FOXTAIL MILLET (JEWAWUT) BLACK NOODLE WITH SUBTITUTION OF FOXTAIL MILLET FLOUR AND CHARCOAL (ACTIVE BAMBOO CHARCOAL POWDER) AS HEALTHY BLACK YAMIE DIVERSIFICATION

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ABSTRACT

Foxtail millet or Otek (*Pennisetum spp.*) includes nutritious cereal plants. One effort that can be done is to innovate noodle products using substitute millet flour. Foxtail millet Black Noodle: black noodles with substitute for millet flour and charcoal (active bamboo charcoal powder) as a diversified healthy noodle substitute for millet flour is an innovative product that will discuss using local ingredients of millet. This study aims to obtain information on the nutritional value, formulation and acceptability of the best society for noodles with substitute for millet flour. The research model used is the R & D, namely the 4D Model which consists of four stages, namely: define, design, develop, and disseminate. Carried out through 3 stages: making millet flour; noodle making, testing of nutrient content and acceptance test. The proximate test results of black millet noodles have a total calorie count of 172 kal / 100g, 6.38% fat, 6.68% protein, 4.15% crude fiber, and 22.28% carbohydrate. The results showed that the best noodles were in the form of 35% millet flour.

INTRODUCTION

Indonesian society in 1970 began to introduce flour-based foods made from wheat. Wheat imports continue to rise to a peak in 2018. Since 2000 rice production has barely changed while the population has increased. Wheat is undoubtedly a staple food alternative (dk 2016).

Based on data from the Central Bureau of Statistics (BPS), the volume of imported wheat commodities in the period January-June 2018 has reached 5.97 million tons, equivalent to US $ 1.73 billion. This record rose 4% compared to the same period last year at 5.74 million tons or equivalent to 1.35 billion. According to the Indonesian Wheat Flour Producers Association (Aptindo), the increase in wheat imports for wheat flour is adjusted to the increase in public consumption of flour-based foods. Throughout 2018, Indonesia's wheat flour consumption has risen 6.2% (Katadata 2018).

The United States Development of Agriculture (USDA) predicts an increase due to food demand that is growing by the large population of Indonesia. The increase in people's income is also accompanied by the need for pasta, instant noodles, and feed needs. The four largest wheat supply countries to Indonesia according to USDA records are Australia, Canada, Ukraine and the United States.

Noodles are foods in the form of long thin dough that has been rolled, dried or wet and cooked in boiling water. Noodles are a popular food in the Asian region. Noodles are estimated to have existed since 4000 years ago. But the history of the noodles as long as the noodles are still confusing. Italy, China, Arabia each claim to be the creators of noodles.

Foxtail millet or Jewawut or Otek includes the fourth economic cereal crop after rice, wheat, and corn. Foxtail millet grows well in dry tropical and wet tropical climates. The top depth of the soil is very important. The morphology of the Millet plant resembles the morphology of rice plants. Most of the cultivated species generally have a plant height of about 100 - 150 cm. The age of millet harvests ranges from 75-180 days or more. In Indonesia it is possible to plant it throughout the year. or three planting seasons in a year.

In the 2009 Indonesian Food Composition (KPI) table it is stated that the iron content of millet is 5.3 mg%, besides that millet is also one of the main sources of energy, protein, vitamin B and essential amino acids such as isoleucine, leucine, fenillalanin and threonine in addition to the presence of nitriloside compounds which play a role in inhibiting cancer cells (Bhuja, 2009).

The use of charchoal bamboo charcoal as a natural food coloring which functions to increase the attractiveness of noodles. In addition to the body, bamboo charcoal is useful for detoxifying the body, freeing the body of all poisons and chemicals due to pollution and consuming beverages and foods that do not realize it contains ingredients that are bad for health, making the body more energetic when poisons or any harmful substances to the body have lost, absorption of nutrients became smooth. Nutrition is more easily absorbed and converted into energy. The body is energized and is not weak during activity because it is carbon.

Processing of millet in the form of flour makes it easier in the application and has a longer shelf life. At the time of making millet flour, it is necessary to do the ignition process first to remove the outer skin and the testa layer. Jawawut flour can be used as raw material for making noodle products. This is because the protein content is almost the same as wheat flour and even contains gluten protein. The elastic properties of gluten in noodle dough causes the noodles to be produced not easily broken up in the process of printing and cooking. Based on the description above, noodle products will be made using substitutes for millet flour and flour.

This study aims to: (i) find the right recipe for a substitute product for Black Noodles for millet flour; (ii) knowing public acceptance of millet substitute black noodles from flour millet (iii): and determining information about the nutritional value of black noodle products replaced with millet flour.

METHOD

This research was conducted at the Laboratory of Culinary, Department of Food and Clothing Engineering Education, Faculty of Engineering, Yogyakarta State University. Starting in February 2019 until the final project exhibition is held in April 2019. The material used in this study is Majene local jewawut which is brick red. The equipment used is a blender, filter, sieve, noodle grinder, measuring cup, scales.

The research model used is the R & D research model developed by Thiagarajan (1974), namely the 4D Model. The 4D model consists of four stages: (1) define, (2) design, (3) develop, (4) disseminate.

Define

The defining stage aims to determine the product that will be developed along with its specifications. In order for the quality of the product to develop according to the characteristics of the reference product, the product development formula must use the reference prescription as a control. Examiners analyzed and compared various recipes which were then selected for the best standard recipe formula.

Design

Product design can be interpreted as designing a product to be developed. Good design requires analysis and synthesis. The synthesis activity in question includes identifying elements in the design, then constructing these elements in a system so that the product can function. In addition, product feasibility must be considered.

Table 1. Recipe for development plans

Material name	Reference Recipe	15%	25%	35%
High protein flour	250 g	212,5 g	187,5 g	162,5 g
Foxtail Millet flour	-	37,5 g	62,5 g	87,5 g
Egg	1	1	1	1
Salt	2,5 g	2,5 g	2,5 g	2,5 g
Vegetable oil	½ tbs	½ tbs	½ tbs	½ tbs
Tapioca flour (dusting)	30 g	30 g	30 g	30 g
Water	80 ml	80 ml	80 ml	80 ml

Develop

The development phase contains the activity of making designs into products and testing product validity repeatedly to produce products that are in accordance with the specified specifications or products that will be used as validation I, validation II, panelist test, and product exhibition. At this stage the development of products that have been designed with the addition of seasonings in the form of dressings and toppings is desirable as decoration for the product being developed. Long noodle shape with a diameter of about 1 mm. The product components are developed using fried dimsum, pakcoy, teriyaki chicken sauce, sesame and spring onion as toppings.

Disseminate

The deployment phase contains activities to disseminate products from the development or preference test to find out how much the level of acceptance of the product, the preference test for the exhibition is 80 panelists. Then the results of consumer ratings are done to improve the product and the results of the final recipe.

RESULTS AND DISCUSSION

The product produced in this study was millet black noodles, namely the black noodle formulation used was 35% noodle formulation with the formula shown in table 1.

According to the research[2], in the presence of immersion in millet seeds, it will reduce the particle size of the flour to become softer. Soaking causes degraded complex molecules to be simpler compounds in the presence of enzymatic reactions, this causes the molecular size to be smaller so that the texture of the resulting flour becomes softer in millet flour which will affect the texture of the noodles.

Limited Test

In the limited test phase with 30 panelists, the test of preference by comparison of control products with substitution products produced the following data:

Table 2. Limited test data

| Characteristics	Sig (2-tailed)	Information
Colour	0,000	Ha
Smell	0,001	Ha
Taste	0,073	Ho
Texture	0,012	Ha
Whole	0,017	Ha

The results of the ANOVA test in the table above show that the taste characteristics have different yield levels that have the highest differences in noodle flavor characteristics resulting from different millet flour substitutions ($p = 0.073$; $p < 0.05$). Whereas for characteristics such as color, aroma, texture and overall did not show differences in the assessment of characteristics such as color, aroma, texture, and overall noodles produced from different millet flour substitutions ($p > 0.05$). This means that replacing millet flour into noodle production does not affect the reception of panelists on the color, aroma, texture of noodles. So in this case, Jewawut flour can reduce flour use even though the taste of noodles still needs to be improved.

Exhibition Test

The next stage is testing the substitution product exhibition with 67 returning forms. Produce data as follows:

Figure 1. Exhibit test data
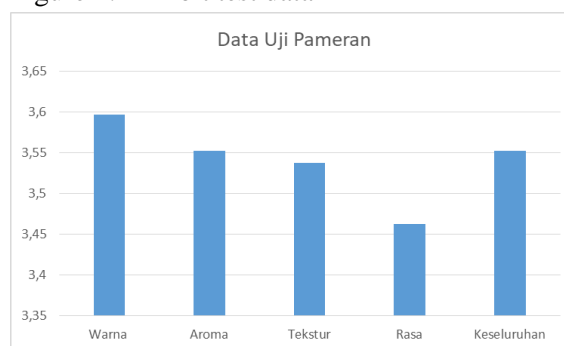
Proximate Analysis

Based on the analysis, the results are as follows:

Table 3. Analysis of millet black noodle data

Analysis	Repetition I	Repetition II
Ash	0.24%	0.25%
Protein	6.58%	6.68%
Fat	6.01%	6.38%
Rough Fiber	4,17%	4.15%
Carbohydrate	22.18%	22.28%
Total Energy (kal / 100g)	167.96	172.17

CONCLUSION

Based on the results of this study, it can be concluded that the product development of Jewawut black noodles using the 4D method obtained the best formula reaching 35% substitution of millet flour by gaining strong elasticity of noodles. Based on the closest analysis, he has 172 cal / 100g total calories, 6.38% fat, 6.68% protein, 4.15% crude fiber, and 22.28% carbohydrate.

REFERENCE

[1] Sutomo, Budi. 2008. *Variasi Mi dan Pasta. In Variasi Mi dan Pasta.* Jakarta: PT. Kawan Pustaka.

[2] Soewitomo, Sisca. 2007. *Sajian Mi.* Jakarta: Gramedia Pustaka Utama.

[3] Anna, et al. 2017. *Karakteristik Tepung Jewawut (Foxtail Millet) Varietas Lokal Majene dengan Perlakuan Perendaman. Balai Penelitian Tanaman Serealia. [online]. Avaliable:* http://ejurnal.litbang.pertanian.go.id/index.php/jpasca/article/view/5103

[4] YuwonoSetiadi Sunarto SiholP.Hutagalung. 2015. *Potensi Tepung Jewawut dalam Meningkatkan Kadar Fe dan Daya Terima Nugget Ayam. [online]. Avaliable:* http://ejournal.poltekkes-smg.ac.id/ojs/index.php/jrk/article/view/356

[5] Fitriania, Sugiyonob, Eko Hari Purnomob. 2013.*Pengembangan Produk Makaroni dari Campuran Jewawut (Setaria italica L.), Ubi Jalar Ungu (Ipomoea batatas var. Ayamurasaki) dan Terigu (Triticum aestivum L.).[online]. Available:* https://repository.ipb.ac.id/jspui/bitstream/123456789/63760/1/2013fit.pdf

[6] Sejarah. 2016. *Sejarah dan Asal Usul Mie. [online]. Avaliable:* http://www.sejarahdk.com/2016/04/sejarah-dan-asal-usul-mie.html (accessed Oktober 26, 2018).

[7] Neliti, media. *Prospek jawawut pennisetum spp sebagai Tanaman Pangan Serealia Alternatif. [online]. Avaliable:* https://media.neliti.com/media/publications/218348-prospek-jawawut-pennisetum-spp-sebagai-t.pdf (accessed November 10, 2018).

[8] Aktualpress. *Indonesia resmi jadi pengimpor gandum terbesar di dunia. [online]. Avaliable:* http://www.aktualpress.com/read/2018/02/28/2018-indonesia-resmi-jadi-pengimpor-gandum-terbesar-di-dunia/ (accessed Oktober 28, 2018).

[9] Arangbambu.com. 2018. *Manfaat Arang Bambu (charcoal). [online]. Avaliable:* https://arangbambu.com/manfaat-arang-bambu/ (accessed Oktober 28, 2018).