



# Empowering the community of Bokesan village through production of So Ikie (Nila-algae fish sausage)

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ARTICLE INFO	ABSTRACT
<p><b>Article history</b>            Received: 2023-12-07            Revised: 2024-01-11            Accepted: 2024-01-20            Published: 2024-02-05</p> <p><b>Keywords</b>            Algae            Nutripreneurship            Oreochromis niloticus            Sausage</p>	<p><i>Fish and algae (seaweed) are abundant commodities in Yogyakarta. The potential for high fiber sausages which have advantages needs to be socialized to the public. The aim of this activity is outreach including education and training for housewives in the hamlet of Bokesan, Sindumartani, Ngemplak, Sleman, Yogyakarta. This area already has local potential for tilapia cultivation. Housewives in Bokesan hamlet are members of the Mina Mandiri business group. The processed tilapia fish product that has been developed is tilapia fish chips or crispy tilapia. With the abundant availability of tilapia in the area, the So Ikie product (tilapia-algae fish sausage) will be developed. The Mina Mandiri business group needs insight into healthy food, So Ikie high fiber sausage products, So Ikie processing skills, packaging and labeling to increase Nutripreneurship empowerment. Nutripreneurship empowerment is carried out by providing education and training. The education provided includes material about healthy food, healthy lifestyles, and Nutripreneurship through diversification of tilapia-based preparations. The training provided is the practice of processing tilapia-algae fish sausage products as a diversification of tilapia-based products. The participants took part in community service activities with enthusiasm and enthusiasm. Empowerment of Nutripreneurship partners can be seen in increasing insight, skills, motivation and commitment to carrying out Nutripreneurship. This is demonstrated by the results of pre and posttest assessments, the quality of practical products, evaluation of activity implementation, and the implementation of follow-up programs independently by partners. The independent follow-up program implemented includes production activities resulting from training.</i></p>
<p><b>Kata Kunci</b>            Nutripreneurship            Oreochromis niloticus            Rumput laut            Sosis</p>	<p><b>Pemberdayaan masyarakat desa Bokesan melalui produksi So Ikie (Sosis ikan nila-algae).</b> Ikan dan algae (rumput laut) merupakan komoditi yang melimpah di Yogyakarta. Potensi sosis tinggi serat yang memiliki keunggulan perlu disosialisasikan kepada masyarakat. Untuk tujuan kegiatan ini adalah sosialisasi mencakup edukasi dan pelatihan bagi para ibu rumah tangga di dusun Bokesan, Sindumartani, Ngemplak, Sleman, Yogyakarta. Wilayah tersebut telah memiliki potensi lokal budidaya ikan nila. Ibu-ibu rumah tangga di dusun Bokesan tergabung dalam kelompok usaha Mina Mandiri. Produk olahan ikan nila yang sudah dikembangkan adalah keripik ikan nila atau nila crispy. Dengan ketersediaan ikan nila yang melimpah di kawasan tersebut akan dikembangkan produk So Ikie (sosis ikan nila-algae). Kelompok usaha Mina Mandiri membutuhkan wawasan tentang makanan sehat, produk sosis tinggi serat So Ikie, keterampilan pengolahan So Ikie, pengemasan dan pelabelan untuk meningkatkan pemberdayaan Nutripreneurship. Pemberdayaan nutripreneurship dilaksanakan dengan memberikan pendidikan dan pelatihan. Pendidikan yang diberikan mencakup materi tentang makanan sehat, pola hidup sehat, dan Nutripreneurship melalui diversifikasi olahan berbasis ikan nila. Pelatihan yang diberikan adalah praktik pengolahan produk pembuatan sosis ikan nila-algae sebagai deversifikasi produk berbasis ikan nila. Para peserta mengikuti kegiatan pengabdian kepada masyarakat dengan antusias dan penuh semangat. Pemberdayaan Nutripreneurship mitra tampak pada peningkatan wawasan, keterampilan, motivasi dan komitmen untuk menjalankan Nutripreneurship. Hal ini ditunjukkan dengan hasil penilaian pre dan post test, kualitas produk hasil praktik, evaluasi pelaksanaan kegiatan, dan dilaksanakannya program tindak lanjut secara mandiri oleh mitra. Program tindak lanjut secara mandiri yang dilaksanakan mencakup kegiatan produksi produk hasil pelatihan.</p> <p style="text-align: right;">Copyright © 2024, Maharini et al            This is an open access article under the CC-BY-SA license</p>



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## INTRODUCTION

Fish and algae are abundant commodities in Yogyakarta. The main handling and trade of fish and algae commodities in Yogyakarta is in the form of fresh fish and algae, dried algae and preserved fish products in the form of dried fish and salted fish (Afriwanti, 2018). The abundant production of fish and algae needs to be followed by the development of the handling of these commodities, among others, by looking for opportunities and innovations of new food products that are healthy, can be mass-produced, popular and have high economic value so that in addition to providing healthy food it also has the potential as a means of developing community Nutripreneurship (Astawan et al., 2018; Goswami, et al., 2015; Ansari, et al., 2020; Ullman & Grimm, 2020).

Sausage is one of the most popular food ingredients and is widely consumed by the public. In general, sausage is made from beef or chicken as the main ingredient and additional ingredients such as fillers and emulsifiers (Abrori, 2017). Sausage is a source of protein and fat nutritional elements. One of the innovative processed products based on fish and algae that has the potential to be produced is sausage. The use of fish and algae as the main ingredients of sausage will produce high fiber sausage because algae is rich in fiber (Koapaha, 2019; Wang et al., 2023; Francezon, et al., 2021; Ścieszka & Klewicka, 2018). In addition to being a source of fiber, algae that can form gels can play a role in producing sausages with good texture, without the need for additional fillers and emulsifiers (Cahyani, 2019). Thus, the production of fish and algae-based sausage has advantages in nutritional aspects because other than containing protein, fat, vitamins and minerals, it is also a source of fiber. This sausage product is also more economical because it does not require other additives such as fillers and emulsifiers (Lawrie, 2003; Espinosa-Ramírez, 2023; Gullón, 2020).

Nowadays, people's awareness of healthy food consumption is growing. Sausage products are very popular and widely consumed. Compared to existing sausage products and similar sausage products, high-fiber sausage products have advantages, among others, in terms of a more complete and balanced nutritional composition. It is expected that this high-fiber sausage product can be widely accepted and consumed by the community so as to support the provision of healthy food, improve the quality of community nutrition, and increase community Entrepreneurship. This community service activity is in collaboration with productive partner Mina Mandiri Business Group. Mina Mandiri Business Group is a business group consisting of housewives in Bokesan Hamlet, Sindumartani Village, Ngemplak, Sleman, Yogyakarta. The number of active members is 20-30 people.

The community in Bokesan Hamlet has a tilapia farming business. Tilapia cultivation is carried out in ponds on farmland or in residential yards. The results of tilapia cultivation are mostly only traded in the form of tilapia seeds and some are processed by the Mina Mandiri business group into crispy tilapia products. The lack of diversification of processed products causes the cultivation products traded to be limited to tilapia seeds. The Mina Mandiri Business Group carries out the crispy tilapia production process every two weeks with a production capacity of around 15-20kg. Crispy tilapia products are traded in thick plastic packaging with a weight of 100gr. Products that have been packaged are then traded directly and through social media and deposited in shops in the Sleman Regency and surrounding areas.

This community service program is undertaken as an act of implementing the tri dharma of higher education, particularly in the aspect of community empowerment. For students involved in this activity can get learning about *Nutripreneurship* including handling, processing, packaging, labeling and marketing So Ikie products based on local potential. Community Service activities in Bokesan Hamlet, Sindumartani Village, Ngemplak, Sleman, Yogyakarta support the implementation of Key Performance Indicators (KPI) 5 through increasing the number of publications of PKM activities carried out by lecturers and KPI 6 through increasing the number of partner collaborations and PKM activities carried out by lecturers.

By implementing this program, nila-algae fish sausage can serve as a healthy food which supports to improve family nutritional quality and it is a potential product to empower community with *Nutripreneurship*. This is in accordance with the needs of the community in Bokesan, Sindumartani village, Ngemplak, Sleman. At that location the community has developed a business venture in catfish and tilapia cultivation. Tilapia is cultivated in addition to using the rice field area also by utilizing the yard land around the house. In Bokesan a business group of housewives has been formed, namely the Mina Mandiri business group. The processed fish products that have been developed are tilapia chips or crispy tilapia. With the availability of fish raw materials, especially tilapia, which is abundant in the area, the Mina Mandiri group will further develop diversification of processed tilapia products. The potential product to be developed is a healthy high-fiber sausage based on tilapia and algae. Housewives who are members of the Mina Mandiri business group need insight into healthy high-fiber sausage food products based on tilapia and seaweed, sausage processing skills, and packaging and labeling to increase Nutripreneurship empowerment through the Mina Mandiri business group. This program is congruent to some of Sustainable Development Goals (SDGs) programs, they are good health and well-being, decent work and economic growth, and responsible consumption and production (sdgs.un.org).

Thus, these housewives can improve food security, economic security, and family health through the provision of nutritious food intake by utilizing local potential and accompanied by a healthy lifestyle. In addition, housewives in Bokesan, Sindumartani village, Ngemplak, Sleman can also further improve Nutripreneurship through increased development of processed products in the Mina Mandiri business group.

## METHOD

The implementation time of this activity is in October 2023. The stages of implementing community service activities are as follows.

### Preparation

This stage is the internal coordination stage of the team implementing community service activities. The preparation stage includes coordination in terms of material and schedule of activities, preparation of materials, equipment and optimization of So Ikie sausage products for training. Posters, videos, and booklets of So Ikie sausage products were also prepared.

### Education

At the stage of educational activities, theoretical material about healthy food, healthy lifestyles, and *Nutripreneurship* through tilapia-based processed diversification includes the concept of product development and tilapia-based food processing technology. Before the delivery of the material, participants took a pre-test.

### Food processing training

#### a. Preparation

The preparation stage was carried out by the implementation team including the preparation of standard recipes, practical materials, equipment and product samples made with standard recipes as a benchmark for the quality of the products to be made by the trainees. The main ingredient for making this typical snack is tilapia fish, which is a leading commodity in Bokesan, Sindumartani village, Ngemplak, Sleman. Another main ingredient used is seaweed, which is commonly found in traditional markets and modern supermarkets.

#### b. Food processing practice

In food processing practices, participants were divided into 5 groups, each group consisting of 3 participants. Each group practiced So Ikie sausage processing with assistance from community service tips and students. The main ingredient of tilapia fish was purchased from the tilapia fish farming pond in Bokesan, Sindumartani village, Ngemplak, Sleman, sausage casings were purchased from online stores and other ingredients were purchased at traditional markets. Materials were prepared by the community service implementation team. Equipment was prepared jointly by the community service implementation team and partners. At this stage, packaging and labeling for So Ikie sausage products were also prepared.

### Production of So Ikie sausage

At the So Ikie sausage production stage, the groups of participants directly carried out the processing and packaging of So Ikie sausages independently, without further assistance. Participants made creations and modifications in terms of the size of So Ikie sausages made according to participants' estimates to attract consumers.

### Evaluation of activity implementation

The activity evaluation stage is carried out in the form of participants submitting an evaluation verbally or by working on the Post Test and filling out the Activity Implementation Evaluation form.

### Follow-up activities

Follow-up activities include the delivery of equipment assistance to be used by partners to carry out training independently to strengthen mastery of processing and packaging skills for So Ikie sausage products.

## RESULTS AND DISCUSSION

An overview of the problems and solutions of partners, indicators and types of outputs of this activity is listed below in Table 1.

Table 1. Types of outputs from partners' problems and solutions

Partner Issues	<ol style="list-style-type: none"><li>1) Mina Mandiri business group women need an increased understanding of nutripreneurship, the potential of tilapia, algae, healthy food, So Ikie products and healthy lifestyles.</li><li>2) Mina Mandiri business group women do not have diversified processed products based on tilapia which is a local potential commodity.</li><li>3) Mina Mandiri business group women do not have skills in making tilapia-algae sausage as a diversification of tilapia-based products.</li></ol>
Solution	<ol style="list-style-type: none"><li>1) Providing education for the women of the Mina Mandiri business group about nutripreneurship, the potential of tilapia, algae, healthy food, So Ikie products and healthy lifestyles.</li></ol>

	2) Developing new products / diversification of tilapia-based processed products in the form of tilapia-algae sausage products (So Ikie) 3) Training on processing sausage products based on local potential commodities of tilapia-algae (So Ikie) as a tilapia-based diversification product
Indicator	1) Mina Mandiri business group women have an understanding of nutriprenurship, the potential of tilapia, algae, healthy food, So Ikie products and healthy lifestyles. 2) Mina Mandiri business group women have diversified tilapia-based processed products in the form of tilapia-algae sausage products (So Ikie). 3) Mina Mandiri business group women have skills in making tilapia-algae sausage (So Ikie).
Outputs	1) Increased knowledge of Mina Mandiri business group women about nutriprenurship, the potential of tilapia, algae, healthy food, So Ikie products and healthy lifestyles 2) Development of tilapia-algae sausage product (So Ikie) 3) Improving the skills of the women of Mina Mandiri business group in making tilapia-algae sausage (So Ikie)

Results of this community service are presented as follows.

### Preparation

At the preparation stage, data collection of activity participants was carried out, namely 15 women from the Mina Mandiri business group. The implementation team together with partners coordinated to prepare schedules, materials, equipment and supporting infrastructure (Figure 1 dan Figure 2).



Figure 1. So Ikie Sausage Product Poster



Figure 2. So Ikie Sausage Product Booklet

### Education

Educational activities were held at the meeting hall of Bokesan, Sindumartani village, Ngemplak, Sleman and attended by all participants. Educational materials include *Nutriprenurship*, tilapia potential, algae, healthy food, So Ikie products and healthy lifestyles. The implementation team took turns delivering educational material interactively and accompanied by the presentation of material in the form of PPT. To find out the students' understanding of the material provided, before the delivery of the material, a Pre-Test was conducted. Educational activities are shown in the Figure 3.



Figure 3. Educational Activities

### So Ikie sausage processing training

At the food processing training stage, the implementation team coordinated with partners to prepare materials, equipment and training venues. The training participants were divided into 5 groups with 3 members/group. The implementation team also prepared samples of So Ikie sausage products to be made.

During the training, each group of participants practiced So Ikie sausage processing. The practice of processing So Ikie sausages can generally be carried out well. The participants were diligent, persistent, and enthusiastic about processing So Ikie sausage products. The quality of the products produced by the participants was mostly good according to the samples or product examples prepared by the implementation team. Some of the So Ikie sausage products made were damaged due to several causes such as improper or too tight sausage ties, filling the sausage casings too full, and lack of control when the sausage was heated/steamed. Practical activities and products as shown in the pictures below.



Figure 4. So Ikie sausage processing practice

#### So Ikie sausage production

In the implementation of the production stage, each group of participants carried out the practice of processing So Ikie sausages independently. The implementation team or students monitored the activities carried out by the participants. The participants seemed diligent, excited, and enthusiastic about carrying out the practice. Learning from experience when carrying out the previous processing practice stage, at the So Ikie sausage production stage which was carried out by each group independently, the quality of the products produced was very satisfying. At this stage, So Ikie sausage product packaging labels were also prepared. At this stage, the calculation of production costs was also carried out to determine the selling price. From the results of the calculation, the selling price is still considered too high, so it needs to be modified in terms of the use of raw materials (tilapia and additional fillers) and the type of sausage casings (from edible film can be replaced using alternative nonedible film casings). so that the selling price is expected to be more affordable. So Ikie sausage products are expected to have a long shelf life of around 2-3 months, hence vacuum packaging and further storage in the freezer. The results of the production process stage activities are presented in the pictures below.



Figure 5. Participants carry out So Ikie sausage production



Figure 6. So Ikie sausage packaging and labeling

**Evaluation of activity implementation**

The evaluation stage is carried out in the form of participants submitting evaluations orally and by doing the Post Test and filling out the Activity Implementation Evaluation form. The results of the verbal evaluation of activities by participants stated that the participants were grateful for the additional insights and skills that had been provided and felt motivated to strengthen the production of So Ikie sausages as a product that could be developed for joint ventures with tilapia chips that had been produced previously. The results of the pre-test and pos-test as well as the evaluation of activities by participants are listed in the Figure 7.

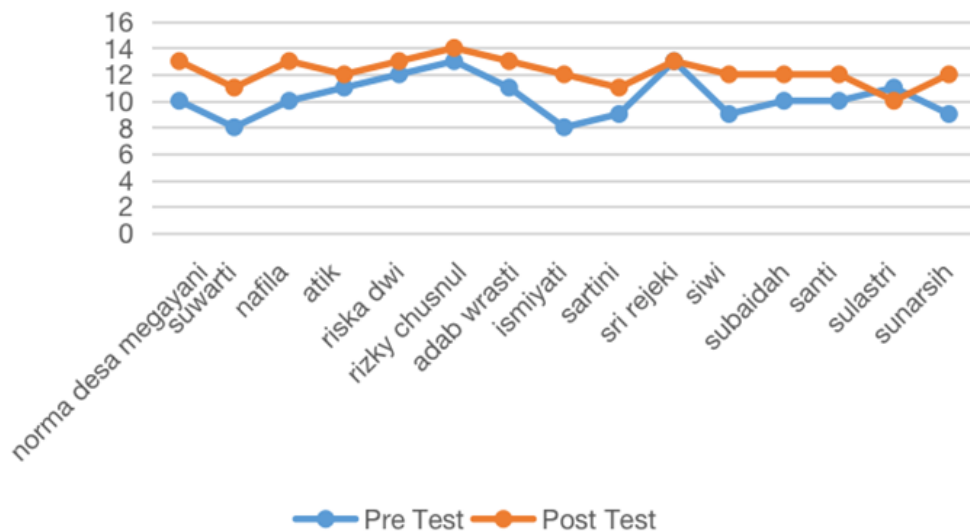


Figure 7. Participants' pretest and post test results

The evaluation results from the participants stated that the implementation of this community service activity was good. However, the weakness is found on weakness is the availability of practical equipment, considering that some practical equipment is not yet available in sufficient quantities for all groups, so it is necessary to take turns in using the equipment. Equipment that needs to be increased in number includes chopper/food processor, stuffer, and vacuum packer. At the end of the activity, the implementation team handed over stimulant practical equipment to partners to support *Nutripreneurship*. The stimulant equipment provided is a chopper/food processor, stuffer, and vacuum packer

which are the main equipment in the So Ikie sausage processing process and based on the evaluation results it is considered that the availability is not sufficient.

### Follow-up of community service activities

At the end of the activity, the implementation team handed over stimulant practical equipment to partners to support *Nutripreneurship*. The stimulant equipment provided is a chopper/food processor, stuffer, and vacuum packer which are the main equipment in the So Ikie sausage processing process and based on the evaluation results it is considered that the availability is not sufficient. Furthermore, the participants will strengthen their product mastery independently to be able to develop the So Ikie sausage production business.

### CONCLUSION

As for the conclusions of this service activity, among others: 1) The education provided is sufficient to provide an understanding of healthy food, healthy lifestyles, and *Nutripreneurship* through diversification of tilapia-based preparations, 2) The participants were able to carry out the product development of tilapia-algae sausage (So Ikie), 3) The participants were skilled in making tilapia-algae sausage (So Ikie), 4) In general, PkM activities have been carried out well.

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