A Great Food for Children Base on Rinuak Shredded Fish
(Psilopsis Sp)

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Abstract. Rinuak fish is an endemic fish in Lake Maninjau, Agam Regency, West Sumatra Province. Fresh fish quickly undergoes a process of decay due to changes due to the activity of certain enzymes. The nutritional status of children under five is closely related to food intake. Therefore, to extend the shelf life of rinuak fish, it is necessary to develop rinuak fish into shredded fish. The purpose of this study was to standardize formulas or recipes, to identify the quality, nutritional content, and preference levels of children under five to shredded rinuak. The formula standardization stage was carried out by eight expert validators in the fields of culinary, food, and nutrition. The results found are standard formulas or recipes, which were carried out through a validation process twice with three trials. The results of the quality of shredded rinuak obtained an average score on the color quality which was categorized as good enough, the shape quality was categorized as good enough, the aroma quality was categorized as very good, the texture quality was categorized as good, and the taste quality was categorized as good. The results showed that water content was 8.65%, fat 50.13%, protein 27.53%, carbohydrate 7.62%, ash content 6.57%, and Fe 33.5625 mg/kg. The results of the hedonic test data (preferences) of toddlers for shredded shows that children under five mostly like it

1. Introduction

Fish is a source of animal protein that is easily found in Indonesia. Fish protein is needed by humans because besides being easy to digest, it also contains amino acids with a pattern similar to that of the amino acids in the human body [1]. One of the typical freshwater fish in Lake Maninjau, West Sumatra is the rinuak fish. Raw or fresh rinuak fish dough contains 21.05% protein and 5.93% fat [13].

From the end of 2016 to mid-2018 the rinuak fish were threatened with extinction, but by the end of 2018 until now, the catch of rinuak fish in Lake Maninjau was again abundant [17]. Fresh fish quickly undergoes a process of decay due to changes due to the activity of certain enzymes in the body, the
activity of bacteria and other microorganisms, or due to the oxidation of fat by air [10]. One of the efforts that can be done to extend the shelf life of fish is by processing it into shredded fish.

Shredded fish is a processed fishery product made from beef, or processed fish with spices [5]. Making shredded fish is an alternative for fish processing, to anticipate the abundance of production or to diversify fishery products [11]. Diversification of food processing is also carried out to increase added value, namely in the chemical content and quality of the food itself [3].

Rinuak fish is used as the main ingredient in quality food products such as shredded fish, and also increases the nutritional content of shredded fish. The purpose of this study was to standardize the formula and identify the quality of shredded rinuak. So it is hoped that the shredded rinuak fish can become one of the healthiest side dishes

2. Methodology

Material
The recipe used in this study, making shredded rinuak is no different from shredded meat from meat. The ingredients used are as follows: 400 grams of rinuak fish, 300 grams of coconut milk, 25 grams of brown sugar, 40 grams of garlic and 40 grams of fried red, 10 grams of salt, 15 grams of galangal, 1 stick of lemongrass, 1/4 lime fruit, and 2 pieces of bay leaves. The spices used are as follows: 20 grams of hazelnut, 50 grams of red onion, 15 grams of garlic, and 5 grams of coriander.

The process of making shredded rinuak is as follows: (1) Smear the rinuak with lime juice. Let stand 15 minutes and fry dry. (2) Heat the oil, saute ground spices, bay leaves, galangal, and lemongrass until fragrant. (3) Add coconut milk, salt, and brown sugar. (4) Cook until thick and dry. (5) Add the fried rinuak. (6) Stir until well blended and completely dry. Enter the garlic and shallots and fried garlic.

Method
The research that was carried out was an experiment, to get a formula design for the shredded rinuak product with a standard recipe. The product validity test is obtained from the response statement which symbolizes the magnitude, level of intensity after the panelists have sensed. Each panelist conducts tests and assessments of the product and writes down his response. The number of validators involved was 8 expert panelists in the fields of culinary, food, and nutrition. Organoleptic test on shape, aroma, texture, color, and taste with a Likert scale of 1-5. The higher the value found, the better the shredded quality produced. The test was carried out three times, at 9.00 - 11.00 or 14.00 - 16.00 WIB where the panelists were not hungry and not full.

Analysis Proximate
A proximate test was carried out at BARISTAND Padang to analyze as follows:

Water Content
Determination of water content using oven and vacuum methods. Measured by weight due to evaporation of water from the dried material at a temperature of about 100°C. How to calculate the water content of the sample as follows:

\[
\text{Water content} = \frac{W_1(W_2 - A)}{W_1} \times 100\%
\]

Fat Content
Total solid (%) = \(\frac{(W_2 - A)}{W_1}\) x 100%
Analysis of fat content can be done by extracting fat with diethyl ether or other fat solvents. Furthermore, the solvent is evaporated and then the fat is weighed and the percentage is calculated. How to calculate the total fat content using the Soxhlet extraction method as follows:

\[
\text{Fat (\%)} = \frac{\text{Berat lemak (g)}}{\text{Berat sampel (g)}} \times 100\%
\]

Protein
Analysis of food protein content generally uses the Kjeldahl method. There are three stages in determining protein using the Kjeldahl method, namely the stage of destruction or digestion, distillation, and titration. How to calculate protein content using the Kjeldahl method as follows:

\[
\% N = \frac{(\text{ml HCl sampel} - \text{ml HCl blanko}) \times N\text{HCl} \times 14.007 \times 100\%}{\text{mg sampel}}
\]

\[
\% \text{Protein} = \% N \times \text{faktor konversi}
\]

Carbohydrate
Analysis of carbohydrate content can be performed using different methods in proximate analysis calculated based on \( \text{ash content} + \text{fat content} + \text{protein content} \). If the result of this reduction is reduced by the percentage of fiber, you will get digestible carbohydrate levels.

Ash content
Analysis of the ash content in food ingredients is by weighing the remaining minerals as a result of burning organic matter at a temperature of around 550°C.

\[
\text{Ash (\%)} = \frac{(W_2 - A)}{(W_1 - A)} \times 100\%
\]

Mineral content of Fe
Determination of the mineral content of Fe using the AAS (Atomic Absorption Spectrophotometry) method with the following stages:

Prepared in a clean cup and roasted at 105°C for 2 hours. Cooled in an excicator for \( \frac{1}{2} \) hour then weighed (a g). Weighed ± 1 g sample (weight of porcelain plate + sample = w g) into the porcelain plate. Put in the porcelain cup electric furnace with the sample in determining the moisture content. The furnace temperature is set to 600°C, then left for 3 hours to turn ash (to speed up the ashing process once the kiln is opened). Let cool slightly then put in the excicator for \( \frac{1}{2} \) hour. Added 3 - 5 ml of concentrated HCl to the ash in the porcelain dish for the determination of the ash content. Diluted with distilled water to the volume close to the lips. Enter into a 100 ml volumetric flask. Rinse with distilled water to mark the line then gently shake until homogeneous (ready for mineral determination). Filtered using filter paper. Then inject it into the ASS tool.

Analysis of the level of consumer preference is carried out through a hedonic test with an assessment aspect of the whole product. The hedonic test was carried out to determine the level of preference of 20 children under five for shredded products that have been validated. The test scale used is 1 = very very dislike, 2 = dislike, 3 = dislike, 4 = like and 5 = very like.

3. Result and Discussion
The recipe made is simple, easy to process and the ingredients used, including spices, are easily available in the local area. Then we get a standard recipe for new rinuak shredded that can be made in one recipe or half a recipe. Based on the basic recipe used, the validation process is carried out. After three validations, the standard recipe for rinuak shredded was obtained as follows:

| Table 1. A standard recipe for shredded Rinuak |
|-----------------------------------------------|
| Ingredient                  | Test 1 | Test 2 | Test 3 |
| Rinuak                      | 400 gr | 400 gr | 400 gr |
| Coconut milk                | 300 gr | 300 gr | 300 gr |
| Brown sugar                 | 25 gr  | 25 gr  | 25 gr  |
| Fried garlic                | 40 gr  | 40 gr  | 40 gr  |
| Fried onion                 | 40 gr  | 40 gr  | 40 gr  |
| Fine salt                   | 10 gr  | 10 gr  | 10 gr  |
| Galangal is crushed         | 15 gr  | 15 gr  | 15 gr  |
| White lemongrass            | 1 btg  | 1 btg  | 1 btg  |
| Lime, take the water        | 15 ml  | 15 ml  | 15 ml  |
| Bay leaf                    | 2 leaves | 2 leaves | 2 leaves |

**Softened seasoning**

| Ingredient            | Test 1 | Test 2 | Test 3 |
|-----------------------|--------|--------|--------|
| Candlenut roasted     | 40 gr  | 20 gr  | 20 gr  |
| Shallot               | 100 gr | 50 gr  | 50 gr  |
| Garlic                | 30 gr  | 15gr   | 15gr   |
| Coriander             | 10 gr  | 5 gr   | 5 gr   |

After three recipe trials, there was no change in the dose or size of the ingredients used.

**Validity Test of Shredded Rinuak**

From the results of the rinuak shredded test three times, several conclusions were obtained from the validator's assessment as depicted in Figure 1.

![Figure 1. The Results Of The Shredded Rinuak Validity Test](image)

The quality of the shredded color produced had an average score of 4.63 in the 3rd trial, according to the validator, which
was very good and able to attract the eye to be seen. The frying process changes color due to the reaction of amino acids and reducing sugars, resulting in a brownish yellow color during the frying process [9]. This is thought to be influenced by the frying process, the frying process will change the color to brownish-yellow like in shredded products in general [7]. The level of color intensity depends on the length and temperature of the frying pan and also the chemical composition on the outer surface of the food.

![Figure 2. Rinuak Fish and Shredded Rinuak](image)

The quality of the form of shredded rinuak in the 3rd test has an average score of 3.8 according to the validator as appropriate as shredded in general, but it is recommended to be slightly smaller so that it can be consumed by toddlers.

The aroma is already appetizing. Shredded fried for 8-15 minutes has a distinctive aroma and crackle texture [12]. In addition, the temperature is also an important factor in the formation of shredded aroma [8].

The quality of the texture is less dry, which in the 3rd test has an average score of 3.6. The texture is one of the parameters in sensory testing that can be felt through the skin or in the sense of taste. The texture is one of the things that distinguishes shredded fish from other fishery products, namely in the form of soft fibers [15].

The quality of taste in shredded rinuak had an average score of 4.5 in the 3rd trial. According to the validator, the taste of the shredded was just right. Taste is something that is accepted by the tongue. A number of compounds are able to strengthen the aroma and taste of food, for example, amino acid compounds, especially glutamate [11]. That glutamic acid found in foods with a distinctive taste or commonly known as umami [16]. At the frying stage, there will be the absorption of oil into the ingredients, where the oil contains high fat so that it produces a savory taste in shredded [9].

**Proximate Test**

The analysis of the proximate value of shredded rinuak was only performed on the best treatment or formula based on the results of the organoleptic analysis. Based on the shredded laboratory test, it can be seen in Table 2.

**Table 2. Results of the Shredded Rinuak Proximate Test**
| Test Parameters | Unit | Analysis results | Analysis Method |
|-----------------|------|------------------|-----------------|
| Water content   | %    | 8.65             | SNI 01-2892-1992, 5.1 |
| Fat             | %    | 50.13            | SNI 01-2891-1992, 8.2 |
| Protein         | %    | 22.53            | SNI 01-2891-1992-7.1 |
| Carbohydrate    | %    | 7.62             | SNI 01-2892-1992, 9   |
| Ash content     | %    | 6.57             | SNI 01-2891-1992, 6.1 |
| Fe              | %    | 33.5625          | SNI 01-2896-1998, 5   |

Water content is an important parameter to determine the quality of the fish in the fish and can affect the storage capacity of the fish because the water content is a microbial medium. This shredded fish can also be used as an alternative for food diversity/diversification [11].

Protein is a nutrient needed by the body and functions as fuel in the body and as a building block and regulatory agent [4]. The high percentage of protein content in shredded rinuak when analyzed was due to a reduction in the percentage of high-water content as well.

Another factor that affects the fat content is the amount of cooking oil used for sauteing spices and for frying shredded rinuak. The amount of fat is one of the main components found in food ingredients other than carbohydrates and protein, therefore the role of fat in determining the characteristics of food is quite large [2].

Ash content is the residual inorganic substance from the combustion of organic material. The ash content and composition depend on the type of material and the method of ashes. Ash content has to do with the minerals of a material. The purpose of determining the total ash is to determine whether a treatment process is good or not; to determine the type of material used and the determination of total ash is useful as a parameter of the nutritional value of food [14].

**Hedonic Test**

![Figure 3. Shredded Hedonic Test Results](image)

At the level of preference (hedonic) shredded rinuak, overall, the shredded rinuak products can be accepted by children under five with the very like category. Of the 20 children under five, 16 people chose to really like shredded rinuak.

4. Conclusion
The rinuak fish is a species of small fish in Lake Maninjau that is again in abundance. Development in the form of processed food products, namely shredded food, is very helpful in diversifying processed nutritious foods for children under five. The shredded rinuak formulation is standard, after three trials. The sensory/organoleptic quality of the shredded floss is categorized in terms of color, shape, aroma, texture, and taste. The nutritional content is sufficient for children under five and the level of preference for toddlers to shredded rinuak is very high. Overall rinuak shredded products can be accepted by toddlers with the very like category.

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