The Role of Technopreneurship on Development of Noodles and Testless Bread Products From Cassava (*Manihot Esculenta*)

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Abstract. This research is research and development on the form of experiments in the laboratory and aims to develop cassava products into noodles and testless bread with a touch of technology (technopreneurship). So far, cassava in Makassar is very abundant although not seasoned and the price is very low because the utilization by the community is still limited. Almost all communities in rural areas have cassava gardens. Therefore it is necessary to innovate its product development by being given a touch of technology-based technopreneurship through research. The results must be socialized so that the benefits are better and can be known by the community as raw materials for businesses that can be processed to be more productive to improve people's lives. Experimental research has been carried out in the PKK laboratory and continued its development and application in the field. It has been started from PNBP research in 2017 and continued in 2018 with PDUPT research in the laboratory and its application on the field in 2019. The research began of an experimental trial to obtain a prototype model of noodle and white bread products from cassava which continued development and application on the field to obtain the final product model that the public likes and is suitable for production and marketing. Using experimental research methods in the laboratory and field, followed by organoleptic tests for hedonic tests and hedonic quality tests with indicators of color, taste, texture, aroma, and product quality. Using an instrument checklist with 25 trained and non trained panelists. Organoleptic test results were analyzed by descriptive and mean test of SPSS program assistance. The product is noodles and white bread made from cassava with specific taste that is liked by the community and its quality is suitable for marketing.

Keywords: Development innovation, technopreneurship, cassava, noodles and white bread.

1. Introduction

Ubikayu or cassava (Manihot esculenta Crantz) is known by other names, namely cassava, ketela pohon, singkong, kassafe, bodin. Originally considered low food but now the government has considered cassava as a local food ingredient that can be used as an alternative staple food. Ubikayu did not originate

from Indonesia but apparently originated from the American continent namely from the State of Brazil but has spread throughout the world whose cultivation was developed by the Portuguese and Spanish. In Indonesia, it began to be known in the 16th century by the Portuguese but later in the 18th century it became a commercial plant. Now cassava is spread all over Indonesia and has popularized and made an alternative staple. Processing also varies. Rich in carbohydrates so that it can be processed into alternative staples, snacks, vegetables, cakes and snacks, chips and crackers, desserts, etc. Even further processed as a substitute for rice and flour. In Indonesia, cassava already has an important economic significance when compared with other tubers. Cassava is often processed into other processed products that have high economic value into various types of industrial products. Besides food, also cosmetics, medicines, paper raw materials, and energy.

The nutritional content in 100 grams of cassava is: carboxyrate 38.06 g, energy 160 calories, protein 1.36 g, total fat 0.28 g, cholesterol 0 mg, fiber 1.8 g, folate 27 mg, niacin 0.854 mg, pyridoxine 0.088 mg, thiamin 0.087 mg, vitamin A 13 IU, vitamin C 20.6 mg, vitamin K 1.9 mg, sodium 14 mg, potassium 271 mg, calcium 16 mg, iron 0.27 mg, magnesium 21 mg, manganese 0.383 mg, phosphorus 27 mg, zinc 0.34 mg. [1]. Cassava is rich in carbohydrates and is a staple food in barren regions in Indonesia. In addition to the tubers, the leaves contain lots of protein that can be used for a variety of vegetables, and the leaves can also be used as animal feed. Various kinds of cassava products include: noodles, crackers, instant tiwul, layer cakes, bidaran, sticks, pluntiran, tiwul, gatot. Noodles that have been researched and made from cassava actually already existed before but made from cassava flour or additional flour and other ingredients making the process of processing a long time. There have been studies using cassava flour and corn for noodles. Afifah & Ratnawati (2017) reported mocaf flour, rice and corn in the proportion of 40:30:30 producing noodles with the best protein and texture, but the cooking quality was still lacking [2]. Making noodles using composite cassava flour and corn flour has also been done by Pato et al. (2016) with the best proportion of 55:45. [3]. The absence of gluten in non-wheat flour causes the noodles to be brittle and break easily [4].

Therefore, the author tries to research by making new innovations that are given a touch of technology so that the resulting noodle and white bread products are better and more time-efficient, processing and processing costs so that they are easily carried out by the general public. Cassava flour based bread with emulsifier treatment results in significantly different levels of development in all treatments. This shows the more addition of emulsifier, the higher the bread. The level of development is closely related to the ability of the dough to hold CO2 bubbles during the fermentation process [5]. Nutrition of bread from cassava flour and soybean flour is greater than bread from wheat flour, but the ability to expand bread from cassava flour and soy flour cannot match bread from flour. [6].

Why choose Noodles and Fresh Bread? Because noodles are the most popular food by the people and are the easiest to process and serve. Likewise, white bread has become a favorite food substitute for rice. During this time the raw material is still very dependent on the flour that must be imported. Therefore it is recommended to be able to process food without depending on flour with substitute materials that can be varied so that the taste is still preferred by the community. Why choose white bread? Because it can be developed into various sweet breads with varied contents. Cassava raw material so that it can reduce dependence on flour that is still imported by utilizing local materials that are in a very abundant environment and are everywhere. Therefore it is necessary to be given a touch of technology so that the results are better and preferred by the community, because it requires technology that can improve the quality of products that are efficient and effective. Technology is the study and practice of ethics to facilitate and improve performance, through the creation, use, regulation of processes, and resources. Technology is the overall means for providing goods needed for the survival and comfort of human life. Technology is the whole of human activity and methods that rationally lead to effectiveness and efficiency. Can be application of science to behavior, supervision to solve problems. It can be in the form of tools, machines, processes, activities or ideas created to facilitate human activities in daily life. Its role and benefits are to improve the quality of results efficiently and effectively.

What is technopreneurship for? Technopreneurship is the process of commercializing less valuable technological products into high-value products, thus attracting consumer interest. Technopreneurship

is a combination of two words namely technology and entrepreneurship means developing entrepreneurship by using technology. Entrepreneurship is entrepreneurship, while the perpetrators are entrepreneurs or entrepreneurs. Technopreneurship is the process of forming a new business that involves technology as its base so that it is expected to create the right strategy and innovation, by placing technology as one of the factors of national economic development. Cosmin Mihai Nacu (2014) argues that technological entrepreneurship is "The road to success in technological entrepreneurship as" starts with an idea and culminates with a successful outcome. [7]. However, there was plenty of technological entrepreneurship research "in Figure 1 as" over the past quarter century so that it can provide some guidance. At the World Economic Forum in 2010 it was discussed that technology as a necessity for the integration of policies in the European Union, which was even strengthened by the Lisbon agenda. More specifically, it was needed for inclusion and reduction of technical gap after the 2004. Up to now, the innovative situations in Central and Eastern Europe (CEE) were modest, but the role of Research and Development is likely to increase in line with the global restructuring of Research and Development. See Figure 2. [8]. The concept of ecopreneurship is often equated with green entrepreneurship, environmental entrepreneurship, and technopreneurship with technological ecopreneurship. There are various reasons why this is so. There is a growing emphasis on environmental sustainability, which gained momentum in the business environment.

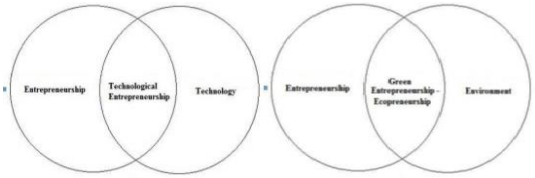

Figure 1. Technological Entrepreneurship. and Figure 2. Ecopreneurship

Innovations in the development of noodle and testless bread products from cassava are the result of the development of utilization by mobilizing technological knowledge and skills, and experience to create or improve new products, processes and systems that provide significant value or value in the economic and economic fields. Innovation is an activity which is the process of creating new designs by commercializing copyright inventions. According to Rogers innovation is an idea, ideas, objects, and practice which is based and accepted as something new by a person or a certain group to be applied or adopted. Innovation means 'renewal' or 'change'. Innovation is defined as ideas, findings, ways or objects that are considered new by individuals, organizations, or social systems. The aim is to improve quality, reduce costs, create new markets, expand product range, replace products and services, reduce energy consumption.[9].Improvement of ideas is to produce improved effectiveness and efficiency in a system.

2. Research Methods

This research is a type of Research and Development (R&D) aimed to developing innovative noodle and white bread products fr om cassava with a touch of technology and applying them in the field. In the initial stage, researchers developed prototype models of noodle and white bread products from cassava through experimental the laboratory to obtain locally based product model prototypes. Research using Joke Model with components: initial findings, design development, realization and formation of a model/prototype, tests, validation and revision, implementation and application of models, evaluation (results), product dissemination.[10]. Experimental research in the laboratory is a quasi type one shot case (XO) experiment [11] but the experimental research continues to application of the model in the field, with surveys and field practice as participants.

Time and place of research: Experimental research has been carried out in the PKK Laboratory (PNBP, 2017 and PDUPT, 2018) and now in 2019 fieldwork was conducted in five districts.

Ingredients: Old, fresh and good quality cassava wood for noodle and white bread products according to the results of laboratory test recipes for field tests. Noodles and white bread are innovated with the

use of materials and processing methods with a touch of technology and technological tools. Application in the field was developed from the best results of laboratory tests. The tools used are adjusted to the application with additional technological tools needed (Re-Noodle and Re-Bread).

Research design: the results of experimental in the laboratory have been carried out three times involving five students and have produced a model called prototype product model that the best fits factory-based product standards so that it is more marketable and preferred by panelists and consumers so they are ready to be marketed.

The unit of analysis: there are two kinds of noodle and white bread products from the results of laboratory experiment trials from cassava flour and fresh cassava, but presented in this article are the results of application in the field are noodles and bread from fresh cassava raw materials with consideration of ingredients easy to get in the area and fast and easy processing.

Research Procedure: Starting from the survey for initial findings about materials, theoretical and prescription studies, design development models, the realization and formation of model / prototype product models that have been tested in the laboratory and the best results selected are applied to the application in field research. The research population is old cassava which is old, good, fresh and available in the area. Samples of research materials taken incidentally are available in the area. A total of 10 kg. The implementing population is PKK mothers at La'bo and Pantiasuhan Daya, who want to develop a business or entrepreneurship. The number of participants are 20 peoples. The research was conducted in La'bo' North Toraja Village and Orphanage in Daya' Makassar.

Data collection techniques used in this study were organoleptic tests for hedonic tests and hedonic quality tests by 25 panelists. Involving four students, one businessman, and a research team. Using triangulation with data sources from instrument checklists, observations, interviews, document analysis, FGDs, research the development and application of prototype product models from previous laboratory test results. Organoleptic tests are used for hedonic tests and hedonic quality tests.[12]. This method has been used by Jokebet in previous studies. Organoleptic tests have collected data on laboratory results and field test results by panelists with observations, interviews, FGDs, and questionnaires. Noodles and testless bread products from cassava which are examined in the field, the data are collected by organoleptic testing by 25 trained and untrained panelists. [13]. This method has been carried out using triangulation of data collection techniques and was successful. It is a testing method that uses the human senses as the main tool for measuring the acceptability of the product and its quality. Indra is used to evaluate products with four main criteria, namely taste, color, texture and aroma. All four were assessed for hedonic testing and hedonic quality.[14]. Stone explained that organoleptic testing is testing food products based on the level of preference and willingness to use a product. Organoleptic test, sensory test or sensory test is a way of testing using the human senses as the main tool for measuring the acceptance of the product. Organoleptic testing can provide indications of decay, quality deterioration, product damage called hedonic quality assessment [15]. Organoleptic testing requires panelists for assessment. There are 7 types of panels that are usually chosen, namely (1) Individual expert, (2) Limited tasting panel (small expert panel), (3) Panel trained (panel), (4) Untrained panel, (5) Panel is somewhat trained, (6) Consumer panels, (7) Children's panels [16]. This field research used 25 trained and unskilled panelists.

Data analysis technique. Data were processed and analyzed by mean and descriptive analysis with help of the SPSS program [17]. Qualitative data were analyzed qualitatively. The research team and students involved were fully involved in all field experiment activities. Performance Indicators are noodle and testless bread products that are produced based on technopreneurship, ecopreneurship, and factory quality models. The products are noodles and testless bread that tastes delicious according to the quality of industrial products, local raw materials and ecosystems. The aim is to produce industrial-based noodle and white bread products, made from local and environmental raw materials. Can be used as teaching materials for entrepreneurship training in the community.

3. Research Result and Discussion

The results of the development of noodle and testless bread products which are given a technological touch have produced noodles and testless bread with specific savory flavors. The experimental research process was carried out at the PKK laboratory in 2018 and experiments for application in the field in 2019. Experiments using cassava flour and fresh cassava flour according to the recipe without flour mixture. Testless Bread Recipes: 500 grams of cassava, 5 tablespoons of powdered milk, 2 chicken eggs, 3 tablespoons of white butter, 200 ml of cold water or ice water, 3 tablespoons of granulated sugar, 1 tablespoon of instant yeast, 1 tablespoons bonus baker, 1 teaspoon of fine salt. Goku noodle recipe: 500 grams of Cassava, 2 pieces of Chicken Eggs, 5 tablespoons of Cooking Oil, 1 teaspoon of Salt, Flour for sprinkles to taste. The results presented in this paper are products of fresh cassava on the grounds of young made and the process is fast. The process and products are as follows:

Figure 2. Materials and tools used (Fresh Cassava, Re-Bread, and Re-Noodle) and Product Result

Figure 3. Cassava Tasteless Bread with Selai (Jam). Goku Cassava Noodle (Fresh and Olready Cook and Ready to serving

Data of field experiment research results were tested organoleptic to assess the level of preference and product quality (hedonic and hedonic quality) has been carried out by 25 trained and untrained panelists namely PKK lecturers, PKK students, and consumers using a score sheet in the form of a checklist that has been validated. The results of the analysis presented are data from the latest results of the product models that have been recommended by panelists to be made into prototype products because their quality is considered to be good and very preferred by panelists. Summary of the results of the final organoleptic data analysis presented in full in the following table. [18]. The assessment rubric is based on hedonic tests and hedonic quality tests using a scale of 1-5.
Description: Organoleptic test for hedonic assessment and hedonic quality with scale 1-5.
Hedonic Assessment Rubric: 1 = Very Unlike, 2 = Don't Like, 3 = Somewhat Likes, 4 = Likes, 5 = Very Likes. Hedonic Quality Assessment Rubric: 1 = Very Not Good, 2 = Not Good, 3 = Somewhat Good, 4 = Good, 5 = Very Good. Summary of the organoleptic test results by panelists for hedonic and hedonic quality can be seen in the tables 1,2,3. Summary of Organoleptic Test Results as follows:

Tabel 1. Summary of Hedonic Asessement Result of The Last Field Experimental Research

Model Product	Aroma					Color					Texture					Flavor				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1. Cassava testless bread/f	0	0	4	16	5	0	0	7	14	4	0	0	4	16	5	0	0	3	14	9
%	0	0	16	54	20	0	0	28	66	16	0	0	16	64	20	0	0	12	56	36
2. Goku cassava noodle/f	0	0	8	14	3	0	0	4	15	6	0	0	3	15	7	0	0	3	15	7
%	0	0	32	56	12	0	0	24	56	20	0	0	12	60	28	0	0	12	60	28

Source: Analysis Result of Organoleptic Test . Data From Panelists (2019)

Tabel 2. Summary of Hedonic Quality Asessement Result of The Last Field Experimental Research

Model Product	Aroma					Color					Texture					Flavor				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1. Cassava testless bread/f	0	0	10	10	5	0	0	5	12	8	0	0	3	12	10	0	0	4	13	8
%	0	0	40	40	20	0	0	20	48	32	0	0	12	48	40	0	0	16	52	32
2. Goku cassava noodle/f	0	0	4	14	7	0	0	4	13	8	0	0	0	11	14	0	0	0	12	13
%	0	0	16	56	28	0	0	16	52	32	0	0	0	44	56	0	0	0	48	52

Source: Analysis Result of Organoleptic Test . Data From Panelists (2019)

Tabel 3. Summary of Mean Analysis Result of Hedonic and Hedonic Quality Asessement. Result of The Last Field Experimental Research (Table 1) and (Table 2)

Model Product	Aroma		Color		Texture		Flavor	
	Hedonik	Mutu Hedonik	Hedonik	Mutu Hedonik	Hedonik	Mutu Hedonik	Hedonik	Mutu Hedonik
1. Cassava testless bread/f	4.04	3.8	3.88	4.12	4.04	4.28	4.20	4.16
2. Goku cassava noodle/f	3,8	4.12	4.08	4.32	4.16	4.56	4.16	4.52

The results of the last experimental research [19] based on the results of the final data analysis can be explained that the quality and acceptability of panelists and consumers on the aroma, color, texture, flavor of testless bread products and cassava goku noodles are already very good. In terms of aroma, color, texture, taste, it has generally been liked and its quality has been rated very well. The assessment of the products of testless bread and cassava goku noodles in terms of aroma, color, texture, taste, has been liked and assessed by panelists and consumers of good quality and worthy of being produced for consumption and for marketing. The average value of hedonic test for both products is 3.8 - 4.52 and the average value of hedonic quality test for both products is 3.8 – 4.52. The aroma and color of the taste is still rather low but the taste and texture is very good. Why are its low because testless bread and noodles, the aroma and color are not very interesting but the more authentic the better. Frequency and percentage who like quite a lot. The quality is also considered good and is worthy of being marketed. However, there will still be continuous improvements to the aroma and color to match industry standards. The conclusion is that the results of the research are generally favored in terms of aroma, color, texture, flavor, and that the quality is considered good from the field experimental results as presented above. White and natural color is also preferred by panelists because it is considered not contaminated with chemicals. If anyone wants to give a natural food coloring or special bleach for bread, that's fine so it's more interesting. This product will continue to be developed and improve the aroma and taste. It has been produced, distributed and was applied on the field research in July 2019. This is a product model that will be further developed.

4. Conclusion

From the results of surveys in the community, cassava is found in all regions in Indonesia. The benefits are huge and the nutrient content is high but often abundant in the season and thrown away as waste because it is not processed due to the ignorance of the community to process it into productive material that has high economic value. The use of unused cassava as noodles and white bread as a substitute for staple food because the nutritional content meets the needs and is very much in the community gardens in Makassar, sometimes abundant and damaged and thrown away into trash, even though the tree grows very much in Makassar and the potential for utilization is very large. That is why the writer chose cassava as one of the important ingredients to be studied and the results were socialized as well as motivating the community to use it. The author has conducted field trials through community empowerment training for home industry coaching and it turns out that it is very popular. Students are involved to become developers, innovators, and agents of innovation for the community to utilize local food in their environment as a source of productive income, while at the same time reducing unemployment and

creating new jobs to improve people's lives. The results that have been achieved are noodle and testless bread products that have been given a touch of factory-based technology (technopreneurship) so that the products have high economic value, are innovative and can be entrepreneurized. This product is based on technopreneurship. If produced and utilized properly, the community will have new jobs as well as more productive sources of income based on the environment whose raw materials are cheap and easy to obtain but can be processed into products with national industry standards.

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