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Analysis of Nutritional Content in Frozen Fishery Products of Mackerel Infected by Anisakis sp.

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ABSTRACT

Scomber japonicus mackerel is an imported commodity that has a high nutritional content as a raw material for traditional fish processing industries in the form of steaming in Indonesia, however imported fish can be infected by diseases due to infection from endoparasites caused by worms. This research aims to analyze the nutritional content which includes moisture, ash, protein, and fat content of mackerel that are not infected and infected with the parasite Anisakis sp.. This research uses an observational method by taking 15 samples of mackerel randomly. Then the organoleptic condition was examined referring to (2014) SNI 4110: 2014 concerning frozen fish to determine the difference between infected and uninfected mackerel *Anisakis* sp.. Furthermore, it is examined to determine the number of parasites that infect and the number of samples infected with the parasite *Anisakis* sp.. Next the samples were tested proximate according to (AOAC) 2005 to compare the nutritional content of the mackerel fish that are not infected and infected with the parasite *Anisakis* sp.. The results of the research were analyzed descriptively and comparatively. It showed that there was no difference between uninfected and infected mackerel with *Anisakis* sp. when viewed from an organoleptic point of view. The results of identification of parasites from 15 samples of mackerel, 10 positive fish were infected with the highest infection intensity in the intestine. The results of the proximate content analysis showed that the mackerel samples were not infected with the parasite *Anisakis* sp. has water content of 62.00%, ash content of 12.96%, protein content of 23.52%, and fat content of 12.28%. While the SM09 sample infected with the parasite *Anisakis* sp. has a water content of 62.81%, an ash content of 10.23%, a protein content of 21.32%, and a fat content of 10.73%.

Keywords: Mackerel (*Scomber japonicus*), organoleptic, fish parasites, *Anisakis* sp., proximate analysis

1. INTRODUCTION

Fish like other living things cannot be separated from various diseases. One of the diseases in fish can be caused by parasites. Various types of fish can be attacked by parasites, both freshwater and marine fish. In general, parasite attacks do not kill fish as a host sporadically, but can interfere with the fish's physiological processes, because parasite attacks can damage body tissues, suck blood and fish nutrition as a source of nutrition for these parasites to grow and reproduce. In addition, parasitic attacks on fish can cause secondary infections, either by bacteria, viruses or fungi, which can lead to death in farmed fish, so that it will have an economic impact due to a decrease in fish production (Rosidah 2016).

There are several types of parasites that are zoonotic, which is a type of parasite that can infect fish and humans. One of theparasites *zoonotic* is *Anisakis* sp. which live as endoparasites in the intestines of fish. According to Hafid (2016) the risk of transmitting these worms to humans is relatively small because the fish consumed after going through the perfect heating process first causes the worms to die. However, fish infected with *Anisakis* sp. The nutritional content of the fish (meat) will decrease, as Muhdi argued in Hidayati (2016), the nature of parasites is to suck nutrients from their host.

Gambar 1. Ikan Makarel (*Scomber japonicus)*
Sumber: Randall (1996)

Mackerel fish species *Scomber japonicus* including sea water fish species which is an imported fish as raw material for traditional fish processing industry in the form of pemindangan in Indonesia and sold in auction place fish in a frozen state. According to data from the Directorate General of Fisheries (2013), mackerel imports in 2011 reached 93,781 tons and an increase in 2012 reached 120,436 tons, this shows that this fish is a leading commodity in Indonesia. Based on data from the Directorate General of Processing and Marketing of Fisheries Products (2012), mackerel is an alternative source of animal protein for Indonesians.

Apart from having a high nutritional content, this mackerel is easily available in the market and the price is relatively cheap, which is IDR 23,500 / kg. November 2012-2017 increased by 10.58% per year. The purpose of this research was to analyze the parasite and organoleptic intensity and to compare the nutritional composition (moisture, ash, protein, and fat content) of frozen fishery products of infected and uninfected mackerel mackerel with *Anisakis* sp ..

Taxonomic Hierarchy

1. Animalia (Kingdom)
2. Chordata (Phylum)
3. Actinopterygii (Class)
4. Perciformes (Order)
5. Scombridae (Family)
6. Scomber (Genus)
7. *Scomber japonicus* (Hart 1973) (Species)

2. MATERIALS AND METHODS

The research method used was observation, by taking samples of frozen mackerel randomly as many as 15 samples. The sampling method used was *purposive sampling method*. The sample was examined to determine the number of infecting parasites and the number of samples infected with the parasite *Anisakis* sp. Then, the sample was also observed for its organoleptic condition to determine the difference between infected and non-infected mackerel fish. Furthermore, the samples were tested proximate which included moisture, ash, protein and fat content as data on the nutritional content contained in mackerel infected with the parasite *Anisakis* sp..

The procedure carried out in this research consisted of three stages, namely organoleptic testing of 15 samples of frozen fishery products. mackerel by 15 semi-trained panelists. After that, surgery was performed to identify the presence of Parasites *Anisakis* sp.. in mackerel. Parasite *Anisakis* sp. which was found further preserved using an alcohol solution. After that, two fish samples were taken consisting of one fish sample that was not infected with the parasite *Anisakis* sp. and one sample of fish infected with the parasite *Anisakis* sp. to be tested for proximate levels.

This research will produce three observable analyzes, namely the results of the organoleptic test, the analysis of the intensity & prevalence of the parasite *Anisakis* sp. In frozen mackerel fishery products and the nutritional content of frozen mackerel fishery products infected and not infected with the parasite *Anisakis* sp .. Organoleptic data, intensity and prevalence ofparasites *Anisakis* sp., and nutritional content of mackerel fish were analyzed descriptively. The results of this research will produce a standard of consumption feasibility for the community for frozen mackerel fishery products in particular.

3. RESULT

3.1 Organoleptic Test

The organoleptic test in this research uses a sensory assessment sheet for frozen fish which refers to BSN (2014) SNI 4110: 2014 concerning frozen fish. The aspects assessed in the frozen fish assessment sheet are divided into two parts, namely when it is frozen and after melting, as presented in Table 3.

Table 1. Results of the average sensory assessment of mackerel

Spesifikasi	Nilai	Kode sampel	
		SM01	SM09
A. Dalam keadaan beku			
1. Kenampakan (khusus untuk *frozen block*)			
Rata, bening, cukup tebal pada seluruh permukaan dilapisi es.	5	√	√
2. Pengeringan (dehidrasi)			
Tidak ada pengeringan pada permukaan produk	5	√	√
3. Perubahan warna (diskolorasi)			
Belum mengalami perubahan warna pada permukaan produk.	5	√	√
B. Sesudah pelelehan (*thawing*)			
1. Kenampakan			
Cemerlang spesifik jenis.	5	√	√
2. Bau			
Segar, spesifik jenis.	5	√	√
3. Daging			
Sayatan daging kurang cemerlang.	4	√	
Sayatan daging mulai kusam.	3		√
4. Tekstur			
Sedikit kurang kompak, sedikit kurang elastis.	2	√	√

Information: SM01 (sample of mackerel infected with *Anisakis* sp.), SM09 (sample of mackerel infected with *Anisakis* sp.)

Based on Table 1, seen from the appearance of the fish in a frozen state, the two samples both have a value of 5, which means that they are coated with ice evenly, clear, thick enough on the entire surface. Then, from the drying indicator, the two samples also got a value of 5 which means that there is no drying on the surface of the product. Both samples also received a value of 5 from the color change indicator, which means that there has not been a change in color on the surface of the product. The next fish assessment is an assessment after the fish has gone through theprocess *thawing*. The appearance of the two samples got a value of 5, which means that they looked bright and were specific to the type of fish. The aroma of the two samples also scored 5, which means that it is fresh with specific types. However, if seen from the indicator of the meat, the samples were not infected with *Anisakis* sp. The average score was 4, which means that the incisions were less brilliant, while the samples infected with *Anisakis* sp. On average, it got a lower score of 3, which means that the cutlet is getting dull. The texture of the two samples also got the same value, namely 2, which means that it is a little less compact, a little less elastic. The decline in the quality of fish meat can be caused by the freezing and thawing processes, as argued by Hong *et al.* (2013) and Hasan (2016) stated that freezing and melting greatly affect the characteristics of fish meat, this occurs due to the oxidation process of fat, protein damage, and changes in the structure of fish meat.

Organoleptic observation of fishery products is very important to do as the main tool for measuring the acceptance of the product. Organoleptics, namely assessing and observing the texture, color, shape, aroma, taste of a food, drink or medicine (Nasiru 2014).

3.2 Hasil Uji Proksimat Ikan Makarel

The proximate test results include moisture, ash, fat and protein content in the control mackerel (SM01) and infected mackerel parasites *Anisakis* sp. Shown in Figure 1.

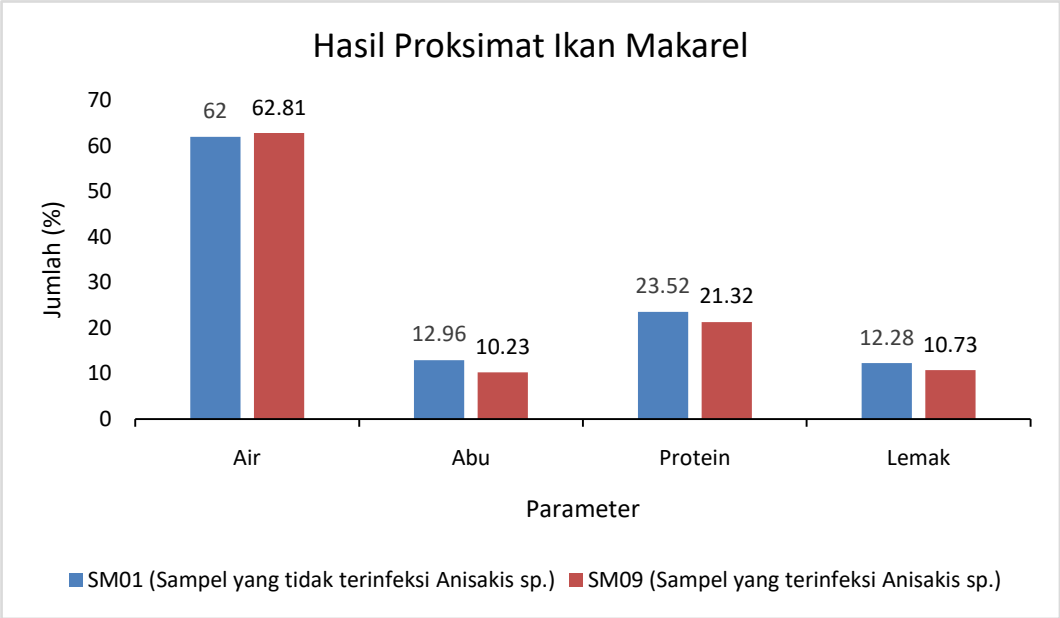

Figure 1. Histogram of proximate analysis results of mackerel (*Scomber japonicus Proximate*).

Testing was carried out to determine the chemical composition and nutritional content of frozen fishery products of mackerel fish that were not infected and infected with the parasite *Anisakis* sp. Broadly speaking, there is no significant difference between the nutritional content of the SM01 sample (not infected with *Anisakis* sp.) And the SM09 sample (infected with *Anisakis* sp.) But with the discovery ofParasites *Anisakis* sp.. can indicate that the meat quality is not good in these fish. This is in accordance with the opinion of Kobayashi *in* Polimeno (2010) which states that the larvae of *Anisakis* sp. in the body of the fish can indicate the fish has poor meat quality and can cause allergic reactions in humans who eat it.

a. Water Content

The results of the analysis of water content (Figure 1) showed that the water content of the samples that were not infected with *Anisakis* sp. lower that is 62% compared to samples infected with *Anisakis* sp. that is

62.81%. The low water content of the samples not infected with *Anisakis* sp. can be caused by various factors, one of which is the shelf life of the sample. There is a decrease in water content in fish, one of which is caused by storage time, in accordance with the opinion of Bawinto (2015), the length of storage affects the moisture content of food. The longer the storage time, the lower the amount of water content will be. The difference in water content in the two samples was not influenced by the presence of Anisakis, because the presence of anisakis itself was more dominant in the digestive part. So it can be concluded that the samples infected with *Anisakis* sp. has a better water content value than the samples not infected with *Anisakis* sp., these results are in accordance with the statement of Suhartini (2005), namely the amount of water content in fish meat is in the range of 60-84%.

b. Ash Content

The results of the ash content analysis (Figure 1) showed the ash content of the samples that were not infected with *Anisakis* sp. it was 12.96% higher than the sample infected with *Anisakis* sp. namely 10.23%. According to Pratama et al (2018), the lower the water content, the more residue is left in the sample. This is consistent with the data identified in the sample, where samples that have a large water content have a small ash content. The total value of the content can be due to the ash content and composition depending on the type of material and the method of ashes. So it can be concluded that the ash content of the samples that are not infected with *Anisakis* sp. better than the sample infected with *Anisakis* sp .. Ash content in the proximate analysis aims to evaluate the nutritional value of food products, especially total minerals. This is in accordance with the statement of Winarno (2008), the ash content of food shows the total minerals contained in these foodstuffs. This also proved that the mackerel fish samples were not infected with *Anisakis* sp. has a higher mineral content compared to the mackerel infected samples *Anisakis* sp .. Because the higher the value of the ash content, the more total minerals of a material are.

c. Protein Levels

The results of the protein content analysis (Figure 4) showed that the protein content of the samples that were not infected with *Anisakis* sp. 23.52% higher than the sample infected with *Anisakis* sp. namely 21.32%, so it can be concluded that the samples not infected with *Anisakis* sp. has a better protein content value than samples infected with *Anisakis* sp., this result is in accordance with Suhartini's (2005) statement, namely the amount of protein content in fish meat is in the range of 18-30%. This can indicate mackerel infected with the parasite *Anisakis* sp. has a lower protein content than fish that are not infected because the worms as parasites in the fish's body have taken nutrients from their host. This is in accordance with the opinion of Rohde (1994) who stated that *Anisakis* sp. can live in various organs and tissues of fish, but are mostly found in the digestive tract. The number of parasites found in the digestive tract is probably due to the large amount of food available to the worms.

d. Fat levels

The results of the analysis of fat content (Figure 4) showed that the fat content of the samples not infected with Anisakis was higher, namely 12.28% compared to the samples not infected with Anisakis, namely 10.73%. This difference can be affected by the amount of moisture content in the sample. Samples not infected with Anisakis had a lower amount of water content than samples infected with Anisakis, this result is in accordance with the opinion of Blight *et al.* (1998) *in* Suharsono (2006) fat content and water content have a negative relationship, so if the fat content is low, the water content has a high value. So it can be concluded that if the sample infected with Anisakis is better than the sample that is not infected with Anisakis, because it has a lower fat content. A decrease in the value of fat content can be caused by many things, one of which is due to an oxidation reaction (Suharsono 2006). Mackerel is classified as a fish that has a high fat content, as stated by Suhartini (2005), the amount of fat content in fish is in the range of 0.1-0.2%.

4. CONCLUSIONS

Based on the research results, it can be concluded the organoleptic test results showed that the organoleptic conditions of infected and uninfected mackerel did not show a significant difference in terms of appearance, smell and texture of meat.

The results of the proximate analysis showed that mackerel infected with the parasite *Anisakis* sp. (SM09) has decreased the quality of nutritional values, seen from the water content of 62.81%; ash 10.23%; protein

21.32%, and fat 10.73%. Meanwhile mackerel fish that are not infected with the parasite *Anisakis* sp. (SM 01) had higher nutrient content, namely 62.00% water content respectively; ash 12.96%; protein 23.52%; and fat 12.28%.

References

[1] Badan Standarisasi Nasional. 2014. SNI 4110:2014 Tentang *Ikan Beku*. Badan Standarisasi Nasional Jakarta. Jakarta.
[2] Bawinto, A.S., Eunike, Mongi., dan Bartie, E Kaseger. 2015. Analisa Kadar Air, pH, Organoleptik, dan Kapang Pada Produk Ikan Tuna (*Thunnus* sp.) Asap di Kelurahan Girian bawah, Kota Bitung, Sulawesi Utara. *Jurnal Media Teknologi Hasil Perikanan*. Vol. 3(2). Hlm 55-65.
[3] Hafid, M. D. 2016. Keberadaan Anisakis typical (Anisakidae) dari Ikan Tongkol dan Ikan Layang dari Perairan Sulawesi Barat. *Jurnal Sain Venteriner*. 34 (1). Hlm 102-111.
[4] Hasan, B. Desmelati., D. Iriani., Sumarto., Sahyudi. 2016. Evaluasi Karakteristik Fisikokimia Baung Asap Yang Dibuat Dari Ikan Segar Dan Beku. *Jurnal Pengolahan Hasil Perikanan Indonesia*. Vol. 19(2):Hlm 121-131.
[5] Hidayati, N. dkk. 2016. Identifikasi Parasit Pada Ikan Tongkol (*Euthynnus affinis*) di Tempat Pelelangan Ikan Lhoknga Aceh Besar. *Jurnal Medika Veterimaria.* 10 (1). Hlm 5-8.
[6] Hong H, Luo YK, Zhou ZY, Bao YL, Lu H, Shen HX. 2013. Effects of different freezing treatments on the biogenic amine and quality changes of big head carp (*Aristichthys nobilis*) heads during ice storage. *Food Chemistry*. 138: 1476-1482 p.
[7] Kementrian Kelautan Perikanan. 2017. Statistik Nilai Impor Komoditas Utama, 2017. Badan Pusat Statistik Ditjen Penguatan Daya Saing-Kementrian Kelautan dan Perikanan. Jakarta. 49 hlm.
[8] Kementrian Kelautan Perikanan. 2017. *Statistik Perikanan Budidaya Air Tawar Indonesia, 2017*. Kementrian Kelautan dan Perikanan. Jakarta. 35 hlm.
[9] Nasiru, N. 2014. Teknologi Pangan Teori Praktis dan Aplikasi. Graha Ilmu. Yogyakarta. 117 hlm.
[10] Polimeno, L. 2010. Anisakiasis, an underestimated infection: effect on intestinal permeability of Anisakis simplex-sensitized patiens. *Journal of Disease of Organisans Hamburg*, 90 (1). 190 – 196 p.
[11] Pratama, R.I., Rostini I., dan Rochima, E. 2018. Amino Acid Profile and Volatile Flavor Compounds of Raws and Streamed Patin Catfish (*Pangasius hypophthalmus*) and Narrow barred Spanish Mackarel (*Scomberomorus commerson*). IOP *Conference Earth Environ*tal *Science*. Hlm 1-17.
[12] Rohde. 1994. *Disease caused by metazoan, helminth. Disease marine animals*. Biolische Anstalt Helgoland. Hamburg.
[13] Rosidah. 2016. *Parasit dan Penyakit Ikan.* Unpad Press. Jatinangor. Cet. ke-1. 304 hlm.
[14] Suharsono. 2006. *Pembuatan Bubuk Flavor Kepala Udang Windu (Paneus Monodon) Secara Enzimatik Sebagai Bumbu Instan Makanan*. Fakultas Perikanan dan Ilmu Kelautan Institut Pertanian Bogor. Bogor. 70 hlm.
[15] Suhartini, S dan N. Hidayat. 2005. *Olahan Ikan Segar*. Trubusagrisarana. Surabaya. 52 hlm.
[16] Winarno, F. G. (2008). *Ilmu Pangan dan Gizi.* Gramedia Pustaka Utama. Jakarta.