International Journal of Life Science and Agriculture Research

ISSN (Print): 2833-2091, ISSN (Online): 2833-2105

Volume 03 Issue 12 December 2024

DOI: https://doi.org/10.55677/ijlsar/V03I12Y2024-14

Impact Factor: 6.774 , Page No : 1009-1013

Potential Utilization of Taro Yam as Food in Ngada District

Maria Alfonsa Ngaku[1], Umbu N. Limbu[2], Antonia P. Bao[3]

[1]Agribusiness Study Program, Flores Bajawa College of Agriculture

Jln. Kapten Piere Tendean-Tanalodu-Bajawa-Flores-East Nusa Tenggara-Indonesia

[2,3]Applied Biology Study Program, Flores Bajawa College of Agriculture

ABSTRACT: Taro *(Colocasia esculenta* L.*)* is a tuberous plant called bonggol that grows underground. The high carbohydrate content of taro makes it a top choice as a staple food when looking for alternatives to rice. Taro has great potential to be processed into various food products to help prevent various nutritional problems and generate additional income for local communities. Ngada Regency is one of the districts that has its own natural strengths and is also rich in natural resources such as local food, one of which is taro yam. Quantitative research was used in this study. Data were collected in the form of secondary data or data obtained from books, journals, newspapers, statistical data and other sources. The technique used for this research study is literature study. Ngada Regency has considerable potential for taro yams. Almost all of Ngada Regency cultivates taro yams. However, taro yam processing in Ngada Regency is still quite simple, such as steaming, frying, making compote and animal feed. The people of Ngada Regency certainly have great potential in processing taro yams into industrial raw materials and materials for food needs, such as turning taro yams into taro rice and taro flour. This needs special attention from the local government in empowering the natural resources owned, to open up business potential and encourage job creation for the community, as well as MSME businesses. Ngada Regency is the third largest district on Flores Island in terms of taro yam cultivation, with 2,916 taro yams produced.

Published Online: December 14, 2024

Corresponding Author: Maria Alfonsa Ngaku

KEYWORDS: Potential, utilization, taro yam, food

INTRODUCTION

Indonesia has a diverse range of local foods with promising potential as alternative food options. These include maize, beans, and tubers that are utilized in various regions to improve food security. (Sulistyowati, et al., 2014). The tubers are one of the local food crops that have long been left by the ancestors which is also a source of food other than rice. These tubers have an important role, namely as local food which is certainly healthy and nutritious for the community. Various types of tubers such as cassava, jalas, taro, kimpul and gayong have the potential to be utilized more effectively as the main alternative to rice in the diet (Ashary, 2010).

Taro, scientifically known as Colocasia esculenta L., is a bulb-like plant that grows abundantly underground, reaching heights between 0.4 and 1.5 meters. Taro leaves typically grow in 2-5 leaflets, featuring bright green petioles that are striped with dark green or purplish colors ranging in length from 23 to 250cm. The base of taro takes on a midrib shape, featuring leaflets that range from 6. 60 to 7. 53 cm in size and are ovate, oval, or oblong with pointed tips. Sometimes, a slight ivory color can be observed around the stem. The underside of the leaf has a waxy texture, while the base is rounded. (Steenis, 1981). The significant amount of carbohydrates found in taro makes it a top choice to replace rice as a staple food. Taro holds great promise to be processed into various food products to help address various nutritional issues and generate additional income for local communities. Taro is rich in essential nutrients, providing water (73%), energy (98 Kcal), protein (1.9 g), fat (0.2 g), carbohydrates (23.7 g%), as well as essential minerals such as calcium (28 mg), phosphorus (61 mg), and iron (1.0 mg). It also contains beneficial vitamins such as Vitamin A (20 SI/100g), Vitamin B (0. 13 mg%), and Vitamin C (4 mg%) (Rahmawati et al., 2012).

Ngada Regency is a district that has its own natural strengths and is also rich in natural resources such as local food, one of which is taro yam. The people of Ngada Regency use taro yams as food to meet their basic needs in addition to rice. Taro yams are also used as a basic ingredient for making flour, cakes, compote, traditional ceremonies and also for making feed for livestock, both ruminants and poultry.

Taro, an indigenous Indonesian food source, grows naturally in Ngada Regency. As one of the abundant vegetable resources in Ngada Regency, taro has great potential to improve food security by utilizing it as a food source.

RESEARCH METHODS

This research uses qualitative methods. The type of data used is secondary data obtained from books, journals, newspapers, statistical data. The method used is to review the research is literature study. According to (adlini et al, 2022) it is explained that this information is collected through a systematic approach by involving from various sources such as books, diaries, and research data conducted and disseminated by scholars. Taro yam data was taken from BPS data of Ngada Regency. The reason for taking the data is because the Flores plain, especially Ngada Regency, has abundant taro yam production. In the next stage, the data found from data sources such as BPS data will be processed and then narrated and or quoted references to be displayed as research findings and abstracted and draw a conclusion.

RESULTS AND DISCUSSION

Taro Potential

Taro provides promising opportunities for development as a versatile food and industrial resource in Indonesia with potential for export to Japan (Sutardjo 2012). Taro is rich in carbohydrates, proteins, minerals, and vitamins. Taro has minimal starch granules and is easily digested, improving digestive health and suitable for toddlers. Taro collagen protein offers skin-healthy benefits which is why it is classified as a major component in cosmetic formulations (Temesgen and Retta 2015; Fitriani *et al*. 2016). Taro shows promise in the production of various processed foods such as chips, taro sticks and flour. According to research, taro offers a wide range of health benefits. (Dalimartha, 2006) has a function as a medicinal plant to treat diseases such as skin inflammation, boils, bloody discharge, scalding, itching, diarrhea, new wound dressing.

Taro flour is versatile and can be transformed into a variety of delicious snacks such as cakes, buns, cookies, wet cakes, and even meatballs. Functional food potential can be seen in taro flour extracts consisting of bioactive water-soluble polysaccharides (PLAs) DP4 at 72. 35% and DP5 HPLC at 87. 98%, which is aimed at combating degenerative diseases. The industrial potential of taro starch lies in its capacity to be a valuable source of industrial starch. It typically consists of 13-29% starch, 63-85% moisture content, and various residues such as riboflavin, vitamin C and ash. Taro starch offers exceptional expandability and viscosity allowing it to develop a velvety gel structure due to its small grain size. Taro contains high amounts of carbohydrates making it a promising option for ethanol production. Sadimo *et al*. (2016) found that taro tuber starch with the highest sugar content was achieved using a ratio of 15% hydrochloric acid to taro tuber starch in a ratio of 10:1 in volume percentage to base, which resulted in a sugar content of 0.651%. The optimal hydrolysis duration to achieve the highest sugar concentration was 2.5 hours resulting in a sugar content value of 0.653%. Further research findings showed that the bioethanol yield from fermentation of taro tuber starch with baker's yeast for 5 days was 7.716%.

Ngada Regency has considerable potential for taro yams. Almost all of Ngada Regency cultivates taro yams. However, the processing of taro yams in Ngada Regency is still quite simple, such as steaming, frying, making compote and animal feed. The people of Ngada Regency certainly have great potential in processing taro yams into industrial raw materials and materials for food needs, such as turning taro yams into taro rice and taro flour. This needs special attention from the local government in empowering the natural resources owned, so that it can open business opportunities and create jobs for the community and MSME businesses. Ngada Regency is the third largest district on Flores Island in terms of taro yam cultivation, with 2916 taro yams produced. The large amount of taro yam production is certainly not separated from the adequate environment, the average community of Ngada Regency is a holti farmer, so it is not surprising that when it comes to cultivation, of course the farmers or people of Ngada Regency already have a lot of experience in agriculture. This is supported by research conducted by (Ngaku, et al., 2024) on increasing sweet potato production in West Manggarai Regency is closely related to government support. The government consistently provides valuable knowledge and information to farmers and extension workers play an important role by providing crucial guidance and interacting with farmers.

Land Potential for Taro Potato Development

Ngada Regency has rolling hills and steep terrain. Most of the slope composition consists of inclines ranging from 26 to 40%, covering 21.5% of the total area of Ngada Regency. The landscape of Ngada Regency mostly consists of areas ranging from 0 to 250 meters above sea level, but most residential areas are located at an altitude of more than 250 meters above sea level. Overall, the topographic features of Ngada Regency can be classified into five categories according to Van Zuidam's slope classification: flat, gentle, gentle, steep, and very steep. A number of sub-districts are characterized by slope and steepness. These sub-districts include Bajawa, North Bajawa, Golewa, West Golewa, South Golewa, Jerebuu, Inerie, Aimere, Riung, and West Riung.For more details, see the topographic map of Ngada Regency below.

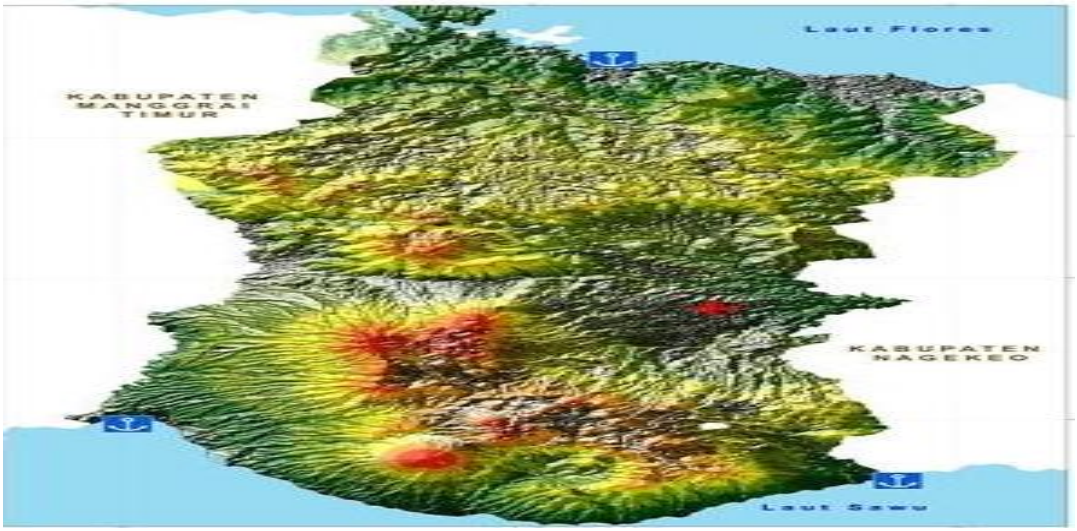

Figure 1: Topographic map of Ngada Regency

From the brief description of the topography of Ngada Regency above, we can see that Ngada Regency is a district with an altitude of more than 250 meters above sea level. Of course, with this altitude, Ngada Regency is very suitable for cultivation such as horticultural crops, tuber crops such as taro yams, cassava and sweet potatoes, and plantation crops such as coffee. This is also supported by the beautiful environmental conditions in Ngada Regency, which are largely determined by the mountainous and coastal areas that surround it, resulting in climate interactions that cultivate abundant rainfall. Ngada Regency has an area of approximately 1,620,620. 92 square kilometers of land, along with 708. 64 square kilometers of water, with a beautiful stretch of beach measuring 102. 318 kilometers.

The potential land for taro yams in Ngada Regency looks quite extensive. There is no need to worry that planting taro yams will not reduce the land area that has been used by rice, corn, soybeans, and so on because taro yams have their own uniqueness in terms of growth. Taro yams can grow between stands of plants, as a shade crop. It is not even recommended to grow taro in monoculture. Let taro grow between stands, shaded because the production will be better.

One of the growing requirements for taro yam is the right soil content. Although taro yams can grow in a variety of soils, the maximum results obtained are planted on sandy loam soils such as alluvial with high humus/BO. Therefore, anyone who grows taro is strongly advised to use manure or other organic fertilizers at the rate of 2 kg to 3 kg per planting hole. Taro yam requires a soil pH of 5.5 to 7.0. The optimal altitude for planting taro is 400-1,000 meters above sea level. The most effective rainfall is 1,000 mm/year with a temperature of 21^0 C to 28^0 C.

Utilization of taro yam as a food ingredient

Taro is part of the tuber category that is commonly used in various processed foods, ranging from chips to delicacies. In Indonesia, various types of tubers thrive and are cultivated as an alternative to rice. Since there are different types of taro available, many processed forms can be made. Different varieties of taro come in different colors such as purple, yellow, brown, white, and many more. Alternative food activities have increased taro productivity, with yields reaching 661 quintals per hectare in some areas in 2011 (Nurbaya & Estiasih, 2013).

Taro plants can be used as animal feed, while various parts of the plant have multiple uses; the leaves and petioles can be eaten as vegetables, and the tubers can be used as a substitute for rice for human consumption. Taro is an important food ingredient as it not only provides carbohydrates, proteins, and fats, but also has various essential minerals and vitamins, making it suitable for medicinal purposes (Hellin Mardina, 2022).

The benefits of taro yams for the people in Ngada Regency are as a source of local food, whether processed through steaming, frying, making compote, and ingredients for traditional events. On the other hand, taro is also widely used as food for livestock, usually the stems, leaves and tubers are the most widely used for livestock. However, the use of taro yam in Ngada Regency is still done traditionally, this certainly needs special attention from the Ngada Regency government in seeking to develop taro yam-based local food sources by utilizing modern technology in order to create products and business opportunities for the community in general, as for the processing that needs to be done from taro yam is flour, various cakes, taro yam pasta, taro ice cream, taro noodles, thickeners and analog rice from taro yam. An additional advantage of taro, as highlighted by Dalimartha (2006), is its effectiveness as a medicinal herb to treat a variety of skin problems including inflammation, ulcers, bleeding, burns, itching, diarrhea, and wound care. Mar'atirrosyidah and Estiasih (2015) stated that bioactive compounds found in indigenous tubers have antioxidant properties that help combat free radicals in the body. Based on statements from various experts and research results, it is evident that taro as a local tuber has significant benefits for the body. We can enjoy the benefits of taro not only by boiling it, but also by doing various industrial processing methods until it turns into processed products.

Taro Postharvest Technology in support of Food Security in Nagada Regency

The potential for taro yam development in Ngada Regency is certainly extraordinary. However, every potential has challenges, obstacles and threats that will be faced. To find out what is and will be faced and what factors can be maximized to achieve goals, it is necessary to conduct a SWOT analysis.

Strengths

The strengths and advantages of taro yam are that it is a unique plant species that is highly adaptive to the environment. It can grow well on any land area in Ngada Regency with no special care required. Because it can grow anywhere, taro yam can even grow under standing trees. Taro yam can now be widely developed through the production of seeds and seedlings with various developments. Of course, it needs to be supported by existing regulations as well as guidance or mentoring for farmers or business actors in Ngada. The next advantage is the nutritional content of taro yams. This plant can be used as an alternative food source. It can be used as a source of carbohydrates to replace rice. Taro yam can be consumed in the form of analog rice, noodles, pasta, and the like (Ubayah Damayant, et al., 2022).

Weaknesses

One of the disadvantages of taro yams is that there is an itchy feeling due to the high oxalic acid content. This makes consumers need time to consume taro yams. However, after research at Gapoktan Juhud, it turns out that it can be found how to reduce the oxalic acid content, namely by choosing a planting site. This method proved effective after the experiment. That is why there are some taro yams that can be consumed directly (without cooking / raw) without causing itching. In general, many farmers ignore administrative matters when cultivating. Many beneng taro trees have no information on them. This includes data on the age of the taro trees, the population of plants based on planting age, information on the condition of the trees, information on what technology is needed or being applied, and so on. If there is a certification program, these details are needed, especially in the seedling section (Ubayah Damayant, et al., 2022).

***Threat* or Challenge**

We all know that *climate change* is a threat to humans in the world so it is unpredictable how the weather conditions will be today. Unlike decades ago when the rainy season and dry season could still be predicted. This climate change will also bring extreme weather that has never happened before and now it could happen. Income is a topic that is always hotly discussed. As farmers, the majority of them give all their time to farming. Of course, this makes farmers' income highly dependent on the yield and selling value. If you want a large income, the harvest produced must be large in quantity and high in quality. Of course, this goes back to the interconnectedness of the upstream and downstream cycles. This challenge related to income/value-added needs to be regularized or regulated to provide justice proportionally for all parties (Ubayah Damayant, et al., 2022).

Opportunity

Natural and human resources, as well as institutions, related to taro yam in Ngada Regency are quite good. Farmers and the community can work together to promote the cultivation of this crop. They can now feel the results when the demand for taro yams upstream increases and the processing of food products downstream is also growing rapidly. This is what makes the opportunity to be able to expand the market wide open to a greater extent (Ubayah Damayant, et al., 2022).

CONCLUSION

From the description of the discussion above and the objectives of the study, the author can draw a conclusion that the potential for utilizing taro yams as food is certainly quite good. However, the utilization of taro yam in Ngada Regency is still classified as very traditional processing. This needs the attention of the local government in seeking and empowering existing resources, so that it can become a business opportunity that is useful for the community itself and also for the government. In this case, the benefits include a long-term food supply in the event of a food crisis.

REFERENCES

1. Sulistyowati, N. KendarinandRespatijarti. 2014. Observation of the Existence of Taro Plants of the Genus Colocasia and Xanthosoma in Kedungkandang sub-district of Malang City and Ampelgadingkab. Journal of Plant Production, 2(2): 86-93.
2. Ashary, S.S. 2010. Study of Gayonh (Canna edulis Ker) Diversity in Surakarta Ex- Karesidenan Area Based on Morphological Characteristics and Isozyme Band Pattern. Thesis. Faculty of Mathematics and Natural Sciences, Sebelas Maret University. Surakarta.
3. Yuliani, S. 2013. Psychochemical Characteristics of Tuber and Flour of Beneng Taro (Xantosoma undipes K.Koch) Cultivated and Wild. Thesis. Faculty of Agriculture. Sultan Ageng Tirtyasa University
4. Achmad, T., & Rahmawati, A. (2012). The effect of environmental performance on financial performance with corporate social responsibility disclosure as an intervening variable. Journal of accounting. Vol. 1 No. 2. Accessed on December 25, 2020. https://ejournal3.undip.ac.id/index.php/accounting/article/view/281

5. Adlini, Miza Nina et al. 2022. "Qualitative Research Methods of Literature Study." Edumaspul: Journal of Education 6(1): 974-80.
6. Adisusilo, Sutarjo. 2012. Value-character learning. Jakarta: PT Raja Grafindo Persada.
7. Temesgen, M and N. Ratta. 2015. Nutritional potential, Health and Food Security Benefits of Taro Colocasia esculenta (L.): A Review. The Open Food Science Journal 36:23-30
8. Afriana, J., Permanasari, A., & Fitriani, A. (2016). Application of STEM-Integrated Project Based Learning to Improve Learners' Science Literacy in View of Gender. Journal of Science Education Innovation, 2(2), 202-212.
9. Dalimartha, S. (2006) Atlas of Indonesian Medicinal Plants. Volume 5. Jakarta: Pustaka Buana
10. Sadimo, M. M., Said, I. and Mustapa, K. 2016. Preparation of bioethanol from taro tuber starch (Colocasia esculenta (L.) Schott) through acid hydrolysis and fermentation. J. Akad. Kim. 5(2): 79-84.
11. Ngaku, M.A., Kaleka, M.U., Bao, A.P., and Limbu, U.N. 2024. Prospects for Sweet Potato Development in Supporting Food Security in West Manggarai Regency. Journal of Agricultural Sciences.
12. Nurbaya, S.R., Estiasih, T. 2013. Utilization of Fleshy Yellow Tubers of Taro (Colocasia esculenta (L.) Schott) in Making Cookies.Journal of Food and Agroindustry. 1(1): 46-55
13. Hellin Mardina, A. K. (2022). profile of taro cultivation farmers. Journal of Natural Scientiae vol 2.no 2 November, 24-30.
14. Dalimartha, S. (2006) Atlas of Indonesian Medicinal Plants. Volume 5. Jakarta: PustakBuana
15. Mar'atirrosyidah, Rahmatul and Teti Estiasih. 2015. Antioxidant Activity of Bioactive Compounds of Local Inferior Tubers: A Literature Review. Journal of Food and Agroindustry. 3: (2).
16. Ubayah Damayant, et al, 2022. Socializing Tubers.Publisher: IPB Prees, Bogor-Indonesia