Global Scientific JOURNALS

GSJ: Volume 9, Issue 10, October 2021, Online: ISSN 2320-9186
www.globalscientificjournal.com

REVIEW ARTICLE : UTILIZATION OF *Pangasius* sp FISH BONE FLOUR IN VARIOUS KINDS OF FOOD PRODUCTS

Lidia Naomi Hasibuan [1], Junianto[1]

1 Department of Fisheries, Faculty of Fisheries and Marine Science, Padjadjaran Universit, Sumedang Regency, West Java, Indonesia.
Coressponding Author : lidianaomi16@gmail.com

KeyWords
Crackers, Biscuits, Rich in calcium, *Pangasius* Bone flour, Traditional Food.

ABSTRACT

The purpose of this paper is to review research on *pangasius* bone meal in various processed food products. Fish waste from fishery processing can be used as a variety of food products. One of them is the utilization of *Pangasius* sp. bone waste into various calcium-rich food products such as vermicelli, biscuits, cookies, crackers, and can also be added to traditional regional foods such as Ilabulo. The addition of *pangasius* bone meal had a significant effect on calcium levels, namely vermicelli (82.1 mg), biscuits (47.7 mg/100 g), crackers (568.345 mg/100g), biscuits (88.96% and 95.06%) and traditional Ilabulo food (0.315%)

INTRODUCTION

Pangasius is a fish commodity that is in great demand from year to year. Pangasius production in Indonesia has increased significantly. In 2018 pangasius production yielded 391, 151 tons, an increase of 22.2% from 2017 which only reached 319,967 tons (KKP 2015). According to (Suryana 2021) *Pangasius* sp production in 2020 Antara News, said the number of national *pangasius* production fish reached 408,538,657 tons.

In Indonesia, pangasius are often processed into various food products, starting in the form of fresh whole, frozen whole, fillet frozen, etc. One of the preparations that are much in demand by the Indonesian market is fillet pangasius (Hastarini et al 2012). In 2019 fillets pangasius in Indonesia for export to Saudi Arabia reached 236,000 tons (Widarti 2020).

The utilization of fish bone waste has not been maximally carried out by the community and the fishing industry, where most of them use fish meat more than other fish body parts, one example being fish bones. Theindustry fillet *pangasius* produces 38.56% of meat, 14.43% of skin, and 3.73% of offal. Meanwhile, the highest yield came from the head and bones of *pangasius*, which was 43.28% (Ningsih et al. 2011).

Generally, the handling of residual waste from the fishing industry is only buried or used as animal feed (Putranto et al. 2015). Waste from pangasius processing can cause new problems in the environment, therefore the utilization and processing of waste from activities fillet *pangasius* needs to be done. This aims to reduce the negative impact of the processing industry fillet *pangasius*.

One of the efforts to handle fishery waste is to process it into food products. One of them by doing fortification. Fortification is the addition of micronutrients is one way to reduce micronutrient malnutrition with a food-based approach (Allen et al 2006).

Calcium is a mineral that the body needs, which functions as a form of bones and teeth, regulates blood clotting (Almatsier 2002). Humans need to consume adequate amounts of calcium to avoid the effects of calcium deficiency. Lack of calcium in children can lead to *rickets inhibited* /bone growth. Lack of calcium can also cause blood calcium levels to decrease, when below normal range (9-10 mg/100 ml) or so-called hypocalcemia, it can cause tetanus or seizures. Sensitivity of nerve fibers and nerve centers to stimuli increased, which can cause muscle spasms, such as leg cramps (Almatsier 2002) Riskesdas data (2018) shows 25.7% of adolescents aged 13-15 years and 26.9% of adolescents aged 16-18 years with poor nutritional status. One way to improve nutrition in adolescents is to do fortification.

Pangasius is one type of freshwater fish that has a fairly high calcium. Tabakka (2004) revealed that the calcium content of *pangasius* bone meal was 26%. Fortification of pangasius bone meal has been widely carried out in various food preparations,

including the fortification of pangasius bone meal for the manufacture of biscuits, vermicelli, crackers, etc. The purpose of this paper is to review research on pangasius bone meal in various processed food products.

Pangasius Bone Flour

Fish bone meal has bone constituent elements consisting of calcium, phosphorus, and nitrogen-materials such as amino acids that form collagen proteins (Edam 2016). Fish bone meal with high calcium and phosphorus content can be used as an alternative to calcium and phosphorus needs for the body.

Calcium phosphate contained in fish bones as much as 14% of the total bone structure, and can be absorbed by the body about 60-70% (Subangsihe 1996). The content is used as an alternative source as a health and bone booster. The content of *pangasius* bone meal from various researchers is as follows:

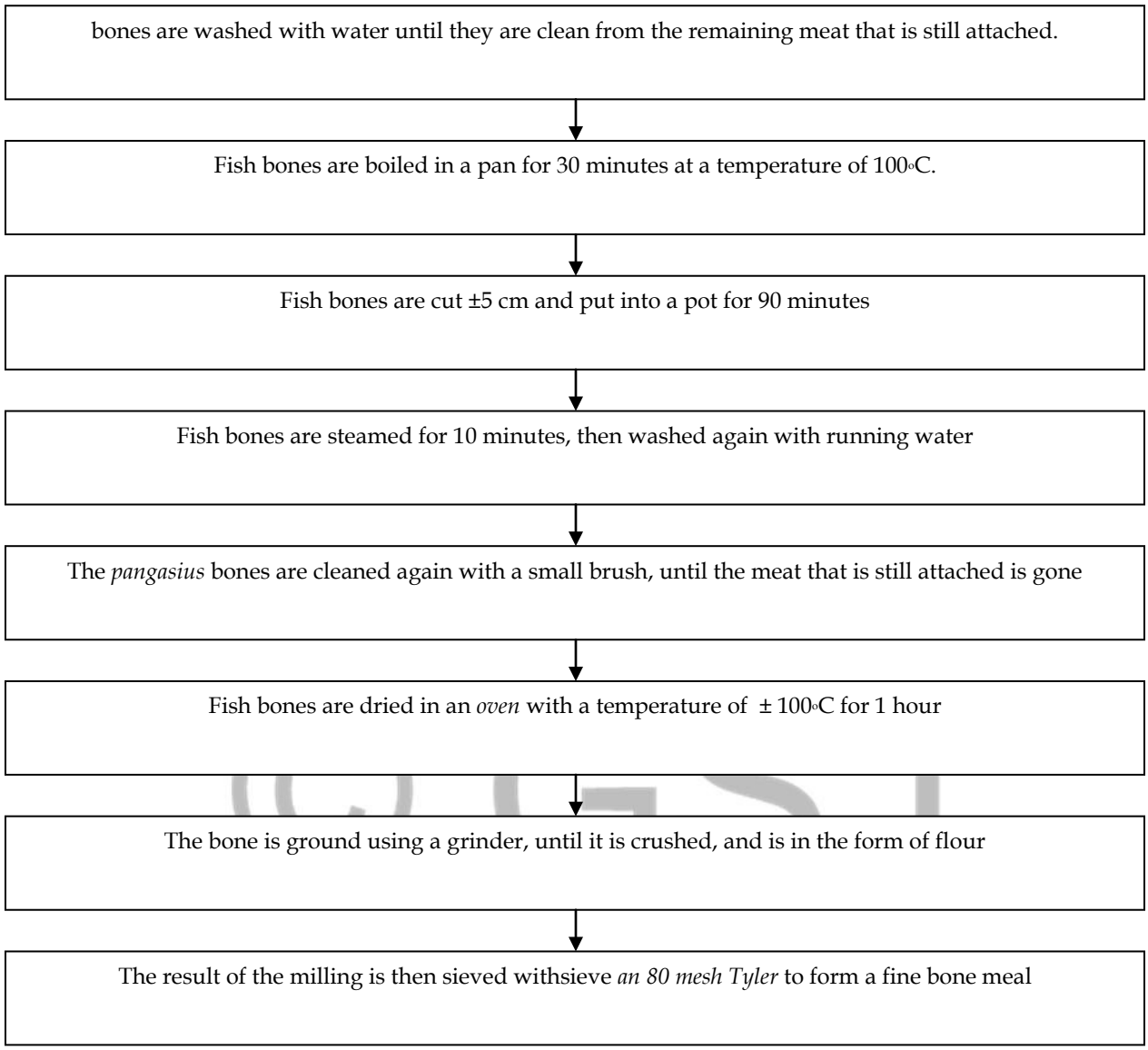
Table 1. Contents of *Pangasius* Bone Flour

Author.	Water	Protein	Fat	Ash Content	Calcium
Afrinis et al (2018)	6.79%	20.39%,	3.36%,	64.23%	1002.00 mg/100g
Angraini, (2019)	6.21%	25.38%	6, 55%	53.41%	51.3%
Rich (2008)	6.53%	22.23%	2.73%	56.38%	264.53 mg

Fish bones used in the manufacture of fish bone meal should be fresh fish bones that have not been decayed (Nabil et al 2006). Fish meal for use as a food additive must be processed properly and correctly. Fish meal processing must pay attention to cleanliness, fish quality standards and good packaging methods to avoid contamination that can lead to oxidation or insects (Yuniawati 2002). High levels of fish fat will accelerate rancidity due to fat oxidation (Ketaren S 2005).

The procedure for making Pangasius Bone Flour Fish

Pangasius bone flour is made using the fishbone making procedure (Asni 2004)



Picture 1 . The procedure for making *Pangasius* Bone Flour Fish (Asni 2004)

Utilization of Pangasius Bone Flour in Processed Products *Cookies*

Pangestika et al (2021) investigated the use of *pangasius* bone meal and tuna fish bone meal in the manufacture of *cookies* which were treated with 8%, 16%, 24% of each fish in the treatment in the manufacture of *cookies*. The results of the calcium content obtained in the addition of 8% *pangasius* bone meal was 47.7 mg/100 g, and the addition of 8% tuna bone meal was 120.2 mg/100 g.

Utilization of Pangasius Bone Flour and Seaweed (*Kappahycus alvarezii)* in Processed Traditional Food Products Ilabulo

Harmain et al (2016) investigated the development of ilabulo traditional food as a functional food fortified with seaweed (*Kappahycus alvarezii)* and *pangasius* bone meal (*Pangasius* sp). This study used 3 treatments, the ratio of *pangasius* bone meal: seaweed porridge, namely A (10%: 5%), B (15%: 10%), C (20%: 15%). The results showed that formulation C (20%:15%) was the most preferred treatment by panelists with nutritional content of 54.46% water content, 11.54% ash content, 7.78% protein content, 8.91% fat, 0 ,61% fiber content, 22.07% carbohydrate, 0.315% calcium content.

Utilization of Pangasius Bone Flour in Processed Crackers

Fajaria et al (2019) investigated the addition of *pangasius* bone meal and white oyster mushroom to calcium levels and sensory characteristics of crackers. This study was tested using a completely randomized design with two factors. The first factor was tapioca formulation: *pangasius* bone meal: white oyster mushroom with three treatment levels (86%:8%:6), (86%:10%:4%), and (90%, 5%, 5%) . The results showed that the best treatment was crackers with a formulation (86%:10%:4%) with a calcium content of 568.345mg/100g, a swelling volume of 176 cm^3, a moisture content of 8.96%, an ash content of 0.63%, a fat content of 0 ,22%, protein content 1.46%, carbohydrate content 88.72%, and phosphorus content 20.28 mg/ 100 g.

Utilization of Pangasius Bone Flour in Processed Biscuit Products

Kaya (2008) investigated the use of *pangasius* bone meal as a source of calcium and phosphorus in the manufacture of biscuits. This study was tested with five treatments, namely 0%, 2%, 4%, 6%, and 8%. The results showed that the best treatment was biscuits with the addition of 2% (A) and 4% (B) with water content of 3.58% and 3.92%; ash content of 1.54% and 2.09% ; fat 20.22% and 19.95% ; 7.72% and 8.07% protein; carbohydrates 66.92% and 65.96% ; while for calcium is 95, 06% and 88, 96%; and phosphorus 20.73% and 41.47%.

Conclusion

Fish waste from fishery processing can be utilized into various kinds of food products. One of them is the utilization of *pangasius* bone waste into various calcium-rich food products such as vermicelli, biscuits, cookies, crackers, and can also be added to traditional regional foods such as Ilabulo. The addition of *pangasius* bone meal had a significant effect on calcium levels, namely vermicelli (82.1 mg), biscuits (47.7 mg/100 g), crackers (568.345 mg/100g), biscuits (88.96% and 95.06%).), and Ilabulo as traditional food (0.315%)

References

[1] Afrinis, Besti H, Harahap.2018. Formulation and Characteristics of Vermicelli High in Protein and Calcium with Addition of *Pangasius* Bone Flour (Pangasius hypopthalmus) for Stunting Toddlers. MKMI Journal. 14 (02): 157-164
[2] Allen Lindsay, Bruno de Benoist, et al. 2006. Guidelines on Food Fortification with Micronutrients. World Health Organization and Food and Agricultural Organization of The United Nations. Switzerland.
[3] Almatsier Sunita. 2002. Basic Principles of Nutrition Science. PT Gramedia Pustaka Utama: Jakarta
[4] Angraini Rara., Desmelati., Sumarto. 2019. Quality Characteristics of Fish Bone Flour from Different Types of Fish (Patin, *Pangasius* and Sembilang). THE BEST Journal. 47 (01): 68-75
[5] Asni, Y. 2004. *Study of Biscuit Making with Addition of Pangasius Bone Flour (Pangasius Hipopthalmus).* Essay. Faculty of Fisheries and Marine Science. IPB Bogor.
[6] Edam Mariati. 2016. Fortification of Fish Bone Flour on Physico-Chemical Characteristics of Fish Meatballs. *Journal of Industrial Technology Research*. 08 (02): 83-90.
[7] Fajaria A, T. Rohmayanti, I. Kusumaningrum. 2019. Calcium Levels And Sensory Characteristics Of Crackers With The Addition Of *Pangasius* Bone Flour And White Oyster Mushroom (Pleurotus oestreatus). Proceedings of the National Seminar on Food Technology. 13 (02): 130-142
[8] Harmain R, Dali F, Nurjanah, Jacob AM. 2016. Study and Development of Ilabulo Traditional Food as Functional Food Fortified Kappaphycus alvarezii Seaweed and *Pangasius* Bone Flour (Pangasius sp.). Research Result Report : Gorontalo State University.
[9] Hastarini E, Dedi F, Irianto HE, Budijanto S. 2012. Characteristics of fish oil from waste processing of siam *pangasius* fillet and jambal *pangasius*. AGRITECH. 32(4): 403-410.
[10] Kaya, AOW 2008. Utilization of *Pangasius* Bone Flour (Pangasius sp) as a Source of Calcium and Phosphorus in Biscuit Making. Essay. Bogor. Bogor Agricultural University.45
[11] Ketaren, S. 2005. Introduction to food oil and fat technology. Jakarta: UI Press. 272p.
[12] Ministry of Marine Affairs and Fisheries. 2015. KKP Performance Report 2014. Jakarta.
[13] Nabil M, Trilaksani W, and Salamah E. 2006. Utilization of Tuna Fish Bone Waste (Thunnu'sSp.) As a Source of Calcium Using Protein Hydrolysis Method. Fishery Products Technology Bulletin 9(2): 34-45.
[14] Putra M., Rodiana., Herpandi. 2015. Fortification of Cork Fish Bone Flour (Channa striata) in Crackers as a Source of Calcium. Journal of Fishery Products Technology. 04(02) : 128-139.
[15] Putranto Hilman, Andi Noor, Indrati K. 2015. Characteristics of Belida Fish Bone Flour (Chital asp) as a Source of Calcium Using Protein Hydrolysis Method. Ziraa'ah Agricultural Scientific Magazine. Vol 4.(1) : 11-20
[16] Subangsihe. 1996. *Innovative and Value Added Tuna Products and Markets*. Infofish International
[17] Suryana Mansyur. 2021. Large Export Potential, KKP Stimulates Development of *Pangasius* Cultivation. Between News. Retrieved September 15, 2021. https://www.antaranews.com/berita/2338426/potensi-ekspornya-besar-kkp-pacu-pengembangan-budi-daya-ikan-patin
[18] Tabakka. 2004. Utilization of *Pangasius* Bone Flour (Pangasius sp) as an Additive to Crackers. Essay. Bogor. Bogor Agricultural Institute.

[19] Widya, Fitria Widyasari, Kusuma A. 2021. Utilization of *Pangasius* Bone Flour and Tuna Fish Bone Flour for Making Cookies. Journal of Food and Agroindustry. 9 (01): 44-45

[20] Widarti Peni. 2020. Production of *pangasius* and *pangasius* is predicted to rise above 20 percent. Economic Magazine https://economy.bisnis.com/read/20200128/99/1194674/hasil-ikan-patin-dan-lele-dipredik-naik-di-atas-20-persen.