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Measurement of quality parameters of Snakehead Fish (*Channa striata*) simplicia from Sungai Itik village, West Kalimantan

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ABSTRACT

Snakehead fish (*Channa striata*) is one of the natural ingredients that have the potential to heal wounds quickly. Snakehead fish extract ointment with a combination of kelulut honey, clove oil, golden sea cucumber extract, and green betel extract can accelerate wound healing. Standardization is a process carried out to ensure the stability, safety, quality, and efficacy of the natural ingredients used. This study aims to standardize simplicia (fish fillet) raw materials used for the manufacture of snakehead fish extract herbal ointment. The method used follows the Indonesian National Standard, samples were sent to LPPT UGM and Baristand Pontianak. The results of the simplicia (fish fillet) test for snakehead fish were 81.6% water content, 0.813% total ash content, 0.02% acid-insoluble ash content, 19.3% protein, 2.93% total fat, 0.01% iron mg/kg, zinc 0.002 mg/kg, and calcium 817 mg/kg and the alkaloid and tannin quality tests were negative. the results of the simplicia test (fish fillet) for snakehead fish E. coli 3 AMP/gr, ALT 3.2 x 104 colonies/g, and the Salmonella test also met the requirements. The results of characterization tests with various methods and parameters that have been carried out show that the simplicia (fish fillet) of snakehead fish (*Channa striata*) has good quality and quality to be processed into extracts.

Keywords: Measurement, snakehead fish, physical parameters, chemical parameters, microbiological parameters

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INTRODUCTION

Snakehead fish is a fish that comes from fresh waters in Indonesia, namely Java, Sumatra and Kalimantan (Haryanto, 2019). Snakehead fish has anti-inflammatory, anticancer, antimicrobial, and nociceptive properties (Alviodinasyari et al., 2019). The protein content of snakehead fish is higher than other types of fish, which is 25.5%. The main content in snakehead fish protein is albumin of 6.22% (Suardi et al., 2020). The high albumin content in snakehead fish can help heal wounds faster (Asikin & Kusumaningrum, 2017). Besides containing albumin, snakehead fish protein also contains amino acids that can help the cell proliferation process (Karliman et al., 2021) and fatty acid that inhibit inflammation (Saputra et al., 2019).

The quality and quality of simplicia meat of snakehead fish is influenced by factors of simplicia raw materials, the process of making simplicia to the storage of simplicia raw materials (Pujiasmanto et al., 2021). The purpose of the measurements is to determine the specifications of the simplicia to be inspected. Since the origin of the living environment affects the content of active ingredients, specifications are made to determine the transparency of inspected materials (Handayani et al., 2017). Snakehead fish is a natural ingredient that can help the wound heal faster. Simplicia is a natural product that is dry but has not yet been processed to use it as medicine (Badan Standardisasi Nasional Indonesia, 2014).

Formulation standardization is a prerequisite for ensuring the reproducibility of drugs and therapeutic quality. Based on the description above, it encourages researchers to standardize snakehead fish simplicia using physical, chemical, and microbiological parameters as standardized herbal medicine requirements so that standardized herbal-based ointment preparations can be produced from local resources that contain nutrients from snakehead fish extract to accelerate wound healing (Handayani et al., 2017). The quality of parameter measurements should further strengthen confidence in medicines made from natural ingredients. Standardization of natural product medicines starts from the raw materials used, the product manufacturing process, and the final product produced. simplicia is one of the most frequently used natural drug dosage forms. To achieve a repeatable effect (reproducibility), simplicia standardization must be performed (Wijaya et al., 2019).

The efficacy and quality of snakehead fish simplicia are determined by the type of raw material used, processing, and storage. Body size, habitat, and diet can also affect the quality of snakehead fish simplicia (fish fillets). The results of the literature review show that research on the standardization of snakehead fish (fish fillet) simplicia, especially in Sungai Itik Village, Kubu Raya Regency, has never been carried out. Based on this, the researcher became interested in conducting this research with the hope that the simplicia of snakehead fish (fish fillets) obtained from Sungai Itik Village can meet the set parameters so that it can be said to be of high quality.

MATERIALS AND METHOD

Materials

The equipment needed in this study included an analytical balance, freezer box. The materials used in this study included (fish fillets), including snakehead fish from Sungai Itik Village..

Methods

Habitat and Morphological

The habitat of the snakehead fish observed was the origin of the waters (rivers, troughs, lakes, and river estuaries) and the distance between the waters and the industry. The morphology of the snakehead fish was observed at Jalan Parit Haji Husin II, Grand Paris Complex No. A20, Pontianak City, West Kalimantan. The morphology of the snakehead fish observed started from the color of the snakehead fish which was black if it was caught in a swamp and faded slightly if it was caught on a river bank. Then, form the body of the cork fish which is round, flat on the front, and upright on the back. The side of the cork fish's body has a ribbon in the shape of < leading to the front (Sinaga et al., 2019). The body parts of the snakehead fish that have fins are the chest, back, stomach, tail, and anus

(Shasia et al., 2021). Snakehead fish also have a labyrinth and gills which are used for breathing (Pertiwi et al., 2017).

Determination

The determination of snakehead fish (*Channa striata*) was carried out at the Biology Laboratory, Faculty of Mathematics and Natural Sciences, Tanjung Pura University, Pontianak, West Kalimantan.

Sample collection

Snakehead (*Channa striata*) was obtained from anglers in Kuburaya Regency, West Kalimantan, Sungai Kakapu District, Sungai Itik Village, Sempaka Hamlet, Parit Tuampe RT 013 / RW 005. Snakehead fish were selected according to the criteria of 30-50 cm in length and 500-1000 g/head weight.

Organoleptic

An organoleptic examination was carried out at Jalan Parit Haji Husin II, Grand Paris Complex No. A20, Pontianak City, West Kalimantan. The organoleptic examination of snakehead fish included appearance (eyes, gills, body surface mucus), odor, and texture. An organoleptic examination is carried out using the five senses. The color of the gills is dark red or reddish-brown with a little mucus. The mucus layer on the surface of the body is clear, transparent, and brightly shiny. Snakehead fish has a very fresh and strong smell typical of snakehead fish. The texture of snakehead fish is dense, compact, and elastic (Badan Standardisasi Nasional Indonesia, 2013).

Making simplicia (fish fillets)

Simplicia (fish fillet) is made at Jalan Parit Haji Husin II, Grand Paris Complex No. A20, Pontianak City, West Kalimantan. Snakehead fish raw materials are sorted by looking at the appearance of the eye which shows a convex eyeball, clear cornea, and pupil. Then the scales, fins, head, tail, and entrails of the snakehead fish are removed. Then, the snakehead fish is cleaned of blood and other impurities while running water until it is clean. Once clean, the snakehead fish meat is cut, then packaged in plastic and labeled. The weight of one plastic is 500 grams. Snakehead fish is stored at low temperatures (freezer) at -20°C to -10°C (Kementrian Kesehatan Republik Indonesia, 2017).

Test parameters

The contents of acid-insoluble ash, alkaloids, and tannins were determined by submitting samples to Gadjah Mada University Integrated Research Laboratory (LPPT), Yogyakarta. Testing ash content, water content, protein, total fat, Ca, Fe, Zn, ALT, Salmonella, and Escherichia coli by sending samples to the Laboratory of the Institute for Industrial Research and Standardization (BARISTAN) Pontianak City, West Kalimantan.

RESULT AND DISCUSSION

Measurement of quality parameters of snakehead fish (*Channa striata*) originating from Sungai Itik Village, Kubu Raya Regency obtained from the waters around the Itik River. Snakehead fish weighing 600-900 will produce protein extracts with high albumin levels (Asikin & Kusumaningrum, 2017). Snakehead fish simplicia (fish fillets) must be packaged quickly, carefully, sanitarily, and hygienically (Badan Standardisasi Nasional Indonesia, 2013). Packaging is carried out in cold conditions to maintain the freshness of the fish. Each packaged snakehead fish simplicia (fish fillets) is labeled according to the day, date, month, and year. The purpose of determining the criteria for snakehead fish and how to treat fish from sampling to storage is aimed at obtaining simplicia (fish fillets) with the best quality and quality so that the protein obtained is expected to have the best protein content as well. The result can be seen in Table 1.

Fresh snakehead simplicia (fish fillets) had a moisture content of 81.6% when tested for moisture content based on the test method by SNI 01-2891-1992. Moisture content in this study was higher than that in the study results conducted by (Umage et al., 2020) which showed the water content of wild snakehead fish was 79.02% (Utami et al., 2017). The water content obtained was higher when compared to the (Umage et al., 2020). which showed the water content of wild snakehead fish was 79.02% (Utami et al., 2017;Ahmed et al., 2012) the research results obtained a water content of 82.66%. The factors that influence the difference in yield from water content are the type of food and habitat of the snakehead fish used as raw material. The ash was tested according to the test method associated with SNI 01-2891-1992 and gave a fresh ash weight value of 0.813%. Ash content is an inorganic component leftover from heating a raw material at a temperature of 500-600 ºC. Ash content consists of several kinds of mineral components. The measurement of ash content aims to determine the purity of the mineral content contained in the simplicial (fish fillets) material of fresh snakehead fish. The amount of ash content and mineral composition in it depends on the type of material and the method of ashing. Ash testing according to the test method associated with SNI 01-2891-1992 showed a fresh simplicia ash weight rating of 0.813%. Snakehead fish habitat can affect the mineral content contained in snakehead fish.

Table 1. Results of snakehead fish Simplicia (*Channa striata*) test conducted at the Pontianak industrial research and standardization institute

Test Method Test	Parameters	Unit	Results
SNI 01-2891-1992	Water Content (Solid Sample)	%	81.6
	Ash Content (Gravimetry)	%	0.813
	Protein	%	19.3
	Fat Total	%	2.93
SNI 01-2896-1998	Mineral Calcium (Ca)	mg/kg	817
	Mineral Iron (Fe)	mg/kg	0.014
	Mineral Zinc (Zn)	mg/kg	0.002
SNI-ISO 7218:2013, item 10.3	Total Plate Number (ALT)	colony /g	3.2×10^4
SNI 01-2897-1992, item 3	*Escherichia coli*	APM/g	3
SNI 01-2897-1992, item 4	*Salmonella*	Negative/25 g	Negative

Protein content testing based on the test method by SNI 01-2891-1992 showed that fresh snakehead simplicia (fish fillet) has a protein content of 19.3%. However, the protein content obtained was higher than the results of Asikin's study (2017) which obtained the protein content of snakehead fish, namely 17.28-18.12% (Asikin & Kusumaningrum, 2017). The protein content obtained was almost the same as the results of (Chasanah et al., 2015) which showed a protein content of 19.85% (Chasanah et al., 2015). Fat content test to determine the amount of fat contained in snakehead fish.

Total fat test results according to SNI 01-2891-1992 test method showed a total fat content of 2.93% for fresh snakehead (fish fillets). Snakehead fish minerals are efficacious in accelerating wound healing, oxygen affinity, and remodeling processes (Saputra et al., 2019). The requirements for ALT test results refer to SNI-ISO 7218:2013 point 10.3. ie 3.2 x 104 colonies/g. The wear and tear results meet the quality and safety requirements of fresh fish based on SNI 2729:2013 where microbial contamination is in the form of ALT with the requirements of 5.0 x 105 colonies/g. Test results *Escherichia coli* based on the test method that refers to SNI 01-2897-1992 point 3 shows *Escherichia*

coli contained in the simplicia of fresh snakehead fish were 3 $^{APM}/_{g}$. These results meet the requirements for fresh fish quality and safety based on SNI 2729:2013 where the microbial contamination is *Escherichia coli* with requirements of 3 $^{APM}/_{g}$. The results of the *Salmonella* based on the test method referring to SNI 01-2897-1992, point 4 showed *Salmonella* contained in the simplicia of fresh snakehead fish showed negative results. This result is to the quality and safety requirements of fresh fish based on SNI 2729:2013 where the microbial contamination is *Salmonella* with the condition Negative/25 g (Utami et al., 2017). SNI 2729 (2013) and Food and Drug Supervisory Agency Regulation (BPOM) Number 13 of 2019 concerning Maximum Limits of Microbial Contamination in Food Processed Fish and Fishery Products Including Molluscs, Crustaceans, and Echinoderms as well as Amphibians and Reptiles stipulate that Salmonella must be negative (Badan Standardisasi Nasional Indonesia, 2013). The result can be seen in Table 2.

Table 2. Simplicia (fish fillets) test results of Snakehead Fish (*Channa striata*) test results based on Gadjah Mada University Yogyakarta, comprehensive research laboratory

Parameter Test	Result	Unit	Method
Acid Insoluble Ash Content	0.02	%	Gravimetry
Alkaloid	Negative	-	TLC
Tannin	Negative	-	TLC

CONCLUSION

The results of the simplicial (fish fillets) test of snakehead fish include the water content of 81.6%, gravimetric ash 0.813%, acid insoluble ash content of 0.02%, protein 19.3%, total fat 2.93%, iron 0.014 mg/kg, zinc 0.002 mg/kg, and calcium 817 mg/kg and the results of the qualitative test for alkaloids and tannins were negative. The simplicia test results of snakehead fish *E. coli* 3 AMP/gr, ALT 3.2 x 10^4 colonies/g, and *Salmonella* negative met the requirements, this is by SNI 01-2897-1992, item 3 and SNI 01-2897-1992, item 4s. Based on the results of the characterization using various methods and parameters that have been carried out, it is possible to obtain simplicia (fish fillets) of snakehead fish (*Channa striata*) with good quality and quality to be continued into extracts.

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