Effect of Formulation Technology on Characteristics and Prices of Cassava Instant Noodles Seasoning Gluten Free

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Abstract. The level of dependence of Indonesian people on noodles from raw materials is very high and is increasing. One potential to reduce the level of dependence of Indonesian people on flour products is by processing and optimizing the local resource base in the form of cassava as a raw material for making gluten free noodles. To increase the added value of the gluten free cassava noodle product by processing it into an instant noodle package in which seasoning flour is added. The purpose of this research activity is to influence the formulation on chemical characteristics, organoleptics and prices of instant gluten free instant noodles with raw cassava flour. The study design used a completely randomized design and was carried out using two replications. The analysis results were processed using SPSS 2.1 software. Whereas the price calculation is based on the results of the practical calculation of the concentration of the use of formula and is calculated manually. The four instant gluten free cassava seasoning powder formulas showed significantly different results with a significant level of 95% for the parameters of water content, ash, protein, and carbohydrate. The seasoning flour for formula D has the highest levels of NaCl compared to other formulas. While the lowest levels of NaCl are found in formula B, which is 45.25%. Based on the results of the analysis of the cost calculation for the making of seasoning flour for gluten free instant cassava products, formula B has the smallest value of processing costs.

Key word: formulation, seasoning, noodle, cassava, gluten free

1. Introduction
The level of dependence of Indonesian people on noodles from raw materials is very high and is increasing. One potential to reduce the level of dependence of Indonesian people on flour products is to process and optimize the local resource base in the form of cassava as a raw material for making gluten free noodles. Potential cassava production in Indonesia has considerable opportunities. Cassava
production in 2005 was 19.5 million tons with an area of 1.24 million hectares. Its productivity is relatively low, although from year to year there is a tendency to increase. Cassava productivity in 1995 was 11.7 tons / ha, in 2005 it was 15.5 tons / ha, and in 2006 it was 16.2 tons / ha. This productivity is relatively small compared to data from centers or research centers that report that cassava productivity can reach 30-40 tons / ha [1]. One of the potentials is to increase the added value of cassava products and reduce the potential for imports, through processing of gluten free cassava noodles. Noodle products can be made using 100% gluten free flour [2].

The gluten free noodle processing technology can be carried out using extrusion technology. Extrusion processing technology is an alternative technology that can play a role in producing various processed products in the form of rice granules as well as gluten-free noodles and pasta. In some research results show that the use of several types of raw materials apparently affect the temperature used in the extrusion process [3, 4].

Noodle processing technology with raw materials in the form of cassava flour without flour has been studied and developed. To increase the added value of the gluten free cassava noodle product by processing it into an instant noodle package in which seasoning flour is added. The seasoning flour is formulated and adjusted to the characteristics of gluten free instant cassava noodles so that it can be consumed like instant noodles that are on the market.

According to Hambali et al. [5], instant seasoning is a mixture of several spices with a predetermined composition and can be directly used as a cooking spice for cooking on certain foods. Instant seasonings come in two forms, namely instant spices in the form of pasta and instant spices in the form of dry or powder (powder). Instant spice processing in addition to preserving purposes is also more practical in its use [6]. The spices here are also very many variants, with a variety of types and kinds of traditional foods in Indonesia. The purpose of this research activity is to influence the formulation on the chemical, organoleptic characteristics and prices of instant gluten free instant noodles with cassava flour raw material.

2. Methodology

In this research, raw materials such as cassava flour, hydrocolloids, salt, water, onion flour A, onion flour B, spices flour, sugar, salt, flavorings are used. The equipment used includes: mixer, steamer, extruder, tunnel drier, furnace oven, distilator, soxhlet, and supporting glass ware. Stages of activities include making cassava gluten free noodles using raw materials in the form of cassava flour, the addition of hydrocolloids, salt and water. Then carried out steaming and printing using cold extruder. While the technology for making seasonings for gluten free instant cassava noodles includes the stages of mixing several dry ingredients consisting of onion flour A, onion flour B, spice flour, sugar, salt, flavorings. The composition and concentration of the use of the bahn becomes a formula for the treatment of research activities. The analysis included proximate analysis (moisture, ash, fat, protein and carbohydrate by different) [7], NaCl levels [8] or salt, organoleptic tests and calculation of price per sachet for 3.7 grams per 70 grams of noodle packs Instant cassava gluten free.

The study design used a completely randomized design and was carried out using two replications. The analysis results were processed using SPSS 2.1 software. Whereas the price calculation is based on the results of the practical calculation of the concentration of the use of formula and is calculated manually.
3. Result and Discussion

3.1 Proximate Analysis

Proximate analysis is an analysis conducted to find out the proportion and composition of its effects on moisture, ash, fat, and carbohydrate content calculated by different. Based on the analysis of the four formulations, the results are listed in Table 1 below.

| No | Sample | Moisture Content (%) | Ash Content (%) | Fat Content (%) | Protein Content (%) | Carbohydrate Content (%) |
|----|--------|----------------------|-----------------|----------------|---------------------|------------------------|
| 1  | Formula A | 3.16\textsuperscript{a} | 41.79\textsuperscript{a} | 0.24\textsuperscript{a} | 7.77\textsuperscript{a} | 47.04\textsuperscript{a} |
| 2  | Formula B | 2.65\textsuperscript{c} | 45.43\textsuperscript{b} | 0.22\textsuperscript{a} | 7.80\textsuperscript{a} | 43.90\textsuperscript{c} |
| 3  | Formula C | 2.88\textsuperscript{b} | 44.40\textsuperscript{c} | 0.20\textsuperscript{a} | 7.63\textsuperscript{a} | 44.88\textsuperscript{b} |
| 4  | Formula D | 2.63\textsuperscript{c} | 46.40\textsuperscript{b} | 0.11\textsuperscript{a} | 7.21\textsuperscript{b} | 43.65\textsuperscript{c} |

Remarks: numbers followed by different letters show significantly different at 95% significance level

Based on the results of the analysis of the four formulas showed significantly different results with a significant level of 95% for the parameters of moisture, ash, protein, and carbohydrate content. While the fat content showed no significant difference based on the results of statistical analysis with duncan further tests. This shows that with the difference in the concentration of the use of raw materials for the manufacture of dry herbs, producing different levels of mositure, ash, protein, and carbohydrate. Sudarmadji et al. [9], which states that ash content depends on the type of material, method of ashes, time and temperature used during the drying process.

3.2 NaCl Content Analysis

To find out the quality of the salt content or confirmed in the form of NaCl levels, the results obtained are as shown in Table 2. The difference in concentration of the use of the ingredients formula affects the NaCl levels of the seasoned flour produced.

| No | Proximate Analysis | NaCl Content (%) |
|----|-------------------|-----------------|
| 1  | Formula A         | 46.90\textsuperscript{b} |
| 2  | Formula B         | 45.25\textsuperscript{d} |
| 3  | Formula C         | 46.10\textsuperscript{c} |
| 4  | Formula D         | 48.80\textsuperscript{a} |

Note: numbers followed by different letters show significantly different at 95% significance level

The seasoning flour for formula D has the highest levels of NaCl compared to other formulas. While the lowest levels of NaCl are found in formula B, which is 45.25%. This shows that the type and concentration of the starting material for making seasoning flour, influences the salinity or NaCl of the product produced. NaCl is used as a material for seasoning some food products [10]. In the NaCl Industry it is used as an ingredient for preservatives and seasoning and has the potential to reduce the bitter taste and help the fermentation process in making dough [11-14]. Whereas in household food processing, NaCl is used for several purposes mainly to improve flavor [15].

3.3 Seasoning Organoleptic Analysis

To improve the quality of the noodles produced, some cassava noodles are packaged with such as fried instant noodles. Fried instant noodles added seasoning. In the context of optimization, an organoleptic test was carried out on the resulting seasoning concoctions. The results of organoleptic analysis of cassava noodles with added spice variants obtained results of organoleptic analysis as shown in the table below.
Table 3. Organoleptic Analysis Results of Cassava Noodles with Seasoning Variations

| Sample  | Colour | Texture | Flavour | Taste | General Acceptance | Criteria |
|---------|--------|---------|---------|-------|--------------------|----------|
| Formula A | 3.60   | 3.43    | 3.77    | 3.97  | 3.77               | Like     |
| Formula B | 3.73   | 3.33    | 3.33    | 3.70  | 3.57               | Like     |
| Formula C | 3.80   | 3.47    | 3.43    | 3.90  | 3.80               | Like     |
| Formula D | 3.73   | 3.43    | 3.60    | 3.60  | 3.60               | Like     |

All formulas are favored by organoleptic test panelists. Based on general acceptance, the scores of the highest scores are formula C and formula A. Both of these formulas have quite high values with a category favored by panelists. Buckle et al. [16], states that drying has several disadvantages such as changes in texture, taste, and aroma.

3.4 Price Parameters

The price analysis factor becomes a separate consideration when marketing products. Analysis of the use of ingredients and the concentration of the material is a calculation factor for the price of the spices produced. Based on the results of calculations on the type and concentration of ingredients for seasoning, the results obtained per spice pack for gluten free cassava instant noodles per package of 70 grams as stated in Table 4 below.

Table 4. Analysis of Seasoning Prices Per Package

| No | Sample   | Price per sachet (+ 3,7 gr) For each noodle packet (70 gr) |
|----|----------|----------------------------------------------------------|
| 1  | Formula A| Rp 178,-                                                 |
| 2  | Formula B| Rp 159,-                                                 |
| 3  | Formula C| Rp 169,-                                                 |
| 4  | Formula D| Rp 158,-                                                 |

Based on the results of the analysis of the cost calculation for making seasoned flour for gluten free instant cassava products, formula B has the lowest value of processing costs compared to other formulas. However, this also needs to be seen regarding the results of organoleptic tests for consideration in the process of further development at the field level. Based on organoleptic test results, formula C has the highest value of 3.88, although the overall quality criteria are the same, which is preferred by all panelists.

4. Conclusion

The four instant gluten free cassava seasoning powder formulas showed significantly different results with a significant level of 95% for the parameters of water content, ash, protein, and carbohydrate. The seasoning flour for formula D has the highest levels of NaCl compared to other formulas. While the lowest levels of NaCl are found in formula B which is 45.25%. While the fat content shows no significant difference based on the results of statistical analysis with duncan further tests. Organoleptic test results show that formula C has the highest value of 3.88, although the overall quality criteria are the same, which is liked by all panelists. Based on the results of the analysis of the cost calculation for the making of seasoning flour for gluten free instant cassava products, formula B has the smallest value of processing costs. For further development, composition factors, organoleptic test results and lowest prices can be a priority for further marketing.

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