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Agribusiness Prospect of Banana Flowers and Oyster Mushrooms as Raw Materials of Meatballs Vegetarian

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Abstract

Meatballs are one of the popular foods in Indonesia which are generally made from beef meatballs, chicken meat, and fish. However, some Indonesian people like meatballs but cannot consume meat for various reasons, one of which is nutrition and health. Therefore, the author tries to make meatballs made from banana blossoms and oyster mushrooms that can reach that community and are also healthy and nutritious. In this study, the authors determine the right formula between the flower of a banana with oyster mushrooms to get the best taste and quality. Then the authors analyzed the levels of crude fiber, water content, protein content, and organoleptic properties of vegetarian meatballs. After ensuring nutrition, the author also conducted a financial feasibility analysis for this vegetarian meatball. The author's research was conducted at Jalan Bambu Kuning National University Laboratory Center Building, South Jakarta, from December 2013 to June 2014. This research resulted in conclusions that the vegetarian meatball formula with a ratio of 40% banana blossom and 60% oyster mushroom is the best formula and meatball making business. This vegetarian can make a profit of IDR 10,560,000 per month.

Keywords: Banana flower, Oyster mushrooms, Vegetarian, Meatballs,

INTRODUCTION

Meatballs including one popular food in Indonesia, mostly raw materials are beef meatballs, meat, and fish epilepsy. Price meatballs are also very affordable to the community, but there are certain groups of people who do not consume meat, so they can not enjoy the meatballs are sold in the market. Shifting the public's understanding of a healthy lifestyle with healthy and nutritious food utilization. One food product that can be categorized as a healthy and nutritious meal is vegetarian meatballs made from banana and oyster mushrooms.

Banana is one of the featured fruit commodities in Indonesia and is one of the primary centers of diversity of banana plants, both fresh bananas, processed and wild bananas. More than 200 varieties of bananas are in Indonesia. This high diversity provides opportunities for Indonesia to take advantage of and choose the type of commercial banana required by the Indonesian consumer.

Banana contains nutrients that are beneficial for the body: proteins, carbohydrates, fats, minerals, and vitamins A, B1, and C. Banana flowers also contain dietary fiber that

is beneficial to the body. Kusumaningtyas (2011) conducted a study of making jerky and shredded from banana and produced products that are similar to beef jerky and shredded meat of beef. Based on that study, banana flowers were allowed to be used as raw material for making meatballs.

Banana flower or commonly known as banana has been used as a vegetable. Not all types of bananas are palatable for some types of bananas have a high tannin content. Banana has a low protein content so that it becomes a problem of making meatballs because meatballs were generally high in protein. The protein content of banana meatballs can be improved with the addition of other ingredients that are high in protein, such as catfish (Eko Pradana, 2013). Banana fiber has a structure like meat so that it can be used as an ingredient in processed foods meat substitutes. Meanwhile, according to Munadjim (2012). Banana fiber amounted to 11.12% and also contain high nutritional value, namely 2.10 g protein, 0.46 g fat, 6.24 g carbohydrate, 8 mg calcium, 0.7 mg iron, phosphorus 60 mg, vit A 170 Si, 0.03 mg vitamin B, vitamin C 7 mg.

White oyster mushroom (*Pleurotus ostreatus*) is one type of vegetable potential to be developed. Oyster mushrooms contain the essential amino acids that are important for the body, a good source of vitamins B1, B2, C, and a source minerals, such as calcium and phosphorus. Oyster mushrooms contain no cholesterol so that they can be used as processed foods that are delicious and nutritious, in addition to the white oyster mushroom contains glutamic acid which can lead to flavor savory, savory, and delicious that oyster mushrooms potential as a food flavor enhancer (Tjokrokusumo, 2008).

The development of agriculture has an important role in enhancing the national economy, especially the economy of the people. Attempts to processing agricultural products to be supporting the success of the agriculture industry. It is expected that the processing of banana and oyster mushrooms become vegetarian meatballs will be able to increase the added value of banana and oyster mushrooms which have very low economic value. Besides making meatballs can add diversification vegetarian food based on local resources.

Oyster mushrooms also have excellent nutritional content, from the results of the study, the average mushroom contains 19-35 percent protein, an essential amino acid found in mushrooms there are nine types of the 20 known amino acids, and contains 72 percent saturated fat. Mushrooms also contain a variety of vitamins, including B1 (thiamine), B2 (riboflavin), niacin, and biotin. In addition to microelements, mushrooms also contain various types of minerals, including K, P, Ca, Na, Mg, and Cu. The fiber content ranging from 7.4 to 24.6 percent is very good for digestion. Mushrooms have a very low-calorie content making them suitable for dieters. According to Djarijah (2001), oyster mushrooms contain fats by 1.7 to 2.2%, from 10.5 to 30.4% protein content, fiber content from 7.4 to 24.6%. Amino acids contained in the oyster mushroom is isoleucine, lysine, methionine, cysteine, phenylalanine, tyrosine, threonine, tryptophan, Valina, arginine, histidine, alanine, aspartic acid, glutamic acid, glycine, proline, and serine is needed by the human body,

The meatballs are generally made from beef that is high in protein and cholesterol. Today some people begin to reduce the consumption of food high in fiber, therefore it is necessary efforts to reduce the use of beef in making meatballs. Banana contains nutrients that are beneficial for the body: proteins, carbohydrates, fats, minerals, and vitamins A, B1, and C. Jantungpisang also contains dietary fiber that is beneficial to the

body. In addition to the heart of the banana as an additive used oyster mushrooms also contain fiber and protein that is high enough.

METHOD

Location and Time Research

Research conducted at the Laboratory Agricultural Sciences, Bambu Kuning Building Laboratory of the Nasional University, South Jakarta. The study was conducted from December 2013 to June 2014.

Materials and Tools

The materials used in vegetarian meatballs are banana kepok, oyster mushrooms, garlic, salt, pepper, and Kepok banana flower.

The tools used are stainless pots, gas stove, blender, pestle and mortar, knife, cutting board, colander, wooden stirrers, spoons, scales kilogram, analytical balance, pH meter, flask, Erlenmeyer, and thermometer.

Experimental Design

The design used in this study is a completely randomized design (CRD) with three replications. The treatment in this study is the difference in the ratio of banana and oyster mushrooms, there are six combinations of the experiment with three replications, namely: A1 = ratio of banana: Oyster mushroom (100: 0), A2 = ratio of banana: Oyster mushroom (80: 20), A3 = ratio of banana: oyster mushroom (60: 40), A4 = ratio of banana: oyster mushroom (40: 60), A5 = ratio of banana: oyster mushroom (20: 80), A6 = ratio of banana: oyster mushroom (0: 100).

The parameters tested in this study are the fiber content, water content, protein content, moreover also tested organoleptic properties including color, texture, aroma, taste, and preferences.

Data Analysis

Data obtained from semus parameters were statistically analyzed using analysis of variance (ANOVA). if Fhitung≥ Fdenganuji table then followed Duncan's New Multiple Range Test (DNMRT) at 5% level. Variables observed were the result of meatballs include color, aroma, flavor, texture, and fondness for meatballs were determined by organoleptic tests.

Making the meatballs Vegetarian

The outside of the banana in the exhaust appears reddish-white color and boils for 30 minutes. After the soft texture of banana, drained and squeezed straight banana mashed with a blended way. Prepare oyster mushrooms as the raw material mixture in a way in the wash clean, refined in the same way. Mix the raw materials under a predetermined formula stir add the ice cubes and spice paste. Finally, add the tapioca flour little by little until the dough is homogeneous and not attached to the hands. Print dots meatballs by hand and enter them into the boiling water. Wait until the meatballs float in boiling water until 15 minutes after the meatballs are removed and drained let stands for one hour and store in the freezer.

Table 1. Formulation Batter Meatballs Vegetarian Appropriate Treatment

Ingredients	A1	A2	A3	A4	A5	A6
Banana flower (g)	100	80	60	40	20	0
Oyster Mushrooms (g)	0	20	40	60	80	100
Tapioca (g)	50	50	50	50	50	50
Salt (g)	1.5	1.5	1.5	1.5	1.5	1.5
Pepper (g)	1	1	1	1	1	1
Garlic (g)	2	2	2	2	2	2

Chemical analysis

Determination of Water Content

Material weighed 5 grams by using aluminum foil. Put in the oven with a temperature of 80 ° C for 30 minutes. Lifted and put in a desiccator for 15 minutes. Weighed and calculated water content:

Moisture = initial weight - final weight in the initial weight x 100%

Determination of protein content

The Kjeldahl method is a method of assay rough protein (crude protein). To determine the protein content in foodstuffs (proximate analysis). This method is based on measuring the levels of total nitrogen in the sample/sample. The protein content can be calculated by assuming a certain ratio between the proteins to nitrogen for the analyzed sample.

Determination of protein in the Kjeldahl method is based on the assumption that the protein nitrogen content of about 16% for nitrogen does not only come from protein. Nitrogen is found on nonprotein components such as free amino acids, small peptides, nucleic acids, phospholipids, sugar amines, porphyrins, vitamins, alkaloids, uric acid, urea, ammonium ions. Nitrogen measured at the Kjeldahl method of protein analysis not only on the protein on the material, a fraction of the components of non-protein nitrogen. To change from the levels of nitrogen into protein levels used numbers 100/16 or a conversion factor of 6.25. While some types of foodstuffs conversion factors used are different.

Determination of Levels of Fibers

Determination of crude fiber content Method: SNI 01-2891-1991 7.1 How To Test Food and Beverages. The working principle of the extraction sample in acid and alkaline is to separate the crude fiber and other materials. Determination of crude fiber by weighing 4 grams of sample 2- lose fat by extraction or by the addition of an organic solvent and then stirred and precipitated done up to three times. The dried sample was added Erlenmeyer 500 ml. Then add 50 ml of 1.25% H2SO4 solution and boil for 30 minutes. Next, add 50 ml of 3.25% NaOH to boil again for 30 minutes. In hot conditions filtered using a Buchner funnel and Whatman filter paper 41. Wash the precipitate on filter paper with 1.25% H2SO4 hot, then wash again with hot water and

96% ethanol. Weigh the filter paper with contents and then dry with a temperature of 105 0C, cooled and weighed until the weight remains. Weight equal to the weight residual crude fiber.

% Crude fiber =(paper filter + residue) - filter paper / x100% sample weight

Appearance Test

Organoleptic assessment in this study refers to the organoleptic assessment by Rahayu (1994) in Santosa (2005). The assessor or referred to in this test panelists included into the semi-trained panelists' number 20 in which all panelists have previously been given an explanation sufficient to determine attributes meatballs quality to be assessed and then given a sample to taste.

The organoleptic test used is hedonic (hedonic) concerning panelist ratings for the product, panelist said of joy or displeasure with the hedonic scale of the products presented. Each panelist was asked to observe each instance and write the impression obtained on the organoleptic testing form that has been provided.

Organoleptic test conducted by a hedonic test against, aroma, flavor, and texture to the vegetarian meatballs. A test (hedonic) is done by a numerical scale of 1 to 5 (1 = strongly dislike, 2 = dislike, 3 = like, 4 = very liked, and 5 = most highly liked).

The procedure used in the organoleptic test is as follows.

1. Vegetarian meatballs served with broth (meatball soup) are ripe.
2. Vegetarian meatballs were coded, hereinafter referred to as the sample which is then presented to the places of the organoleptic test.
3. Samples are presented to - each panelist with paper assessments.
4. Before filing panelists perform the assessment, carried out an explanation of how the organoleptic assessment on samples
5. During the filing by a panelist, panelist ratings were observed in order not to be affected by the judgment of the other panelists.
6. Assessment is done by hedonic test (hedonic) with a numeric scale is given by A-level panelists on each - each product is presented.

Financial Feasibility Analysis

In this study criteria feasibility of manufacture vegetarian meatballs financially used include NPV (net present value), IRR (Internal Rate of Return), Net R / C ratio, and Payback Period.

Net Present Value (NPV)

Net present value is the present value of the different benefits (Gain benefits) and costs (cost) at a certain interest rate. Net Present Value (NPV) is also the amount of net profit a period count calendar from a business started, where the count of 0 (t = 0) until the deadline of the end of the calculation period in which the n-1 (t = n-1) as the deadline for the calculation period.

with analysis Net Present ValueThis, then the project can be considered beneficial (decent) or failure in performing operations. An investment plan is feasible if it produces a wider NPV of zero. Conversely, if the NPV is less than zero then it is not worth holding. Calculation of NPV (Hussein, 2005), is as follows:

$$NPV = \sum_{t-1}^{N} \frac{CF_t}{(1+K)^t} - I_0$$

Where :

CF_T = annual cash flow in period t

I_0 = The initial investment in the year 0

K = interest rate (*discount rate*)

Internal Rate of Return (IRR)

Internal Rate of Return (IRR) is the discount that can make the current net proceeds of an investment (NPV) is equal to zero. Searches were carried out by estimating the value of IRR at random from each of the interest rates specified. The formula (Hussein, 2005) used are:

$$IRR = P_1 - C_1\left(-\frac{P_2 - P_1}{C_2 - C_1}\right)$$

Where :

P_1 = The discount rate to 1

P_2 = The discount rate to 2

C_1 = The net present value which is positive (NPV 1)

C_2 = The net present value which is positive (NPV to 2)

If the values obtained IRR is greater than the applicable discount rate, the project is feasible or practicable. However, if the value of IRR is less than the applicable discount rate, the project is not feasible.

Net Benefit-Cost Ratio (Net B /C)

Net Benefit-Cost Ratio(Net B / C Ratio) is the ratio between the present value of net benefits are positive (Bt - Ct> 0) with the present value of net benefits are worth negative (Bt - Ct <0).

The formula used to calculate the Net B / C Ratio (Hussein, 2005) are:

$$Net\ {}^{B}/_{C}\ Ratio = \frac{\Sigma \text{ PV Net positive B}}{\Sigma \text{ PV Net positive C}} = \frac{Net\ B}{Net\ C}$$

With business criteria, the value of net B / C contains two meanings:

a. Net B / C> 0: Enterprises feasible, further assessment general percentages. The net value of B / C is greater than the interest rate

b. Net B / C <0: business is not feasible, a further assessment percentage of the value of Net B / C is smaller than the level of public interest.

Payback Period

The payback period of the investment or *payback period* is an indicator which is indicated by the size of time to determine how many years that is required by the project to be able to restore the investment costs incurred or in other words the time required by an investment plan to generate an NPV at that point is equal to zero. The analysis payback period is expressed in the formula (Hussein, 2005), as follows:

$$Payback\ Period + \frac{Total\ Cost}{Total\ Reception}\ Time\ Production$$

Expected Results

From the results of this study are expected to be found the right formula and methods in making vegetarian meatballs made from banana and oyster mushrooms. This vegetarian meatball will be developed for the diversification of healthy food. With the hope that is helpful for consumers should not consume beef or consumers who deliberately run a healthy lifestyle vegetarian. It can also be useful for other consumers to consume healthy nutritious meatballs with high fiber content.

RESULT

Material raw vegetarian meatballs were used in this study is the heart of the banana kepok and white oyster mushroom. The treatment in this study is six combinations of ratios of banana and oyster mushrooms with three replications.

Crude Fiber Content

The crude fiber content of vegetarian meatballs generated in this study are presented in Table 2 below:

Table 2. Assays Fiber Meatballs Vegetarian

Treatment	Food Fiber Content (%)
A1	5.48 ab
A2	5.31 ab
A3	5.24 a
A4	5.09 a
A5	4.96 a
A6	4,74a

Note: figures are followed by the same lowercase, no significant effect by DNMRT test at 5% level.

Table 2 shows that the fiber content of vegetarian meatballs produced ranged from 4.74% to 5.48%. Based on analysis of crude fiber content seen that more and more banana is used then the resulting fiber content will be even greater, it is closely related to the level of banana fiber used in making vegetarian meatballs. While the addition of oyster mushrooms have not shown an increase in crude fiber content compared with the use of banana. A previous study produced that kind of higher banana containing crude fiber is a type of banana kepok. In addition, Robby, et al. (2008) suggested more use in the manufacture of naken banana fibers produced balls make levels will be higher. In line with the opinions of Abadiya (2009), the higher the addition of banana in the

manufacture of carp jerky the resulting the fiber content will be higher of 4.37 to 7.6%. Graph crude fiber content measurement results for all treatments vegetarian meatballs can be seen in Figure 3.

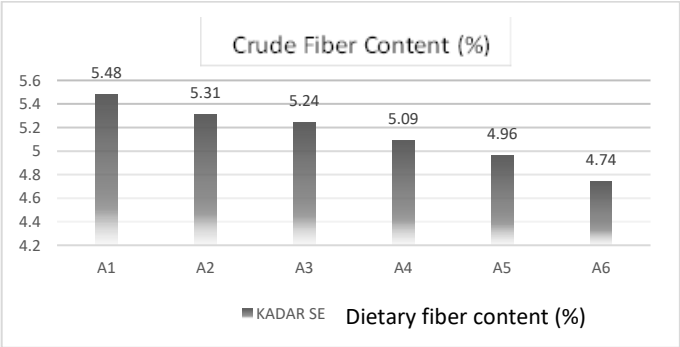

Figure 3. Graph Crude Fiber Content Measurement Results Meatballs Vegetarian

Water Content

Further testing on water content contained in the vegetarian meatballs can be seen in Table 3.

Table 3. Testing Results Water content (%) On Meatballs Vegetarian

Treatment	Water Content (%)
A1	79,71a
A2	78.23 a
A3	78.25 a
A4	79.16 a
A5	79.70 a
A6	79.57 a

Description: The numbers followed by the same lowercase, no significant effect by DNMRT test at 5% level.

Table 2 shows that the water content contained in the vegetarian meatballs ranged from 78.23% to 79.70%. and still, meet quality standards meatballs' water content can also be affected by the fiber content in the material, due to the high fiber content will cause water absorption is also high. Each formula is made in this study using the same banana and oyster mushrooms with varying proportions, but because banana and oyster mushrooms at the same moisture content are high then the water content meatball produced almost the same. Besides that, higher levels of water contained in vegetarian meatballs will reduce the shelf life or expiration getting shorter. The resulting graph meatballs' water content measurement can be seen in Figure 4. Each formula is made in this study using the same banana and oyster mushrooms with varying proportions, but because banana and oyster mushrooms at the same moisture content are high then the water content meatball produced almost the same. Selain it with higher levels of water contained in vegetarian meatballs will reduce the shelf life or expiration getting shorter. The resulting graph meatballs' water content measurement can be seen in Figure 4. Each

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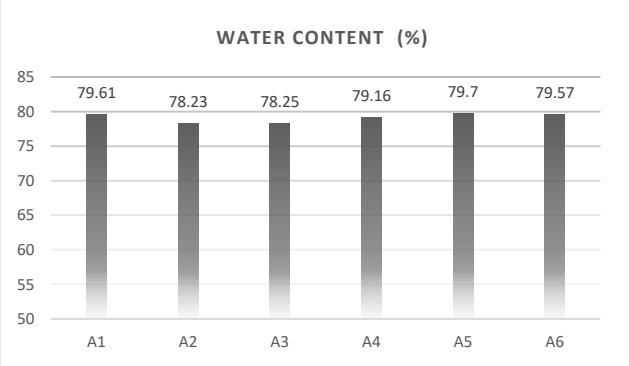

Figure 4. Graph Measurement Results Moisture (%) Meatballs Vegetarian

Protein Levels

The test results vegetarian meatballs protein levels for all treatment combinations can be seen in Table 4 below:

Table 4. Results of Assays Protein (%) On Meatballs Vegetarian

Treatment	Protein Content (%)
A1	9,26ab
A2	9,41ab
A3	10,11a
A4	10,13a
A5	10,52a
A6	11.17 a

Description: The numbers followed by the same lowercase, no significant effect by DNMRT test at 5% level.

Based on Table 4 above shows that the protein content of vegetarian meatballs these results ranged from 9.26 to 11.17% so that all formulas produced meatballs still meet quality standards for fish balls (SNI 01-2346-2006) is the protein content of at least 9%. The protein content was lowest for the meatballs formula containing 100% of banana which is 9.26% of this may be due to the protein content of banana were lower compared with the oyster mushrooms due to high levels of protein meatball is closely related to the protein content of the raw materials used in the manufacture of meatballs, This is consistent with that proposed by Wattimena (2013) that the Heart of banana contains nutrients that are beneficial to the body in the form of 12.05% protein, carbohydrates 34.83% and 13.05% total fat. the dried oyster mushroom protein content reaches 10.5-30.4%, which means the protein content is much higher than other feed ingredients such as rice that only 7.3% of dry weight and 13.2% by weight of dry grain. Graph for protein content for all meatball formulas shown in Figure 5.

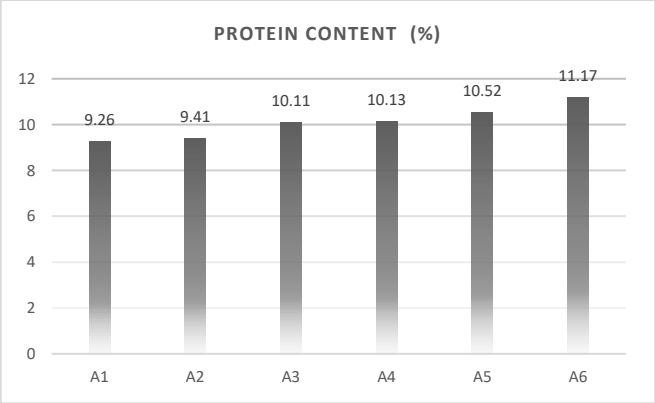

Figure 5. Graph Measurement Result protein content (%) Meatballs Vegetarian

Appearance Test Against Aroma, Taste, and Color Meatballs Vegetarian

An organoleptic test is a way of measuring or assessing the quality of a product by using the sensitivity of the human sensory organs. In this study, the organoleptic test used is a hedonic test (hedonic) which is one of the acceptance tests. In the hedonic test, panelists are asked to express their responses of affection or dislike of the product and are expected to reveal the level of preference or dislike of the hedonic scale.

A is one of the sensory properties that are important in the acceptance of a food product. A also includes the likes on color, aroma, and taste is the unity of the interactions between sensory properties and an overall sense of the product being assessed. Testing of the organoleptic test variable is one very important variable because of the effect on the preferences like which factors greatly affect product acceptance by consumers. An organoleptic test value generated is a value that must be considered, because of the organoleptic test A value - average means product great demand by consumers. The hedonic scale is a scale in the levels of love, like, please, do not like, and it does not like

The number of examples given for each test is 1 to 2 examples with 6 types of vegetarian meatballs.

Table 5. Hasil Average Rate Test Descriptive Aroma, Flavor, Color, and Vegetarian Meatball
Elasticity

Treatment	Organoleptic			
	Aroma	Flavor	Color	Elasticity
A1	1.64	2.05	1.42	3.43
A2	2.20	2.02	2.30	3.24
A3	2.75	2.60	3.44	3.65
A4	3.52	3.15	3.38	3.85

A5	3.24	3:05	2,59	3.24
A6	3.35	3.25	2,32	3.25

Aroma

In general, the aroma of which is received by the nose and the brain is more of a mixture of various aromas that is fragrant, sour, rancid, and charred. Many food aromas determine delicacy and assessment of food. (Winarno, 1989 in Hutami, 2009).

In this observation, the variable is the aroma is the smell arising from vegetarian meatballs produced, perceived by the sense of smell. Based on the results mean score of the aroma vegetarian meatballs produced is significantly affected by the number of oyster mushrooms are added. The addition of oyster mushrooms and 100% increase on the scent panelists A vegetarian meatballs with a score of 3.35 which is the category of love to love. While the meatballs formula with 100% banana without the addition of oyster mushrooms produced a score of 1.64 (dislike) for assessment of aroma. , This is in line with the results Tjokrokusuma (2008) that the oyster mushroom contains glutamic acid which can lead to flavor savory, savory, and delicious that oyster mushrooms potential as a food flavor enhancer.

Flavor

Taste is one of the sensory properties that are important in the acceptance of a food product. Despite the color, aroma and other sensory properties are good, but if it feels uncomfortable, consumers tend to reject these foods. The taste was assessed by taster (tongue), which is the unity of the interactions between the sensory properties aroma and taste of the food rated the overall taste. (Nasution 1980, Fatonah 2002, in Hutami 2009).

To know the taste of vegetarian meatballs panelists using the sense of taste. Ratings are given by savory or sweet that panelists at the time of testing express their likes and dislikes. Based on the average ratings descriptive test vegetarian meatballs' taste is significantly affected by the ratio of raw materials between the banana and oysters mushroom in making meatballs. Where the average test score descriptive sense ratings ranged from 2.05 to 3.25 (in the category do not like to like). This is due to more and more oyster mushrooms are added to the stronger taste of savory, sweet and savory from glutamic acid contained in the oyster mushroom (Tjokrokusuma, 2008). Results of organoleptic test aroma, flavor, color, and elasticity can be seen in Figures 6 and 7.

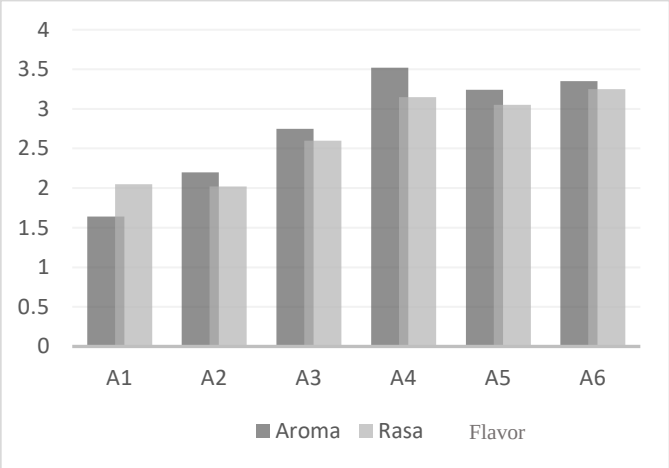

Figure 6. Graph Results Test Score average Appearance Aroma and Flavor Vegetarian Meatballs.

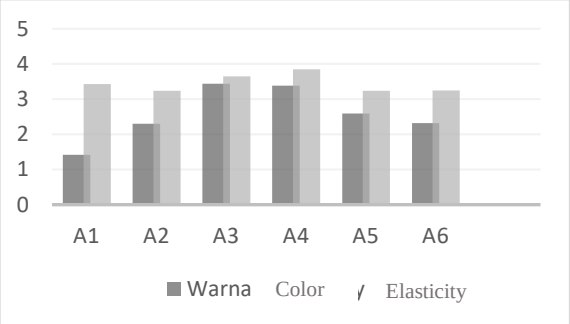

Figure 7. Graph Results Average Test Scores Color Appearance and Elasticity Meatballs Vegetarian

Color

Color is one of the sensory properties of foodstuffs be the determining factor of quality. If there are deviations in colors, the food can be said to be severely degraded. Color can be a consumer appeal for consuming a product, therefore color becomes an important part of the nature of the food. Color testing done by organoleptic tests, that each - each panelist gives a score value of the products tested by visually observing the brightness of the color of the product. Table 3 shows that the average assessment score - average vegetarian meatballs color is in the range of 1.42 to 3.08. It turns out the average score assessment vegetarian meatballs color indicates the color difference significantly between several formulas. the ratio of banana and oyster mushrooms is different. Formula meatballs with banana 100% with a color score of 1.42 with color categories meatballs hardly preferred by consumers. This is because the color of brownish-purple banana is very dominant in the formula without additional oysters. Fungus is in line with research Watimena. M (2013) THAT banana contains phenolic

compounds with enzymatic reactions that affect brown color with chicken meat and then with the addition of corn starch as a binder results in gelatinization during the ripening process to produce the darker-colored meatballs. The higher the substitution of banana and sago flour is added to addons meatballs the more the color is getting gray. This is because the color of brownish-purple banana is very dominant in the formula without additional oysters. Fungus is in line with research Watimena. M (2013) THAT banana contains phenolic compounds with enzymatic reactions that affect brown color with chicken meat and then with the addition of corn starch as a binder results in gelatinization during the ripening process to produce the darker-colored meatballs. The higher the substitution of banana and sago flour is added to addons meatballs the more the color is getting gray. This is because the color of brownish-purple banana is very dominant in the formula without additional oysters. Fungus is in line with research Watimena. M (2013) THAT banana contains phenolic compounds with enzymatic reactions that affect brown color with chicken meat and then with the addition of corn starch as a binder results in gelatinization during the ripening process to produce the darker-colored meatballs. The higher the substitution of banana and sago flour is added to addons meatballs the more the color is getting gray. M (2013) THAT banana contains phenolic compounds with enzymatic reactions that affect brown color with chicken meat and then with the addition of corn starch as a binder results in gelatinization during the ripening process to produce the darker-colored meatballs. The higher the substitution of banana and sago flour is added to addons meatballs the color is getting gray. M (2013) THAT banana contains phenolic compounds with enzymatic reactions that affect brown color with chicken meat and then with the addition of corn starch as a binder results in gelatinization during the ripening process to produce the darker-colored meatballs. The higher the substitution of banana and sago flour is added to addons meatballs the more the color is getting gray.

Elasticity

In Table 3 it can be seen that the hedonic ratings (level A) to the vegetarian meatballs viscosity ranges rather like to like and like the score of 2.85 to 3.43. , According to Eko Pradana (2012) the higher the addition of oyster mushrooms in making meatballs then the resulting elasticity is preferred by the panelists. Viscosity formula meatballs containing oyster mushroom 100% or banana 100% has a range preference level of love to love so visible that the elasticity of meatballs vegetarian heavily influenced by the addition of mushroom This is in line with Ahmad (2012) that the more high addition of oyster mushroom will increase suppleness meatballs for their protein content in mushrooms in oyster mushroom. Protein content similar to beef plays a role in the process of gelatinization. Meatballs' elasticity is associated with the strength of the gel formed by heating, the results Komariah (2005) states that the elasticity of meatballs mixed with 10% and 20% of oyster mushrooms is more supple than control. White oyster mushrooms also contain pectin compounds that can form a colloidal dispersion in hot water and will form a rubbery gel that when cooled (Winarno, 1994). Likewise, research results Eko Pradana (2012) states that addition banana to 90% increase the elasticity score of meatballs A banana and catfish. White oyster mushrooms also contain pectin compounds that can form a colloidal dispersion in hot water and will form a rubbery gel that when cooled (Winarno, 1994). Likewise, research results Eko Pradana (2012) states that addition banana to 90% increase of the

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Rate all level passions Vegetarian Meatballs

Table 6.On average Assessment Test All Parameters Appearance Of Meatballs Vegetarian

Treatment	Scoring Average Average Rating
A1	2,14
A2	2.44
A3	3.11
A4	3.48
A5	3.03
A6	3.04

Based on the above Table 6 he turns vegetarian meatballs formula best score of the assessment by the panelists was the formula A4 and A3 where the results of the assessment of this formula in the range of likes and loves. Formula A4 is a combination of vegetarian meatballs raw material consisting of 40% of heart Banana + 60% Mushroom and A3 formula is a combination of vegetarian meatballs raw material consisting of 60% of heart Banana + 40% Mushroom. Graph the average assessment of all test parameters organoleptic vegetarian meatballs can be seen in Figure 8.

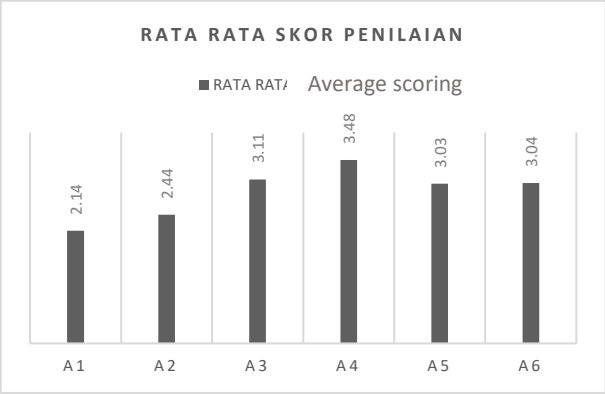

Figure 8. Average Rating All Parameter Test Results Appearance Of Meatballs Vegetarian

Financial Feasibility Analysis Of Vegetarian MeatballsVegetarian meatballs financial feasibility analysis of production and reception per month.

Table 7. Investment Cost

Commentary	Unit	Amount (Rp))
Gas stove	1	600,000
blender	1	600,000
Stainless pot	2	1,200,000
Wagon Meatballs	1	2,400,000
Basin	5	300,000
Cutting board	2	120,000
Knife	6	240,000
Equipment Sales (platter, spoon, fork, bowl, etc.)		1,200,000
Total Investment		6.46 million

Operating Costs Per Month

1.Fixed Costs per month

Table 8. Fixed Costs

Depreciation Value per Month	Amount (Rupiah)
depreciation Gas	10,000
depreciation Blender	10,000
depr. Pot Stainless	20,000
depreciation carts	100,000
depreciation basin	25,000
depreciation Cutting	10,000
depreciation Knives	20,000
Total Fixed Costs	195.000

2. Variable Cost per month

Table 9. Variable Cost per month (for the production of 1000 pieces of meatballs or 40 packs)

N	Commentary	Per Day (USD)	Per Mont
1	Banana flowers	100,000	3,000,000
2	Oyster mushroom	225.000	6,750,000
3	Tapioca flour	30,000	900,000
4.	Garlic	10,000	300,000
5	Beef Seasoning meat	10,000	300,000
6	Gas	20,000	600,000
7	Packaging (40 pack @ 25 pieces of meatballs)	40,000	1,200,000
8	Salt	5,000	150.000
9	Labor	40,000	1,200,000
1	Marketing	50,000	1,500,000
Total Variable Cost		530,000	15,900,000

3. Reception

Meatballs sales per month = 40 pack x 30 x Rp. 25,000 = Rp. 30.000.000,-

4. Gain Per month

Gain per month = Total Revenue - Total Costs
= Rp. 30.000.000 - Rp. 15,900,000
= Rp. 14,000,000

Assuming all of the products sold out, then the vegetarian meatballs businesses will benefit or revenue of USD 14.1 million, - per month, or an income of Rp. 169.2 million per year. Income from the calculation of this it can be concluded that this vegetarian meatball-making business has excellent prospects.

Table 10. Financial Feasibility Analysis of Meatballs Vegetarian

Month	Cash flow	PVT (10%)	PV
0	-160 200.000	1.00	-160 200 000
1	27 800 000	0.909	116 170 200
2	127 800 000	0.826	105 582 800
3	127 800 000	0,751	95.9778 million
4	127 800 000	0.683	87.2874 million
5	127 800 000	.621	79.3638 million
NPV			+324,182,000
IRR			33.4%
R / C RATIO			1.798
payback Period			1 year 5 months and 2 days

Based on the calculation of financial feasibility vegetarian jerky business obtained a positive NPV value or greater than zero, so we can say that the business of making vegetarian meatballs is feasible. So also for the value of R / C ratio which gained the value of R / C ratio of 1.798 or greater than one. This suggests that these efforts will gain greater acceptance than expenditures or total cost. While the right IRR = 33.4% is also higher than the prevailing interest rate. While the length of a return on capital or measured by the value of PP for one year and five months and two days.

CONCLUSION

1. The best formula is the ratio of 40% and 60% banana oyster mushrooms with a fiber content of 5.09% and a protein content of 10.13%, while for the organoleptic test with an average overall score of 3.48 or a range like to like.
2. Formula vegetarian meatballs with a ratio of 40% and 60% banana oyster fungus are the most appropriate formula for generating the levels of fiber and protein levels were highest with organoleptic test score results with the highest level of preference.

3. The interaction between the type of banana and oyster mushrooms is not significantly different with vegetarian meatballs quality. There are elevated levels of dietary fiber banana for concentration higher.
4. The result of the calculation of income from the business of making vegetarian meatballs showed gains amounting to Rp 10.65 million, - per month, or Rp. 127.8 million per year. While the financial feasibility analysis obtained amounted to 324 182 000 NPV, IRR of 33.4% B / C ratio of 1.798, and the payback period for one year and five months and 2 days.

SUGGESTION

We recommend further research on more appropriate technology in the processing of meatballs for example the use of banana and oyster mushrooms with the proper moisture content so that the resulting firmer meatballs

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