Available online at http://proceeding.rsfpress.com/index.php/ess/index
LPPM UPN "Veteran" Yogyakarta Conference Series
Proceeding on Engineering and Science Series (ESS)
Volume 1 Number 1 (2020): 139-145

Community Empowerment in Making Cassava Leaf Tempe

Maryana, Suwardi, Sugeng Priyanto

Universitas Pembangunan Nasional Veteran Yogyakarta
[1]E-mail address maryono@upnyk.ac.id, [2]E-mail address sugeng.priyanto@upnyk.ac.id

Abstrack

Community empowerment is an activity to increase the ability and independence of the community. The purpose of this activity is to improve life skills in making tempeh from cassava leaves. The method used is mentoring and lectures, as well as training to solve these problems. The results obtained are cassava leaf tempeh with a composition of 5 tablespoons of tempeh yeast, 10-15 tablespoons of rice flour, and 1 kg of boiled cassava leaves.

Keywords: cassava leaf tempe, community, life skills, method,

I. INTRODUCTION

Community Empowerment is a process in which society, especially those who are resource-poor, women, and other neglected groups, are supported in order to be able to improve their welfare independently (Rochdyanto, 2006). Community empowerment also means increasing the ability and / or increasing community independence (Soemarno, 2001). Based on all that, the people of Kaligawe hamlet, located in Bantul Village, began to be motivated to carry out community empowerment. The target of the program is to carry out activities for people who are not economically productive but who have a strong desire to become entrepreneurs. The business undertaken is by making tempeh from cassava leaves. There are many cassava leaves in the area but do not know that the cassava leaves can be made of cassava leaf tempeh.

The problems that are often faced include aspects of production, namely the manufacturing process or the processing process, and aspects of business management, including low entrepreneurship and business sustainability. In other words, no one has included the science and technology aspects, both

production, management, marketing, and finance, in this group. The purpose of this activity is for partner problems and to improve life skills in making tempe from cassava leaves.

II. LITERATURE REVIEW

The planting of cassava plants to harvest the fake sticky rice varieties of cassava leaves is carried out at the age of 25-40 days after planting. Cassava leaf harvest is carried out at about 35 days after planting. Harvesting of cassava leaves along 20-23 cm measured from the tip of the cassava growing point (top). Harvesting cassava leaves is more profitable for farmers than harvesting cassava tubers. This is because cassava leaves can be harvested sustainably once every 20 days for 5 to 6 years, while the harvest of cassava is only one harvest per year. Cassava leaf products can be processed first into cassava leaf tempeh, which can be sold in the market or for own consumption. Thus, cassava leaves will increase family income (Maryana and Bargumono, 2020).

According to Bakhtiar (2011), after several failed attempts at making cassava leaf tempe, finally, in 2006, cassava leaf tempe was successfully made. The fermentation process lasts 2 - 3 days, the same as making tempe from soybeans. Cassava leaf tempeh is clearly attractive because it uses nutritious, inexpensive, and easy to find raw materials. Cassava leaf tempeh is useful as a food ingredient to improve community nutrition. That's because tempeh contains high protein and is easy to digest. Besides that, the raw materials are abundant, different from the soybeans that we have to import so far. The potential of cassava leaves in Indonesia is quite large because it is the third producer of cassava after Nigeria and Brazil.

Furthermore, the opinion of Santosa (2015) provides a recipe for making cassava leaf tempeh as follows: ingredients, 1 kg of cassava leaves, 1-2 g / kg of leaves, and water for boiling. How to make it (a) prepare young cassava leaves; (b) boil young cassava leaves until the texture is soft; (c) Drain (let stand on the container) the boiled cassava leaves for a while, then squeeze until all the cooking water is wasted; (d) spread cassava leaves on a banana leaf, and sprinkle the yeast on the surface, then wrap and tie. In other literature, it is stated that in warm conditions, the nails can be printed on banana leaves, plastic, or others while sprinkling the yeast *Rhizopus oligosporus* on the surface and then wrap it. In other literature, the yeast is sprinkled and then stirred; (e) let stand for 2-3 days for the fermentation process (curing), in other literature, 3-4 days. Fermentation (curing) is carried out in a place protected from the sun, and (f) after the fermentation is complete, the cassava leaf tempeh is ready to be cooked.

The recipes above still open up opportunities to make it more attractive in terms of appearance and texture of cassava leaf tempeh, among others, by adding rice flour or tapioca flour so that the fermentation process is more attractive and has a uniform whitish color, just like soybean tempeh.

The processing of cassava leaf dregs into tempeh is actually a byproduct of extracting a bioflavonoid compound called routine. Routine is a glycoside compound containing quercetin aglycone and routine sugar. This compound is also called vitamin P, which functions to maintain the permeability of blood vessels (Bakhtiar, 2011). Routine is also an ingredient in the pharmaceutical industry, growth regulators, and cosmetics.

To obtain the compound by precipitating the juice of cassava leaves. The green sediment is what is said to be "routine." To get "routine," cassava leaves are cooked at low temperature or cassava leaves are leaked in hot water, then squeezed, and this juice of the water is deposited. (Betha, 2013). According to Amri Bakhtiar, vitamin P (routine) has the effect of strengthening the capillary structure and reducing the permeability or flexibility of blood vessels. In the world of vitamin P medicine, various blood vessel disorders are often used (Maryana and Bargumono, 2020).

Good quality cassava leaf tempeh, rich in nutrition, soft texture with a distinctive aroma, and dark green inside. Cassava leaf tempeh can be processed into a variety of snacks by frying, sauteing, or curling. The test results at the Padang Research and Standardization Center, West Sumatra Province, and the Laboratory of the Faculty of Animal Husbandry, Andalas University, showed that the total protein content of cassava leaf tempeh was 20-30%. Compare with milk protein, which reaches 25% or soybean 35-43%. In addition, according to the Food and Agriculture Organization (FAO), cassava leaves are rich in vitamin A, and vitamin C. Cassava leaves contain 11,000 IU of vitamin A and 275 mg of vitamin C in 100 grams. Fruits that are identical to vitamin C, namely oranges, contain only 50 mg, while one glass of apple juice has 20 IU of vitamin A. Both of these nutrients are beneficial for eye health and immunity, especially in children. This means that cassava leaf tempeh is an option to meet the needs of these two essential vitamins.

Some of the people of Padang, West Sumatra, also accept the presence of the newcomer tempe. Cassava leaf tempeh, the taste is delicious. In fact, when cassava leaf tempeh was first present, many refused to taste it because the appearance of the greenish cassava leaf tempeh was so different from the tempeh they were familiar with. However, over time they just love this unique snack.

Cassava leaf tempeh is not the only non-soybean tempeh. In Indonesia, there are many tempe made from non-soybean (although it is included in the legume group), such as korobenguk Tempe from korobenguk seeds (*Mucuna pruriens*), gude Tempe (*Cajanus cajan*), and koropedang Tempe (*Canavalia ensiformis*). In addition, there are also tempe made from non-legume raw materials such as tempe Mungur (*Enterolobium saman*), bongkrek Tempe (*Ceiba pentandra cake*), and rubber tempe (*Hevea brasiliensis rubber* seeds) (Bakhtiar, 2011).

III. RESEARCH METHODOLOGY

The approach method used is mentoring. Mentoring is an activity carried out together with the community in observing real problems faced in the field, then discussing together to find alternative solutions towards increasing the productive capacity of the community. This assistance is related to outreach and training activities.

According to Law Number 16 of 2006, the extension is a learning process for main actors and business actors so that they are willing and able to help and organize themselves in accessing market information, technology, capital, and other resources. All of this is an effort to increase productivity, business efficiency, income, and welfare, as well as increase awareness in the preservation of environmental functions. Training is a process designed to increase knowledge and technical skills, or training to improve the skills and employability of a person or group of people.

This method is felt to be the most appropriate to solve this problem. With assistance, strategic and technical aspects can be carried out. Assistance is also able to ensure that improvement programs are implemented consistently. The Service Team assisted by several students will help to get out of the problem.

IV. FINDINGS AND DISCUSSION

The results obtained during participating in community empowerment, in this case, PKK mothers in the manufacture of cassava leaf tempe, are enthusiastic and motivated to work together in carrying out activities given by the LPPM Community Development Team "Veteran" Yogyakarta National Development University. In the activity of making cassava leaf, Tempe is through the preparation of raw materials, namely by taking (picking) cassava leaves with a size of 20-23 cm measured from the point of plant growth, for subsequent picking interval of 20 days. Then the cassava leaves are collected and processed in making cassava leaf tempeh.

According to Tonny Haryo Wibisono, a biology study program student at the Faculty of Mathematics and Natural Sciences, YSU said that cassava leaves contain high protein ranging from 23.42 percent, 6.31 percent fat, 15.80 percent crude fiber, anti-nutritional substances HCN 550-620 ppm on young leaves, and 400 -530 ppm in old leaves, as well as vitamin A and vitamin C. Cassava leaves can also be a source of vegetable protein, while the fiber is good for digestion. One of the advantages is in the production process, where the making of cassava leaf tempe is simpler and relatively accessible to everyone compared to tempe from soybeans. If making tempe from soybeans generally requires several treatments such as soaking the seeds, steaming, washing, and removing the epidermis, which is a long process, but in cassava leaf tempe, it only needs to be boiled and washed (Fatimah, 2016).

The process of making cassava leaf tempeh is as follows: (a) prepare yeast tempeh, as much as five tablespoons of tempeh for 1 kg of thinly sliced cassava leaves; (b) cassava leaves; (c) rice flour, as much as 10-15 tablespoons for 1 kg of thinly sliced cassava leaves. The rice flour was intended to change the color of the dark green cassava leaf tempeh to a brighter whitish color. The stages of making cassava leaf tempeh are the same as others, as was done by Fatimah (2016), (a) The relatively young cassava leaves are boiled until soft. The duration of boiling depends on the level of aging of the leaves; the older the leaves are, the longer the boiling time is needed (Fatimah, 2016). (b) After the leaves are soft, then the boiled cassava leaves are removed, (c) Then they are drained and washed with clean water (rinsed with running water) and squeezed dry to reduce the cyanide acid content. (d) Extracted cassava leaves that are slightly dry, then thinly sliced. The stew of cassava leaves is sliced thinly, which is used to help to ferment microorganisms work faster to form mushrooms and eventually become tempeh (Fatimah, 2016). (e) The thinly sliced cassava leaves are then flattened and allowed to weaken, so they do not clump together. (f) After that, add tempeh yeast and rice flour according to the measurements. (g) Then wrapped (packed) in banana leaves and paper pieces, and ripened (fermented) for 2-3 days, by leaving the tempe wrapped evenly in the container. The use of these pieces of paper, in addition to using banana leaves, is more efficient and effective, and the fermentation process will be faster because it causes heat faster. The results after fermentation of cassava leaf tempe are shown in Table 1 and Figure 1 regarding the performance of cassava leaf tempe.

Table 1. Results of cassava leaf tempeh after fermentation

Description	Cassava leaf tempe Without rice flour	Cassava leaves With rice flour
Color	Dark green	Bright vaginal discharge
Texture	Mushy	Not mushy
Taste	Not good (Dominant leaf flavor)	Delicious

Table 1 shows a very real difference between cassava leaf Tempe without rice flour and cassava leaf tempe with rice flour. The use of additional rice flour besides improving the appearance of cassava leaf tempeh is viewed from the aspect of color, texture, and taste. Thus, the use of rice flour or cassava flour (tapioca) and starch combined with cassava leaf tempeh is very important.

TDS without rice flour
Tempeh yeast 5 tbsp
1 kg of cassava leaves

TDS rice flour 5 tbsp
Tempeh yeast 5 tbsp
1 kg of cassava leaves

TDS rice flour 10 tbsp

TDS rice flour 15 tbsp

Tempeh yeast 5 tbsp	Tempeh yeast 5 tbsp
1 kg of cassava leaves	1 kg of cassava leaves

Figure 1. The performance of cassava leaf tempeh

Figure 1 shows that there is a very clear difference between the color, taste, and texture of the cassava leaf tempe. Cassava leaf tempeh with composition without rice flour, five tablespoons of yeast, and 1 kg of boiled cassava leaves show a dark green color, unpleasant taste, and mushy texture, which is less good than cassava leaf tempe with a composition of 10-15 tablespoons of flour. Rice, five tablespoons of tempeh yeast, and 1 kg of boiled cassava leaves, which have a bright whitish color, delicious taste, and not mushy texture.

V. CONCLUSIONS AND FURTHER RESEARCH

The best composition of cassava leaf tempeh is five tablespoons of tempeh yeast and 10-15 tablespoons of rice flour, and 1 kg of boiled cassava leaves. For further research is to use other flour, for example, tapioca flour and/or starch.

VI. REFERENCES

Bakhtiar, A. (2011). Daun Singkong Jadilah Tempe. https://www.trubus-online.co.id/daun-singkong-jadilah-tempe/. Diunduh 20-3-2020.

Betha, S. (2013). Tempe Daun Singkong. http://bumiternak-betha.blogspot.com/2013/01/tempe-daun-singkong.html. Diunduh 20-3-2020.

Fatimah, S. (2016). Mahasiswa UNY Ciptakan Tempe Daun Singkong. https://news.okezone.com/read/2016/10/04/65/1505620/mahasiswa-uny-ciptakan-tempe-daun-singkong. Diunduh 20-3-2020.

Maryana dan Bargumono. (2020). Memilih Panen Daun Singkong Atau Panen Umbi Singkong. LPPM Universitas Pembangunan Nasional "Veteran" Yogyakarta.

Rochdyanto, S. 2006. Pengenalan Metode Pemberdayaan Masyarakat. Bahan Pelatihan untuk Pelatih (TOT) Pengembangan Pengelolaan Sistem Irigasi Partisipatif (PPSIP). Diselenggarakan oleh Pusat Studi Pedesaan dan Kawasan Universitas Gadjah Mada (PSPK-UGM) bekerjasama dengan Direktorat Jenderal Pembangunan Daerah (BANGDA) Depertemen Dalam Negeri Republik Indonesia. Yogyakarta, 21-25 Nopember 2006.

Santosa, U. (2015). Membuat Tempe Kedelai dan Tempe Daun Singkong. https://sivitasakademika.wordpress.com/2015/06/04/membuat-tempe-kedelai-dan-tempe-daun-singkong/. Diunduh 20-3-20

Soemarno. (2001). Paradigma Baru Pembangunan Agrokompleks Dalam Menangkap Peluang Otonomi Daerah Dan Menjawab Tantangan Globalisasi. Pusat Pengkajian Pembangunan Pertanian dan Pemberdayaan Masyarakat (P5M). Fakultas Pertanian. Universitas Brawijaya. Malang.

Undang-Undang Nomor 16 Tahun 2006. Sistem Penyuluhan, Pertanian, Perikanan dan Kehutanan