International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 48 No. 1 December 2024, pp. 632-634

Analysis Of Heavy Metal Content (Pb And Cd) In Brother Fish (Hyposarcus Paradalis) In The Rawang River Area, Asahan Regency

Lucia Indrayani Manurung[1], Muhammad Zakiyul Fikri[2] and Maysuri Sri Handayani[3]

[1,3]Fishery Product Processing Technology Study Program, Tanjungbalai Polytechnic, North Sumatra
[2]Fishery Product Technology, University of Riau, Riau

Corresponding author: Lucia Indrayani Manurung;dewiindrayani29@gmail.com

Abstract – This study aim to know the heavy metals content of broom-broom fish meat *(Hyposarcus pardalis*) can be used as raw material and show the public that it is safe or not for broom fish *(Hyposarcus pardalis)* to be consumed. The benefits of this study are expected to provide scientific information about fish *(Hyposarcus pardalis)* become raw materials for processed fishery products. The stages carried out in the study of heavy metal testing of broom-broom fish (*Hyposarcus pardalis*). The test method used is the measurement of the concentration of Cd, Hg, carried out based on the atomic absorption spectrophotometry (AAS) method according to (AOAC 2005). The test results obtained the value of lead metal (pb) 0.04 % and the value of cadmium metal (cd) 0.06 % the value is still below the threshold provisions. Thus, it is said that broom fish is safe for consumption safely used as raw material for fishery products.

Keywords – Fish Broom,Brom (*Hyposarcus Pardalis*), Heavy Metals, Rawang Rivers, Raw Materials For Fishery Products.

I. INTRODUCTION

The janitor fish is not a native Indonesian fish, but was introduced from Central America and South America, currently the janitor fish has been widely found in various Indonesian waters. The existence of janitor fish is usually easy to find in large and small rivers, swamps, and ditches. Its survival ability is classified as very high, even exceeding the survival of catfish and snakehead fish. Because janitor fish are also able to swim in water conditions that are not only muddy but also filled with dangerous chemicals [1].

In the Rawang area, Asahan - North Sumatra has a river flow that is a source of agricultural irrigation and the continuation of community life. The river flows into the residents' rice fields and is also used as a means of washing for housewives who live on the banks of the river.

Initially, there were many types of freshwater fish including carp, tilapia, kepunggul fish, and others that lived in the river. Over time, these fish began to run out because many residents caught fish by electrocuting fish, netting, soapy water, and also the waste from every resident's house that was thrown into the river. So that all types of freshwater fish began to run out, only the sapu-pupa fish still survived and reproduced in the river. However, the residents of Rawang village never consumed sapu-pupa fish because of their hard skin and also because of the issues that sapu-pupa fish contain poison and cannot be consumed by humans, plus the nature of sapu-pupa fish as a cleaning fish, so residents are reluctant to consume this type of sapu-pupa fish and consider sapu-pupa fish garbage that is not suitable for human consumption. For research on the content of heavy metals in sapu-

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pupa fish in the Rawang river. This research was conducted to determine the nutritional content, heavy metals, and also to utilize the meat of the janitor fish as raw material for shredded meat and to show the public whether or not janitor fish is safe for consumption.

II. RESEARCH METHODOLOGY

Gills and fish muscles each ± 1 gram and liver ± 0.5 grams were weighed using a digital scale with an accuracy of 1 mg then destroyed by wet ashing using strong acids, namely HNO3 (p), H2SO4 (p), a mixture of HClO4: HNO3 (2:1), and HCl (p). The final solution from the destruction was stored in a clean and tightly closed polystyrene bottle at room temperature to further measure the concentration of heavy metals. Measurement of Cd, Hg, and Pb concentrations was carried out based on the atomic absorption spectrophotometry (AAS) method [2].

III. RESULTS AND DISCUSSION

Heavy metals are metallic and metalloid chemical elements, have high atomic weight and specific gravity which are toxic to living things [3]. The amount of heavy metals that exceed the threshold and cannot be detoxified will accumulate in various organs. Heavy metals affect the activity of metalloenzymes and subcellular organelles by displacing important metal cofactors from enzymes or disrupting the structure of subcellular organelles [4]. From the results of analyzing heavy metal data that were tested for lead (Pb) and cadmium (Cd) can be seen in table 2.

Table 2. Results of Metal Testing of Janitor Fish (*Hyposarcus pardalis*)

No.	Result	Unit	Parameter
1.	Lead (Pb)	Mg/kg	< 0,04
2.	Cadmium (Cd)	Mg/kg	< 0,06

Based on table 2, it can be seen that the lead (Pb) content in janitor fish in the Rawang River is <0.04 mg/kg, and the cadmium (Cd) content in janitor fish in the Rawang River is <0.06 mg/kg. The maximum limit of cadmium (cd) contamination in food is 0.5 mg/kg. and the maximum limit of lead (Pb) contamination in food is 0.4 mg/kg [3]. The results of the test values that have been carried out indicate that the content of heavy metals lead (Pb) and cadmium (Cd) is still below the threshold. Analysis of heavy metals such as Pb and mercury are indicators of marine pollution, shellfish are filter feeder animals so that if the waters are polluted, shellfish can store heavy metals in their bodies [5].

The Cirata reservoir stated that the mercury metal content (hg) in catfish from the Cirata reservoir was still below the threshold with a value of 0.006 mg/kg [6]. So it is said that catfish are safe for consumption. Lead is a highly toxic metal, especially for children. It is naturally found in the soil. Lead is odorless and tasteless. Lead can react with other compounds to form various lead compounds, both organic compounds such as lead oxide (pbO), lead chloride (pbcl2) [3].

Lead can enter the body through respiration and food. Consumption of large amounts of lead directly causes tissue damage, including mucosal tissue damage. The most sensitive system is the blood tissue system (hematopoietic) so that haema biosynthesis is disrupted. All cells that are actively developing are sensitive to lead. Lead can also damage nerves [3].

Cadmium is a metal found naturally in the earth's crust. Pure cadmium is a soft, silver-white metal. However, so far cadmium has never been found in a pure metal state in nature. Cadmium is commonly found as a mineral associated with other elements such as oxygen, chlorine, and sulfur. Cadmium has no specific taste or aroma, cadmium is used in industry as a material in the manufacture of batteries, pigments, metal coatings, and plastics [3]. Handling of this heavy metal problem must be followed up immediately, because higher public consumption will have a negative impact on health [7]. The alternative that will be carried out is socialization and handling using natural ingredients (before consumption), such as soaking with chitosan to remove heavy metals [8].

IV. CONCLUSION

The janitor fish *(Hyposarcus pardalis)* is suitable for consumption and is safe to be used as a raw material for processing fishery products because the janitor fish *(Hyposarcus pardalis)* has a lead (Pb) content of 0.04% and a cadmium (Cd) metal value of 0.06% which is below the threshold.

ACKNOWLEDGEMENTS

The author would like to thank the Organoleptic and Processing Laboratory of Tanjungbalai Polytechnic and the Laboratory of the Medan Industrial Research and Standardization Center, North Sumatra for facilitating this research.

REFERENCES

[1] Kottelat, M. 1993. The identity of Barbus johorensis Duncker, 1904 (*Teleostei: Cyprinidae)*. Raffles Bull. Zool. 40: 187-192.

[2] Manurung and Siregar. 2022. Analysis of Heavy Metal Content and Nutritional Content of Lantern Shellfish (Lingula Unguis) as Raw Material for Fishery Products. Journal of Fisheries, 12 (1), 74-79 (2022).

[3] [BSN] National Standardization Agency. 2009. Maximum Limit of Heavy Metal Contamination in Food. Jakarta. SNI 7387-2009.BSN.

[4] Lu Fc. 2006. Basic Toxicology: Fundamentals, Target Organs, and Risk Assessment. Second Edition. Translated from: Basis Toxicology: Fundamentals, Target Organs, and Risk Assessment by Edi Nugroho (Translator). Uui Press, Jakarta. 412 P.

[5] Azhary H. Surest, Aria Risma Wardani, & Resi Fransiska. 2012. Utilization of Shell Waste to Increase Ph in the Process of Managing Swamp Water into Clean Water. Journal of Chemical Engineering. http://jkt.unsri.ac.id/index.php/jkt/article/view/20.

[6] Chaidir, A. 2001. Effect of Washing Minced Fish Meat of Broom Fish (*Hypostomus sp.*) on the Quality of Minced Fish in Making Fish Balls. Thesis. Department of Fisheries Product Technology. Faculty of Fisheries and Marine Sciences.IPB. Bogor.

[7] Azizah, R., Nuraini, T., Endrawati, H., & Riza Maulana, I. 2017. Analysis of Chromium (Cr) Heavy Metal Content in Water, Sediment and Green Mussels (Perna viridis) in Trimulyo Waters, Semarang. Journal of Tropical Marine, 20(1), 48–55. https://doi.org/10.14710/JKT.V20I1.1104.

[8] Inem Ode. 2020. Density and distribution pattern of clams (*Tridacnidae*) in the Waters of Nitanghahai Bay, Morella Village, Central Maluku - Sangia Publishing. Agrikan: Journal of Fisheries Agribusiness.