

Figure 10. Data on skills and interests of service partners after training activities.

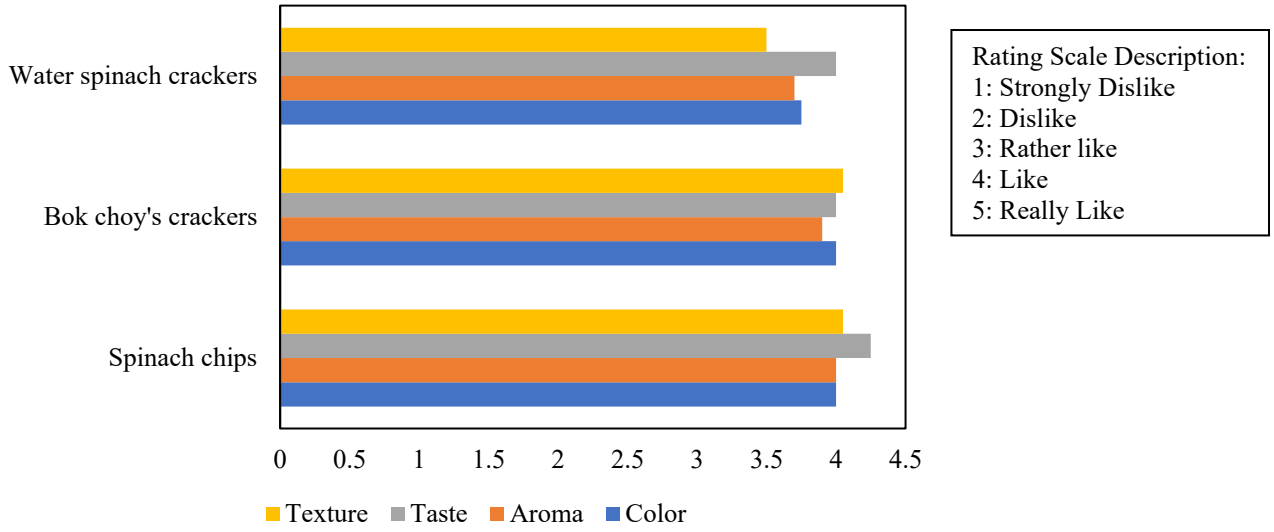

Figure 11. Data on service partners' preferences for food products resulting from training activities.

4. Conclusions

The community service team has carried out community service activities in the form of training on hydroponic vegetable food diversification, namely processing hydroponic vegetables into spinach chips, water spinach stick crackers and bok choy's small martabak. In this training activity, 20 participants gained an increase in the skills and interest of partners, previously only 30% of participants had made processed hydroponic vegetable products and after the training activity, 85% of participants understood how to make food products from hydroponic vegetables and 75% of participants were interested in trying to make them independently at home. Moreover, service partners liked the color, aroma, taste and texture of the food products.

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