Organoleptic Quality of Fresh Vaname Shrimp (*Litopenaeus vannamei*) Marketed in Modern Markets of Makassar City

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Abstract

This research seeks to determine the organoleptic quality of fresh vaname shrimp which are marketed in modern market of Makassar City. The research was conducted from December 2019 to February 2020, in three modern markets with each representing the eastern, central, and western parts of Makassar. Samples were taken three times in each market during 10.00-11.00. The organoleptic testing consisted several parameters; appearance, smell, and meat/texture, and was performed at the Laboratory of Fisheries Product Quality Implementation Agency (BPMPP) of South Sulawesi Province. In addition, shrimp temperature and pH tests were performed shortly after sampling. The data obtained were analyzed descriptively and presented in tabular form. The research results showed that vaname shrimp marketed in three modern markets of Makassar City were categorized as fresh shrimp which were within the safe limit for consumption. Compared to the Indonesian National Standard (01-2728.1-2018) regarding the organoleptic safety of fresh shrimp, this results showed values meeting safety standards.

Keywords: Organoleptic quality, vaname shrimp, modern market

1. Introduction

Shrimp is a fishery product possessing high economic value and is in great demand, just like fish does. One kind of shrimp that is widely consumed by the public is cultivated vaname shrimp, which are available throughout the year. Abundant availability, delicious taste, and relatively cheap price compared to other aquaculture shrimp, such as tiger prawn, become the reason why vaname shrimp is highly in demand. As one of the leading commodities, vaname shrimp has the highest production rate of 20,643.9 tons (45.53%), beating tiger prawn at 12,045.8 tons (26.57%), fire shrimp at 11,312.8 tons (24.95%), and other shrimp at 1,339.3 tons (2.95%) of the total shrimp commodity (45,341.8 tons) in South Sulawesi in 2017 (Department of Marine and Fisheries of South Sulawesi, 2018).

Shrimp contains high-value protein but is considered as perishable food due to its high water and nutritional contents, making it a suitable medium for the growth of putrefactive bacteria (Houwing, 1974). The deterioration of shrimp quality causes a decrease in consumer acceptance due to reduced sensory parameters, such as color, texture, smell, and appearance. Thus, it requires fast, precise, and hygienic handling by applying low temperature to maintain shrimp freshness. Efforts to shrimp freshness are intended to inhibit the rate of change in quality in order for the shrimp reaches consumers fresh, fit, and safe for consumption.

Most consumers buy shrimp which are marketed at retailer level, including in traditional and modern markets, as well as those sold by peddlers. Modern markets are often found in big cities such as Makassar. They generally provide fresh shrimp by paying attention to hygiene factors, making them ideal shopping place for some city community.

Sales areas equipped with cooling, sanitation, and hygiene facilities indicate that the shrimp marketed in modern markets are of high quality and safe for consumption. Is that a fact?

In several cases, it was found that fish and shrimp which are marketed in modern markets were no longer fresh, displaying signs of red eyes, soft-textured meat, and bad smell. This was evidenced by unannounced inspection carried out by Food Security Service of Makassar in one of the modern markets. The results of inspection found fishery products, fish and shrimp, were no longer fresh and even containing dangerous chemicals (Terkininews.com, 2017).

Currently, information regarding the quality of vaname shrimp marketed in Makassar City, especially in modern markets, is limited. Thus, it is important to conduct research inspecting the quality of fishery products, especially vaname shrimp, marketed in modern markets. The quality parameters in question are organoleptic parameters.

2. Research Methods

The material used in this research was vaname shrimp (*Litopenaeus vannamei*). This research was conducted from December 2019 to February 2020, by sampling vaname shrimp (*Litopenaeus vannamei*) in three modern markets in Makassar City. This research belonged to case study, implementing direct observation. Sampling was done by purposive sampling, a sampling technique used by deciding what needs to be known in relation with research objectives. Sampling of shrimp was carried out in three modern markets in Makassar City, Eastern (A), Central (B), and Western (C) markets. In addition, the three markets sold vaname shrimp and had the same operating time, which was 09.00 - 21.00. Samplings were conducted three times a week for each market, during 10.00-11.00 o'clock. For each sampling, shrimp was purchased as much as 300 - 500 g which then put into a plastic zipper and stored in a cool box filled with ice to maintain the freshness of shrimp, before being analyzed. The testing of research parameters were as the following

2.1. Organoleptic Test (SNI 01-2346-2006)

The organoleptic test on vaname shrimp (*Litopenaeus vannamei*) was done to determine the freshness of shrimp by nine trained panelists based on organoleptic assessment sheet taken from SNI 01-2346-2006. The test was carried out by providing a detailed assessment at score sheet table by guidelines provided in the attachment A of SNI 2728: 2018 for shrimp samples. The scores presented in the table ranged from 1-9.

2.2. AOAC Temperature Test (1995)

The procedure for measuring shrimp temperature at each observation point referred to method listed in the Association of Official Analitycal Chemysis (AOAC) (1995). Shrimp temperature was measured using an alcohol thermometer, which was a thermometer sensor inserted into shrimp meat until it reached its thermal center point. It was then left there for a while until the temperature value was stable within 30 seconds.

2.3. AOAC pH Test (1995)

pH test was carried out using a pH meter which was calibrated in advance using a standard buffer of pH 4 and 7. 10 grams of shrimp were crushed and homogenized with 90 ml of distilled water using a homogenizer. The crushed meat was then measured using a pH meter that had previously been calibrated.

3. Result and Discussion

The organoleptic test is one of the parameters used for determining fishery products freshness (Litaay et al, 2017). This test is mostly done to examine signs of freshness of

fishery products because of its simplicity. Fresh shrimp poses almost the same properties as live shrimp, both in appearance, smell, taste, and texture.

3.1. Organoleptic Test

Organoleptic characteristics of shrimp which are marketed in three modern markets in Makassar City, including appearance, smell, and texture, were obtained through subjective test performed by trained panelists, whose results are presented in Table 1.

Table 1. The Results of Organoleptic Test on Vaname Shrimp (*Litopenaeus vannamei*) which are Marketed in Modern Market of Makassar City

Organoleptic Parameter	Market A	Market B	arket C	Average Score	Quality Description
Appearance	7,8	7,2	7,8	7,6	Intact, Clear, Infirm joints
Smell	7,4	7,2	7,6	7,4	Fresh, specific to neutral smell
Meat/Texture	7	7,2	7	7	Compact
Average	**7,4**	**7,2**	**7,4**	**7,3**	

According to Hadiwiyoto (2009), the higher the value or numbers which is given by the panelists, shows the better fish condition/freshness. The results showed that the overall organoleptic value of vaname shrimp which are marketed in the modern market of Makassar City ranged from 7.2 to 7.4 with an average of 7.3. Based on SNI 2728/2018, the minimum organoleptic quality standard for fresh shrimp is 7, so it can be claimed that vaname shrimp marketed in modern markets in Makassar City is still fresh and quite good. These data are an accumulation of assessments of the appearance, smell, and texture of meat. The good and correct handling of shrimp is very important to pay attention because the decrease of the dead shrimp process was very fast.

The organoleptic data of vaname shrimp which are marketed in Modern Market B has the lowest organoleptic value in terms of appearance, smell, and texture. This is thought to be due to the length of storage time of the shrimp, as research has been conducted by Nurqaderianie (2016); Litaay (2017) states that storage time and organoleptic value have a negative relationship, which means that the longer the storage time, the organoleptic value will more decrease. This is also supported by interview data related to shrimp supply, in this case the three modern markets have their own differences. Modern Market A suppliers deliver shrimp everyday, Modern Market B suppliers deliver shrimp every week in large quantities and further handling is carried out by storing them in a refrigerator, while the Modern Market C suppliers deliver shrimp every day in limited quantities.

3.1. Temperature and pH Test Results

Physical and chemical parameters which are represented by temperature and pH values are determinants of the freshness level of shrimp (Azizah, 2015). This parameter is used as supporting data for the quality determining of the vaname shrimp which are marketed in the modern market of Makassar City.

3.1.1 Temperature

The temperature value of shrimp which are marketed in three (3) modern markets in Makassar City can be seen in Table 2.

Table 2. The results of the vaname shrimp (*Litopenaeus vannamei*) temperature which are marketed in the modern market in Makassar City

Modern Market	Temperature (ºC)			
	Sampling 1	Sampling 2	Sampling 3	Average
A	21	19.7	14.7	18.4
B	24.8	19.2	21.4	21.8
C	19.7	20.3	16.9	18.9

Temperature greatly affects the level of freshness and durability of shrimp in storage. Therefore, the decomposition process can be inhibited through cooling (Suprapti, 2004). Based on the research data, the temperature value of vaname shrimp in the three modern markets is in the range of 18.4ºC - 24.8ºC with the highest temperature shown by the shrimp which are marketed in the modern market B. As for the temperature of shrimp in markets A and C are relatively the same. The measured shrimp temperature in those three markets was classified as high and indicated that the application of low temperature was not applied correctly.

Shrimp temperature is influenced by the cooling method applied both during storage and display. Shrimp cooling in Markets A and C is cooled where the ice is placed under and on top of the shrimp pile, but the surface of the shrimp is not in direct contact with the ice. This allows the process of taking heat from the body of the shrimp to run more quickly on the part that is in direct contact with the ice. A slightly different thing was found in the display shrimp in Market B which the ice was only applied to the bottom of the shrimp pile, while the top was left exposed to the air. This treatment causes the cooling process is not optimal, hence the temperature of the upper shrimp tends to be higher. In addition, sampling is done by taking the shrimp which are on the top. The method of cooling shrimp that is applied to the three modern markets can be seen in Figure 1.

Figure 1. Shrimp cooling method in Modern Market A (a), Modern Market B (b), and Modern Market C (c)

3.1.2 Potential Hydrogen (pH)

The pH value of vaname shrimp which are marketed in three modern markets in Makassar City can be seen in Table 3. The pH value of alive fish is neutral (Irianto and Giyatmi, 2014). Based on the research results, the pH value of shrimp in the modern markets in Makassar City ranges from 7.0 - 7.5.

Table 3. The pH test results of vaname shrimp (*Litopenaeus vannamei*) in the modern markets in Makassar City

Markets	pH			
	Sampling 1	Sampling 2	Sampling 3	Average
A	7.3	7.3	6.5	7
B	7.6	7.4	7.5	7.5
C	7,2	7,3	6,5	7

According to Leitao and Rios (2000), the longer the storage time, then the pH value will also increase along with the deteriorating phase of shrimp quality. Thus, it is assumed that the shrimp which has a high pH in the Modern Market B is due to the longer storage time. This is based on interview data regarding the shrimp supply obtained and storage time of shrimp stocks that the shrimp in Modern Market B are obtained from distributors who collect shrimp from PPI Rajawali with a time of collection once a week. Large amounts of shrimp are stored in the refrigerator and removed gradually when the displayed shrimp runs out. However, it is different from cooling shrimp in Modern Market A and C. Modern Market A receives shrimp supply from PPI Paotere regularly three times a week so that the shrimp storage time is shorter than in modern markets B. While the shrimp in Modern Market C comes from PPI Paotere which are delivered by supplier every day in a certain amount. Thus, the storage time of shrimp is relatively shorter than the shrimp which are marketed in Modern Markets A and B.

The relationship between temperature and pH values with organoleptic data shows that the organoleptic value decreases with increasing temperature and pH. This is shown by the vaname shrimp which are marketed in the Modern Market B.

4. Conclusions and suggestions

Based on the research, it can be concluded that the quality of vaname shrimp which are marketed in three (3) modern markets of Makassar City is categorized as fresh vaname shrimp which is at the safe limit for consumption with the overall organoleptic value in the range of 7.2 - 7.4. Based on the Indonesian National Standard (01-2728.1-2018) regarding the safety of fresh shrimp organoleptically, it shows a value that is satisfying the safety standard.

The description regarding organoleptic conditions still does not describe in detail related to food safety in vannamei shrimp, for that it is advisable to carry out more testing to obtain more complete information. So that this research can become a reference in handling shrimp as a staple ingredient with fresh nutritional value and provide information for the government in determining policies

References

AOAC (1995). Official Method of Analysis of The Association of Offial Analytical of Chemist. Arlington Virginia USA (US): The Association of Official Analytical Chemyst, Inc.

Azizah, L.H. (2015). Analisis Kemunduran Mutu Udang Vaname (*Litopenaeus Vannamei*) Secara Kimia Dan Mikrobiolois. Skripsi, Institut Pertanian Bogor 151: 10–17.

Badan Standar Nasional (2006). SNI 01-2346- 2006. Petunjuk Pengujian Organoleptik atau Sensori. Badan Standardisasi Nasional.

Badan Standar Nasional (2018). SNI 01- 2728.1-2018. Udang segar –Bagian 1 :Spesifikasi. Badan Standardisasi Nasional.

DKP Sulsel, (2018). Laporan Statistik Perikanan Sulawesi Selatan. Dinas Kelautan dan Perikanan Provinsi Sulawesi Selatan.

Hadiwiyoto, S. (2009). Teknologi Pengolahan Hasil Perikanan. Jilid I Cetakan Kedua, Liberty. Yogyakarta.

Houwing H, (1974). Technical, economic and organizational conditions for an industrial plant for irradiation preservation of shirmps (Technical and Economic Report ITE. No. 85), Commission of the European Communities, Euisotop Offi ce, 11–14.

Irianto, H.E, dan S Giyatmi (2014). Teknologi Pengolahan Hasil Perikanan. In , 1–53. http://repository.ut.ac.id/4554/1/LUH T4443-M1.pdf.

Leitao MFDF dan Rios DDPA (2000). Microbiological and chemical changes in freshwater prawn (*Macrobrachium rosembergii*) storaged refrigeration. Brazil Microbiology 31(3): 1-4.under Journal

Litaay.C, dkk (2017). Pengaruh Perbedaan Metode Pendinginan dan Waktu Penyimpanan Terhadap Mutu Organoleptik Ikan Cakalang Segar. Jurnal Ilmu dan Teknologi Kelautan Tropis Vol. 9 No. 2, Hlm. 717-726, Desember 2017.

Nurqaderianie. A.S. (2016). Tingkat Kesegaran Ikan Kembung Lelaki (Rastrelliger kanagurta) yang dijual Eceran Keliling di Kota Makassar. Jurnal IPTEKS PSP, Vol.3 (6) Oktober 2016 : 528 – 543.

Terkininews.com (2017). Sidak Gabungan Ketahanan Pangan, Temukan Pelanggaran Supermarket Glael. http://www.terkininews.com/2017/05 /15/Sidak-Gabungan-Ketahanan Pangan-Temukan-Pelanggaran- Supermarket-Glael.html . [Diakses 10 Januari 2020].