**MICROBIOLOGICAL ANALYSIS ON BONE FLOUR PATIN FISH (Pangasius Hypophthalmus Sp.) BISCUIT IS RICH IN CALCIUM FOR CHILDREN**

***Dewi Sartika Siagian1,* Wahyu Margi Sidoretno2, Sri Kartini3**

1. *Program Studi KebidananUniversitas Abdurrab*

*Jl. Riau Ujung no. 73 Pekanbaru, postcode 28291, Indonesia*

1. *Program Studi D-III Analis Farmasi dan MakananUniversitas Abdurrab*

*Jl. Riau Ujung no. 73 Pekanbaru, postcode 28291, Indonesia*

1. *Program Studi D-III Analis Farmasi dan MakananUniversitas Abdurrab*

*Jl. Riau Ujung no. 73 Pekanbaru, postcode 28291, Indonesia*

*email: dewi.sartika.siagian@univrab.ac.id, email: wahyu.margi@univrab.ac.id, email:* *sri.kartini@univrab.ac.id*

***ABSTRACT***

Ikan Patin bones are a by-product of the fish processing industry which contains the most calcium from the fish body because the main elements of fish bones are calcium, phosphorus and carbonate. Biscuits are snack that have a water quality standard of less than 5% so that they have a crunchy texture. The purpose of this study was to see microbial contamination in biscuits using the ALT (Total Plate Number) method. The results of microbial contamination meet the specified requirements and are included in the category of safe and normal standards according to SNI 2973:2011.

Keywords: Patin bones, Biscuits, Microbial

**INTRODUCTION**

Patin fish bones are a by product of the fish processing industry which contains the most calcium from the fish body because the main elements of fish bones are calcium, phosphorus and carbonate (K, 2010). Calcium absorption and retention in body is influenced by the quantity and quality of the dietary protein consumed. The interaction between calcium and protein is of special concern considering the fact that bone tissue is nearly 50 per cent protein by volume and other 50 per cent of bone is calcium (Agrahar-Murugkar et al., 2018).

One of the easiest and cheapest food sources to obtain is fish, such as Patin fish. Patin fish is a fish that is classified as tasty, delicious and savory fish. In addition, Patin fish contains high protein and low cholesterol. Patin contains 68.6% protein, 5.8% fat, 3.5% ash, and 59.3% water (K, 2010).

Patin fish bone meal is rich in nutrients. The nutritional content of Patin fish bone meal can be determined by proximate analysis and mineral analysis. Proximate analysis is the determination of the percentage of the main components (ash content, moisture content, fat content, protein and carbohydrates) of food stuffs, while mineral analysis is the determination of the percentage of calcium and phosphorus in food stuffs. Patin fish bone meal contains 25.6% calcium and 15.1% phosphorus.

Biscuits are snacks that have a water quality standard of less than 5% so they have a crunchy texture (Manley, 2001). The chemical properties of biscuits can be seen from the parameters of moisture content, fat content, protein content, and ash content according to the Indonesian National Standard. Changes in the chemical properties of biscuits can occur due to the influence of several factors, such as the composition of the ingredients, temperature and baking time. The biscuit quality standard as a whole has been regulated in SNI 2973-2011(Badan Standarisasi Nasional Indonesia. Biskuit. Sni 2973: 2011., 2011).

Stunting is one of the nutritional problems in Indonesia, the direct causes of stunting are infectious diseases and inadequate food intake, such as protein and calcium deficiency.(Nur Afrinis, 2018). Biscuits with additional patin fish bone meal are biscuits that contain calcium so that they can be given to children under five to support growth and development. These protein and calcium rich biscuits can help overcome many nutritional deficiencies and can add variety to the bakery industry (Agrahar-Murugkar et al., 2018). The purpose of this study was to see microbial contamination in biscuits and to determine the number of microbes contained in biscuits so that they are safe for consumption.

 Based on research (Nur Afrinis, 2018) on the formulation and characteristics of bihun high in protein and calcium with the addition of Patin fish bone meal (*pangasius hypopthalmus sp*.) For stunting toddlers with the aim of knowing the best formula and characteristics of bihun high in protein and calcium with the addition of fish bone meal Patin fish (*pangasius hypopthalmus sp*.). The results of research on Patin fish bone meal showed protein content of 20.39%, water content of 6.79%, ash content of 64.23%, 3.36% fat, 8.35% carbohydrates, 1002.00 mg / 100g calcium, and formulations. The selected bihun was F1 (4%) for children under five with stunting.

**RESEARCH METHODS**

In addition to determining the quality of biscuits using chemical criteria, it is also necessary to determine microbial contamination. This aims to determine the number of microbes contained in biscuits so that they are safe for consumption. The principle is to liberate bacterial cells that may be protected by food particles and to reactivate bacteria which may have reduced viability due to unfavorable conditions in food. Microbial contamination using the ALT method (Angka Lempeng Total) has a maximum limit of 1 x 104 colonies / g.

**RESULTS AND DISCUSSION**

Based on the test results, all formulas meet the requirements for microbial contamination limits required by SNI 2973: 2011. This can be seen in the table below;

|  |  |
| --- | --- |
| Sampel | Parameter Uji Cemaran Mikroba |
| Angka Lempeng Total(Koloni/g) | Coliform(APM/g) | Escherecia coli(APM/g) | Kapang dan Kamir(Koloni/g) |
| F0 | 29 x 101 | < 20 | <3 | 14 x 101 |
| F1 | < 2,5 x 102 | < 20 | <3 | < 2 x 102 |
| F2 | < 2,5 x 102 | < 20 | <3 | < 2 x 102 |

Table 1 Test results for microbial contamination on biscuits

Based on the results of the calculation of microbial contamination using the ALT method (Angka Lempeng Total), it can be seen that the highest number is found in F0, this is because the formula that does not contain Patin Fish bone meal has a higher water content than the other formulas. While the number of bacteria in F1 and F2 is low, this is due to the heating factor and low water content. In addition, the roasting process in biscuit processing causes a decrease in moisture content, there by inhibiting microbial growth. The maximum limit for microbial contamination using the ALT method is 1 x 104 colonies / g. Based on the research conducted, the results of microbial contamination using the ALT method still meet the stipulated requirements.

The results of the identification of Coliform and E. coli bacteria, can be seen that the biscuits with or without the addition of catfish bone meal contain less than the stipulated provisions. This result is still declared normal according to SNI 2973: 2011. So it can be indicated that the biscuits made are included in the safe standard category. It is known that Coliform and E. coli are members of the Enterobacteriaceae family, enteric bacteria, which are facultative Gram-negative anaerobic bacteria, which are usually found in the intestinal tract of warm-blooded animals including humans, located in the digestive tract especially in the cecum and large intestine (Olivier Tenaillon, David Skurnik, Bertrand Picard, 2010). E. coli, can interfere with the gastrointestinal tract in children and adults.

The results of the kapang/kamir test showed that the amount of kapang/kamir in biscuits with the addition of Patin fish bone meal or without Patin fish bone meal was still below the SNI requirement, namely a maximum of 2 x 102 colonies / g. Biscuits that have good storage conditions so that they are not contaminated with outside air will avoid kapang/kamir contamination. In addition, the presence of kapang/kamir and bacteria can be caused by the raw material used which is thought to have been contaminated with microbes before hand. Raw materials, factory environment, microbiological state of equipment and packages, and lack of cleanliness are all possible factors for microorganism contamination (Olivier Tenaillon, David Skurnik, Bertrand Picard, 2010). When technological processes are less precise, beverage and food production methods will have a significant impact on the type of spoilage microflora (Kregiel, 2015).

# CONCLUSION

Based on the research conducted, the results of microbial contamination using the ALT method still meet the stipulated requirements. The results of the kapang/kamir test showed that the amount of mold / yeast in biscuits with the addition of Patin fish bone meal or without Patin fish bone meal was still below the SNI requirement, namely a maximum of 2 x 102 colonies / g.

# REFERENCES

Agrahar-Murugkar, D., Dwivedi, S., Dixit-Bajpai, P., & Kumar, M. (2018). Effect of natural fortification with calcium and protein rich ingredients on texture, nutritional quality and sensory acceptance of cookies. *Nutrition and Food Science*, *48*(5), 807–818. https://doi.org/10.1108/NFS-02-2018-0041

Badan Standarisasi Nasional Indonesia. Biskuit. Sni 2973: 2011., (2011).

K, M. Gufran. H. Kordi. (2010). *Panduan Lengkap Memelihara Ikan Air Tawar di Kolam Terpal*. Lily Publisher.

Kregiel, D. (2015). Health Safety of Soft Drinks: Contents, Containers, and Microorganisms. *BioMed Research International*. https://www.hindawi.com/journals/bmri/2015/128697/

Nur Afrinis, V. B. dan H. D. A. (2018). Formulasi Dan Karakteristik Bihun Tinggi Protein Dan Kalsium Dengan Penambahan Tepung Tulang Ikan Patin (Pangasius Hypopthalmus sp.) Untuk Balita Stunting. *MKMI*, *14*(2). https://journal.unhas.ac.id/index.php/mkmi/article/view/3984

Olivier Tenaillon, David Skurnik, Bertrand Picard, E. D. (2010). The population genetics of commensal Escherichia coli. *Nat Rev Microbiol*, *8*(3). https://pubmed.ncbi.nlm.nih.gov/20157339/