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Standardization of Snakehead Fish (*Channa striata*) Concentrates Obtained from Sungai Itik Village, Kubu Raya District, West Kalimantan

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ABSTRACT

Standardization is the method of identifying properties based entirely on quality parameters. to advantage the identical diploma of satisfaction. It has been proven that vitamins decided in snakehead fish (Channa striata) from herbal assets can be implemented as a possibility to hasten the recuperation of wounds. With the assistance of the techniques of freeze drying, this examination sought to set up the standardization of snakehead fish pay attention from Sungai Itik Village in Kubu Raya Regency, West Kalimantan as an uncooked material for prescribed drugs that treat wounds. Standardization carried out on concentrate samples consisted of specific and non-specific parameters. Specific parameters consist of organoleptic, water-soluble essence content, protein, and albumin. While the non-specific parameters tested were moisture content, ash content, acid-insoluble ash content, and drying shrinkage. The test results showed that the water content contained in snakehead fish was 7.21% ± 0.165, ash content was 10.47% ± 1.06, acid insoluble ash content was 1.40% ± 0.115, water-soluble essence content was 77.10% ± 0.54, dry shrinkage rate was 13.973% ± 0.193, the protein was 99.49% and albumin was 7.03 g/dl. The standardization parameters have not met all the tests so it can be said that snakehead fish concentrate has not met the standard and has not been standardized for natural wound healing medicinal ingredients.

1. Introduction

Snakehead fish is a type of freshwater fish from Channa genus which has economic value and has long been used as a consumption fish (Asikin & Kusumaningrum, 2017). Because of the high protein content, particularly albumin and vital amino acids, this fish has a very beneficial composition for sustaining health (Muliani et al., 2021; Mustafa et al., 2012). One type of nutritional component in snakehead fish that the body need is protein. Protein has a unique function that cannot be absorbed by other nutrients, namely building and maintaining body tissue cells (Asikin & Kusumaningrum, 2017). In this research, snakehead fish albumin will be extracted to obtain concentrate using the freeze dry method. Freeze-dry or freeze drying is a non-thermal drying technology that usage of low temperatures (Habibi et al., 2019).

Quality in the sense of meeting the requirements of chemical, biological, and pharmaceutical standards, including ensuring the upper bounds of stability as a pharmaceutical product generally, is achieved through standardization, which is a series of parameters, procedures, and methods of measuring the results that are elements related to the pharmaceutical paradigm (Purwoko et al., 2020). Maintaining stability and safety as well as the consistency of the active ingredient content of simplicia extracts is the goal of standardization (Utami et al., 2017). Based on the description above, it encourages researchers to standardize snakehead fish concentrate using specific and non-specific parameters as a requirement for standardized herbal medicine so that standardized herbal-based ointment preparations can be produced that contain nutrients from snakehead fish extract.

Based on the results of the latest literature search regarding standardization research on snakehead fish concentrate, especially in Sungai Itik Village, Kubu Raya Regency, this has never been carried out. In research conducted by (Arsih et al., 2022) the research carried out was the characterization of snakehead fish and snakehead fish meat simplicia. Therefore, researchers are interested in standardizing snakehead fish concentrate, which is part of the water phase, as a research update and to ensure the production of quality concentrate.

2. Materials and Methods

2.1. Materials

The tools used in this study included glass tools, weighing bottles, desiccators, freezer boxes (*AQUA Chest Freezer-200 Liter*®), Freeze dryer (*Labconco)*, steamer, 10 mL volumetric flask (*Pyrex*), Kjeldahl flask, analytical balance, oven, water bath, hydraulic press (*modified*), centrifugation (*PLC Series*), test tubes (*Pyrex*), electric furnaces, thermometers, scales (*KrisChef*®), syringes, distillation kits, and water baths.

The materials used in this study included bromcresol green, $CuSO_4.5H_2O$, DMDM hydantoin, dilute HCl (HCl 0.2 N), H_2SO_4, methyl red indicator, K_2SO_4, 30% NaOH, and snakehead fish (*Channa striata*).

2.2. Methods

Standardization of the process for making snakehead fish concentrate begins with observing the habitat where the snakehead fish lives, particularly within the wild, consisting of waters origin (trenches, rivers, river estuaries, or lakes) and far from industrial locations. Observation of the morphology of the snakehead fish (*Channa striata*) includes the shape of the head and body of the snakehead fish. Snakehead fish have a head shape that resembles a snake's head covered in scales. The body shape is nearly round at the front and flattened closer to the flattened towards the back, becoming longer and more compressed. This fish has a blackish-brown body color with a combination of dark-colored stripes in the form of ribbons (*striata)* (Pertiwi et al., 2017).

Determination of snakehead fish (*Channa striata*) was carried out at the Biology Laboratory, Department of Biology, Faculty of Mathematics and Natural Sciences, Tanjungpura University. The selection of samples for this study was carried out to ensure accuracy in identifying snakehead fish and to prevent errors in sampling for research (Handayani et al., 2017).

Samples inside the shape of clean snakehead fish in intact circumstances and nonetheless alive have been from snakehead anglers obtained in Parit Toampe, Sungai Itik Village, Sungai Kakap District, Kubu Raya Regency. Fish with a body weight range of 600–900 grams, are chosen. The head of the snakehead fish that is still alive is killed by being stabbed. The snakehead fish is then located through a welding manner. The snakehead fish's meat changed into then cautiously cleaned by being washed under flowing water. The 500 grams of snakehead fish meat was separated into three equal pieces. Meat from snakehead fish is packaged and labeled. Keep the snakehead fish in the freezer between -20°C and -10°C (Trisnawati et al., 2020).

Snakehead fish meat is wrapped in a clean flannel material and steamed in a pan for ± 30 minutes on the range at 70ºC, after steaming, the snakehead fish is placed into a hydraulic press. Then repeated urgent turns into performed to extract the snakehead fish extract. The snakehead fish extract received changed collected in a beaker glass, then continued within the freeze-dryer technique to supply pay attention. The results of freeze-dried snakehead fish are formed like crackers and then mashed into a powder concentrate

Snakehead fish concentrate was standardized using both specific and non-specific. Organoleptic, water-soluble extract content, total protein, and albumin are examples of specific parameters. Tests for water content, ash content, acid-insoluble ash content, and drying shrinkage are examples of non-specific parameters.

Organoleptic testing is carried out directly using the human senses as the main tool for measuring product acceptance (Utami et al., 2017). By weighing the sample in a crucible with a known-weight cap, the gravimetric method is used to determine the sample's water content. Oven time 3 hours at

105°C for drying. Cool in a desiccator, weigh, and repeat this paintings until a regular weight is acquired (Badan Standardisasi Nasional Indonesia, 1992).

Samples in a porcelain cup with a certain weight were weighed to check the ash content. Charcoal is burned over the burner flame, pulverized in an electric furnace at a temperature of 600ºC for 8 hours, till the burden is constant. Cool in a desiccator, then weigh till the weight stays (Badan Standardisasi Nasional Indonesia, 1992).

The gravimetric method was used to conduct the test on the acid-insoluble ash content. In 25 mL of diluted HCl (0.2 N HCl), the ash that was obtained from the measurement of total ash content was heated for 5 minutes. The parts of the sample that are insoluble in acid were eliminated using filter paper free of ash. Heat after washing in hot water for as long as the weight is still there. For the dried material, the acid-insoluble ash content is expressed as % w/w (Badan Standardisasi Nasional Indonesia, 1992).

The test sample changed into macerated for twenty-four hours with 50 mL of water in a plugged flask to check the water-soluble extract content material, then stirred from time to time for the first 6 hours, then allowed to face for 18 hours, and finally filtered. As much as 25 mL of filtrate is taken and put in a shallow cup with an even base that has been tareed and then evaporated at 80ºC. The residue was heated at 105ºC until constant. The proportion of water-soluble essence for the material that was air dried is calculated (Departemen Kesehatan Republik Indonesia., 2000).

To carry out the dry shrinkage test, crucible were prepared, heated at 105°C for 30 minutes, then weighed. This is finished until the weight of the measuring bottle remains constant or the distinction between the two measures does not exceed 0.005 g. The test fabric was weighed and put right into a crucible with a complete weight of 2 g. After 30 minutes of drying at 105°C, the check fabric become considered once more.The difference between subsequent weighings shall be less than 0.25 percent, the drying process is continued and the weighing is (Departemen Kesehatan Republik Indonesia., 2000).

The Kjedahl technique was used to determine the protein content. The Kjeldahl method is a way to determine how much protein is in a sample by measuring the quantity of total nitrogen (N) in the sample. The Kjedhal method works by utilizing a catalyst and sulfuric acid to dissolve the sample's protein and organic components (Nisah et al., 2021).

Trying out for albumin ranges turned into done using measuring the absorbance of the pattern. The result of the extract by filtering was taken as much as 0.5 mL then 2.5 mL of 0.01% BC reagent was added, and it was left for 10-15 minutes. The mixture was put into a cuvette and its absorbance was measured at a wavelength of 546 nm (Niga et al., 2022).

3. Results and Discussion

3.1.Habitat Observation

The choice of habitat for the snakehead fish from Sungai Itik Village, Sungai Kakap District, Kubu Raya Regency, is because the snakehead fish population is still abundant and the price is lower than that of snakehead fish available on the market. The snakehead fish come from the Embankment Trench and creeks around the Itik River. the Embankment Trench is not commonly overgrown with aquatic plants, while the creeks are covered with aquatic plants such as water hyacinths and embarrassed daughters. Aquatic plants are related to the availability of food for snakehead fish. Because there aren't any industrial factories in the area of the Itik River where garbage could poison the river water, the environment is still beautiful there.

3.2.Sample Determination

Snakehead fish (*Channa striata*) were determined in the Biology Laboratory, Department of Biology, Faculty of Mathematics and Natural Sciences, Tanjungpura University. The identification revealed that the snakehead fish was a species of *Channa striata*.

3.3.The Sample Collection

Samples of fresh snakehead fish in intact condition and still alive came from snakehead anglers obtained in Parit Toampe, Sungai Itik Village, Sungai Kakap District, Kubu Raya Regency. Sampling was done by taking fish weight randomly. Snakehead fish samples were obtained from clean and uncontaminated waters. Fish are selected with criteria for a body weight of 500-1000 grams. This is because the research results show that snakehead fish weighing 500-1000 g will produce protein extracts with high levels of albumin (Badan Standardisasi Nasional Indonesia, 2014).

3.4. Sample Preparation

The head of the snakehead fish is pierced so that the snakehead fish dies. This treatment refers to research carried out with the aid of (Trisnawati et al., 2020) on the nice technique for killing snakehead fish to hold the freshness of snakehead fish for 12 hours and organoleptically, the SNI is great trendy for sparkling fish. next, a weeding method is executed for the snakehead fish including putting off the entrails, scales, fins, and tail. Then the entrails, scales, fins (pinnacle, bottom, chest), tail, and body of the fish are weighed respectively from the weight of the part of the snakehead fish that has been separated. Then clean the snakehead fish meat using running water. Three pieces of snakehead fish meat, each weighing 500 grams, were divided. Snakehead fish meat is put in a package and labeled. Store the snakehead fish inside the freezer at a temperature of -20^{o}C to -10^{o}C (Trisnawati et al., 2020). Packaging is done in cold conditions to maintain the freshness of the fish. Each packaged snakehead fish simplicia is labeled according to the day, date, month, and year. The purpose of setting the criteria for snakehead fish and the method of treating the fish from sampling to storage is to obtain simplicia with the best quality so that the protein obtained has the best protein content.

Fig 1. Snakehead fish (*Channa striata*)

Steamed for ± 30 minutes snakehead fish meat in a pot with a temperature of 70^{o}C wrapped in a flannel cloth. Furthermore, pressing is done using a hydraulic press. To avoid evaporation and outside contamination, snakehead fish is steamed for around 30 minutes at 70^{o}C in a firmly closed steaming pan. For the nutrients in snakehead fish flesh to be extracted as best as possible during processing, the cork fish meat cells must be broken down during the steaming process at 70^{o}C. Steaming for ± 30 minutes gives the best yield for releasing albumin and oil in snakehead fish meat. Steaming for a longer time will cause protein denaturation, while steaming for a shorter time will cause the cell lysis process to be less than optimal, thereby reducing the oil content obtained. Then repeated pressing was carried out to extract the snakehead fish extract. The produced snakehead fish extract was then collected, placed in a beaker glass, and covered with aluminum foil and a clean cloth. The purpose of pressing is to obtain snakehead fish extract while wrapping with a clean flannel cloth or napkin is intended so that the extract obtained does not mix with impurities. The extract results obtained were then continued in the freeze-drying process. The purpose of freeze-drying is to maintain the quality of the snakehead fish so that it is not damaged (Andrie et al., 2019; Andrie & Sihombing, 2017) Snakehead fish extract used as much as 1,100 mL. After the freeze-drying process, the concentrate was obtained from the dried snakehead fish extract. Freeze-drying results in dry form were then crushed using a blender and weighed until a mass of 77.41 g was obtained.

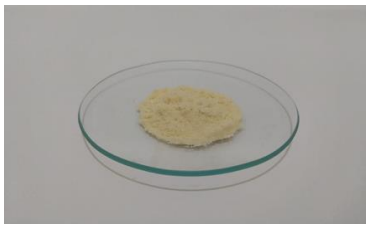

Fig 2. Snakehead fish concentrate

Snakehead fish concentrate (*Channa striata*) produced in the organoleptic test is light yellow with a characteristic odor of snakehead fish and is in the form of a fine solid. The color of the snakehead fish concentrate produced meets good color quality standards, namely a slightly yellowish color. The color of the concentrate when it has just been processed is gray, and after it has been stored, the color can change to a yellowish brown. However, this does not affect the nutritional value of the concentrate because the acceptance of a material's color varies depending on natural factors, geography, and social aspects of the receiving community.The resulting form also meets the standards, namely in the form of fine solids, this is because during the steaming process, the process is carried out well so that it affects the final result, especially in the shape and texture generated (Fatmawati & Mardiana, 2014). The aroma that the concentrated snakehead fish generates is also suitable; it comes from the specific aroma of the snakehead fish that has been processed.

Based on the results of water content testing using the gravimetric method, the water content of snakehead fish concentrate produced was 7.21%. The method used in testing the water content is gravimetric. By utilizing an oven to evaporate the water in the sample, the gravimetric method is employed to determine the sample's water content. Moisture content is determined based on the difference in sample weight before drying and after drying (Yoga et al., 2021). It can be said that the test results have been able to meet the requirements that a good water content for natural products for the manufacture of pharmaceutical preparations is less than 10% (Badan Standar Nasional, 1996; Fatmawati & Mardiana, 2014). High water content can trigger microbial activity, which will increase the decomposition process. The smaller the water content in the concentrate, the less the risk of the growth of microbes and other organisms (Rosidah et al., 2020).

Table 1. Snakehead fish (*Channa striata*) concentrate test results

Parameter	Results	Average (%) ± SD
Water Content	7.04 %	7.21 ± 0.165
	7.37 %	
Ash Content	9.41 %	10.47 ± 1.06
	11.53 %	
Acid Insoluble Ash Content	1.29 %	1.40 ± 0.115
	1.52 %	
Water Soluble Extract Content	76.56 %	77.10 ± 0.54
	77.64 %	
Drying Shrinkage	13.78 %	13.973% ± 0.193
	14.17 %	
Proteins	99.49 %	-
Albumin	7.03 g/dl	-

Based on the test results, snakehead fish concentrate contained 10.47% ash. This number shows that the snakehead fish concentrate's remaining inorganic mineral content is 10.47%. It can be said that the test results have been able to meet the requirements for a good ash content according to SNI, the maximum allowable ash content is 20% (Badan Standar Nasional, 1996). The amount of minerals in the snakehead fish's natural habitat has an impact on the ash content. The type of food present in the fish's habitat can also have an impact on the amount of ash (Setiawan et al., 2013; Suwandi et al., 2014). To understand how the processing procedure from the beginning until the production of the

concentrate affected the internal and exterior mineral content, the ash content was tested (Sarnia et al., 2018).

Based on the test results, it shows that the results of measuring the acid insoluble ash content in the snakehead fish concentrate was 1.40%. Based on the stated requirements, the acid-insoluble ash content should not be more than 0.7%. This shows that the acid-insoluble ash content in snakehead fish concentrate exceeds the stated requirements. The acid-insoluble ash content in snakehead fish concentrate that does not meet the requirements can be caused by errors in sample preparation, for example, during processing that is not clean enough at the stage of washing fresh ingredients. The acid-insoluble ash test results won't be reliable if the sample isn't properly prepared. Testing the amount of acid-insoluble ash might be impacted by moisture in the sample.

The water-soluble essence content first describes the quantity of compound content in the concentrate that can be dissolved by air or by polar solvents (Departemen Kesehatan Republik Indonesia., 2000; Latifa et al., 2022). Testing for water-soluble essence content aims to roughly refine the content of polar (water-soluble) active compounds (Warnis et al., 2021). The determination of the air-soluble essence content is also used to determine the proportion of the drug substance that can be extracted in the air solvent. The water-soluble essence content is calculated as a percentage of the water-soluble essence of the air-dried material. The results of measuring water-soluble essence content was 77.10%. The requirement for water-soluble essence content is greater than 12% (Latifa et al., 2022). The water-soluble essence test indicates that the nutritious substance in the concentrate dissolves easily in water solvents (Aziz, 2019).

Drying shrinkage indicates the moisture content of the sample related to the drying process of the sample (Paramita et al., 2019). The drying loss value of snakehead fish concentrate samples was 13.973%. This indicates that 13.973% of water and chemicals were lost during drying. It can be determined that the results of the drying shrinkage test on concentrate samples do not meet the test because a good criteria for drying shrinkage is less than 10% since drying shrinkage also shows the evaporated water content. Drying shrinkage levels that exceed the requirements can also be caused by the loss of volatile substances in the sample during drying. Volatile substances such as essential oils can be lost during drying, which can reduce sample weight and result in higher-than-expected drying shrinkage levels.

The results of the protein content test based on the Kjeldahl method showed that the protein content inside the snakehead fish concentrate was 99.49%. The results of this protein content test show that the results obtained are by following the requirements stated in the SNI, namely at least 65% (Badan Standar Nasional, 1996). The protein content of fish meat is influenced by the sort of meals, habitat, and food availability.

The results of the albumin level test showed a result of 7.03 g/dl. Albumin is a type of protein that is important for the growth and repair of tissues in human and animal bodies. Sufficient albumin levels in snakehead fish concentrate indicate that the product has good quality protein and nutrients needed for body health. However, albumin is only one of many types of protein contained in snakehead fish concentrate and cannot be the sole assessment of the quality of this product. The quality of snakehead fish concentrate must also be seen from an overall perspective, such as the levels of fat, minerals, vitamins, and amino acids contained in it.

4. Conclusion

Standardization of snakehead fish concentrate (*Channa striata*) originating from Sungai Itik Village, Kubu Raya Regency consists of organoleptic, moisture content, ash-content, acid insoluble ash content, water-soluble extract content, drying loss, total protein content material, and albumin content. Based totally on the effects of standardization the use of various methods and parameters which have been performed, it can be stated that snakehead fish (*Channa striata*) concentrate has not been standardized for raw materials for natural medicinal drug for wound healing because the listen outcomes have no longer fulfilled all the test necessities achieved.

Author Contributions:

Yunita Hananda Aulia wrote the first script; all authors interpreted the records and agreed to the final script version. All authors study and authorized the final manuscript.

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Competing Interests

The authors declare no conflict of interest.

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