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THE EFFECT OF SOAKING VANNAMEI SHRIMP (*Litopenaeus vannamei*) ON PEELED AND DEVEINED (PND) PRODUCTS AT PT. SATU TIGA ENAM DELAPAN (1368) BANYUWANGI-EAST JAVA

Pengaruh Perendaman Udang Vannamei (*Litopenaeus vannamei*) Pada Produk *Peeled And Deveined* (PND) di PT. Satu Tiga Enam Delapan (1368) Banyuwangi-Jawa Timur

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ABSTRACT

Shrimp is one of the important export commodities from the Indonesian fishery sector due to the considerable contribution to the economy. Rendemen on frozen shrimp processing can affect the financial aspect of the company. This study aims to identify the flow of frozen shrimp processing process, shrimp soaked with different time and size, and the quality of the raw material and the final product. Frozen raw shrimp processing process includes Raw Material Acceptance, Washing I, Weighing I, Cutting Head, Washing II, Weighing II, Initial Sorting, Final Sorting, Weighing III, Peeling and Intestinal Disposal, Washing III, Weighing IV, soaked, Weighing V, Laundering IV, Preparation, Freezing, VI Weighing, Glazing, Packaging, Metal Detection, Flap and Storage. shrimp soaked with different time and size obtained by different increase result for size 41/50 has a small increase percentage compared to size 61/70 and 71/90 which have big increase. The quality of peeled and deveined peeled shrimp products based on organoleptic test of fresh shrimp and finished product has met the standard. The quality of sensory shrimp raw shrimp PND with size 41/50, 61/70, 71/90 with soaked time of 2 and 4 hours still received by panelists based on the parameters of appearance, odor, taste and texture. Shrimp quality based on microbiology (ALT, *E. coli, Salmonella, and V.chollerae)* and chemistry (antibiotics) have met the standard.

Keywords: Shrimp, soaking and Quality

ABSTRAK

Udang adalah salah satu komoditas ekspor utama dalam sektor perikanan Indonesia dan memberikan kontribusi yang signifikan terhadap perekonomian negara. Rendemen pada pengolahan udang beku dapat mempengaruhi aspek finansial perusahaan. Penelitian ini bertujuan untuk mengidentifikasi alur proses pengolahan udang beku, perendaman udang

dengan waktu dan *size* yang berbeda, serta mutu bahan baku dan produk akhir. Tahapan pengolahan udang mentah beku mencakup Penerimaan Bahan Baku, Pencucian Pertama, Penimbangan Pertama, Pemotongan Kepala, Pencucian Dua, Penimbangan Dua, Sortasi Awal, Sortasi Akhir, Penimbangan Tiga, Pengupasan Kulit dan Pembuangan Usus, Pencucian Tiga, Penimbangan Empat, Perendaman, Penimbangan Lima, Pencucian Empat, Penyusunan, Pembekuan, Penimbangan Enam, *Glazing*, Pengemasan, Pendeteksian Logam, Pengepakkan dan Penyimpanan. Perendaman udang dengan waktu dan *size* yang berbeda diperoleh hasil kenaikan yang berbeda untuk *size* 41/50 memiliki persentase kenaikan yang kecil di bandingkan *size* 61/70 dan 71/90 yang memiliki kenaikan yang besar. Kualitas produk udang kupas mentah beku PND (*Peeled and Deveined*) berdasarkan uji organoleptik pada udang segar dan produk akhir telah memenuhi standar. Mutu sensori udang kupas mentah beku PND dengan *size* 41/50, 61/70, 71/90 dengan waktu perendaman 2 yang di sukai oleh panelis. Mutu udang berdasarkan berdasarkan mikrobiologi (ALT, *E.coli*, *Salmonella*, dan *V.chollerae*) dan kimia (antibiotik) telah memenuhi standar.

Kata Kunci : Udang, Perendaman dan Mutu

INTRODUCTION

Shrimp is one of the main export commodities in the Indonesian fisheries sector, contributing greatly to the economy, especially as a source of foreign exchange, income for fishermen or cultivators, employment opportunities, and protein content. Exported shrimp commodities include frozen shrimp, fresh shrimp and processed shrimp. Based on data released by the Central Statistics Agency, from January to August 2016, Indonesia exported 136.3 thousand tons of shrimp with a value of US$ 1.13 billion. The volume of Indonesian shrimp exports between 2015 and 2019 ranged from 17% of production (Kusuma & Sari, 2021).

Shrimp is one of the superior fishery products that has a distinctive aroma and high nutritional content. Shrimp with fresh conditions have good quality so that their selling value is higher, when compared to shrimp that are less fresh have low quality so that they have a cheaper selling price (Yuniarti *et al.,* 2021). The types of shrimp are very diverse, in Indonesia there are 11 types that are considered to have high commercial value. Most of them come from two main genera, namely Penaeus and Metapenaeus. The types of marine shrimp that dominate are *Penaeus monodon* (tiger shrimp), *Panaeus merguiensis* De Man (jerbung shrimp), *Palaemonid shrimps* (egg shrimp), and also *Litopanaeus vannamei* (White Shrimp) (Harahap *et al.,* 2017).

Vannamei shrimp (*Litopenaeus vannamei*) is one of the marine fishery commodities with high economic value that is in demand in both domestic and international markets, where 77% of production comes from Asian countries including Indonesia. The main advantages of vannamei shrimp include high selling price, ease of cultivation, and resistance to disease. Processed products in the form of frozen raw peeled shrimp are one form of business diversification to increase added value (Value Added Product/VAP). This product is made from fresh shrimp through the process of washing, decapitation, sorting, arranging, freezing, packaging, and storage (BSN, 2014).

Frozen raw peeled shrimp processed products are one of the most famous product diversifications both domestically and abroad (Hanifah *et al.,* 2021). Frozen raw peeled shrimp production companies need to consider several supporting factors for profit, one of which is yield. Information on the yield of processed shrimp products is very important for companies to calculate the company's potential profits, because there is no definite data on the yield based on shrimp size. In addition, the implementation of this study aims to study the yield that can be used as a reference for the company. Based on the explanation above, this study aims to identify

the flow of the PND (Peeled and Deveined) shrimp processing process, observe the shrimp soaking process, and determine the quality of raw materials and final products of PND (Peeled and Deveined).

RESEARCH METHODS

Tools and Materials

The equipment needed in the processing stage of frozen raw peeled shrimp is a work table, scales, lorries, plastic baskets, storage tanks, plastic basins, basins, picks, knives and freezing machines. Equipment for organoleptic testing uses a pencil, while the score sheet for fresh shrimp (SNI 01-2728.1-2006) and for the score sheet for frozen raw peeled shrimp (SNI 01-3457.3-2014) and testing equipment include digital scales, petri dishes, volumetric pipettes, Erlenmeyers, autoclaves, measuring cups, incubators, plastic stirrers, tweezers and scissors. The main materials used in observations and tests during the implementation of the final practice are fresh shrimp. The auxiliary materials in this study are water and ice with standardized ones, as well as chemicals used in the quality testing process.

Data collection

The data collection technique used is using primary data and secondary data. The primary data obtained in this study is by using organoleptic test results on fresh shrimp and also the final product. While the secondary data used comes from previous research on shrimp processing related to the quality of shrimp and also the final product of shrimp.

Procedure and Data Analysis

The research procedure was carried out by observing the processing stages of frozen raw peeled shrimp PND by participating directly in the processing unit. Observation of the flow of the frozen raw peeled vannamei shrimp processing stages refers to SNI 3457: 2014. This SNI is a reference in observing the flow of the PND shrimp processing process.

Observation of the effect of shrimp soaking was carried out at the soaking stage by soaking the shrimp in each container with different soaking times, namely two hours, four hours, and six hours with shrimp sizes of 41/50, 61/70, and 71/90 then the yield calculation was carried out.

Sensory testing was carried out using a cooked shrimp scoresheet based on SNI 3458: 2016 which had been modified with parameters of appearance, odor, taste and texture. This test was carried out using 30 non-standard panelists.

RESULT

Frozen Raw Peeled Shrimp Processing Process

The stages of shrimp freezing processing for PND (Peeled and Deveined) products at PT 1368, namely through several stages starting from Receiving Raw Materials, First Washing, First Weighing, Head Cutting, Second Washing, Second Weighing, Initial Sorting, Final Sorting, Third Weighing, Peeling and Intestinal Removal, Third Washing, Fourth Weighing, Soaking, Fifth Weighing, Fourth Washing, Arranging, Freezing, Sixth Weighing, Glazing, Packaging, Metal Detection, Packing and Storage.

Observation of shrimp soaking is carried out by soaking the shrimp using several sizes (41/50, 61/70, 71/90) which are the same with different soaking treatments, namely with a soaking time of two hours, four hours and six hours for each size.

Shrimp Immersion Observation

Shrimp with size 41/50 obtained a small average yield percentage compared to shrimp size 61/70 and 71/90 which had a larger average percentage. Shrimp with small size with long soaking obtained a large yield. This is because during the soaking process, small shrimp are

easy to stir and have a large enough space when soaked. The calculation of the yield value is based on the increase in shrimp weight after soaking divided by the shrimp weight before soaking where the shrimp weight is influenced by the amount of substances that enter (both solvents and solutes) into the shrimp cells (Verdian *et al.,* 2020).

Quality Monitoring

Organoleptic Quality of Fresh Shrimp and Final Products

The organoleptic calculation of the raw materials received by the company obtained an organoleptic value of 8. This shows that the raw materials have met the standards required by the company which are adjusted to SNI 01-2728.1-2006, namely a minimum organoleptic value of 7.

Microbiology and Chemical Testing

Microbiology testing conducted by the company's microbiology laboratory includes ALT, *coliform*, *E.coli, Salmonella, V.cholera* testing. Testing is conducted by employees at the PT.1368 laboratory which aims to meet export requirements. and chemical testing that meets standards.

Peeled and Deveined (PND) Product Sensory Test Results

Evaluation of sensory characteristics to describe the product using a score-based assessment method. The organoleptic parameters analyzed include visual characteristics, aroma, texture, and taste (Lestari *et al.,* 2023).

Appearance

Appearance is one of the important factors in the acceptability of food products. Appearance is related to the physical condition of the product that can be seen directly with the eye (visible) such as in terms of color and appearance, therefore the most important aspect of appearance is how good the appearance of the product is. The results of the appearance sensory test can be seen in Figure 1.

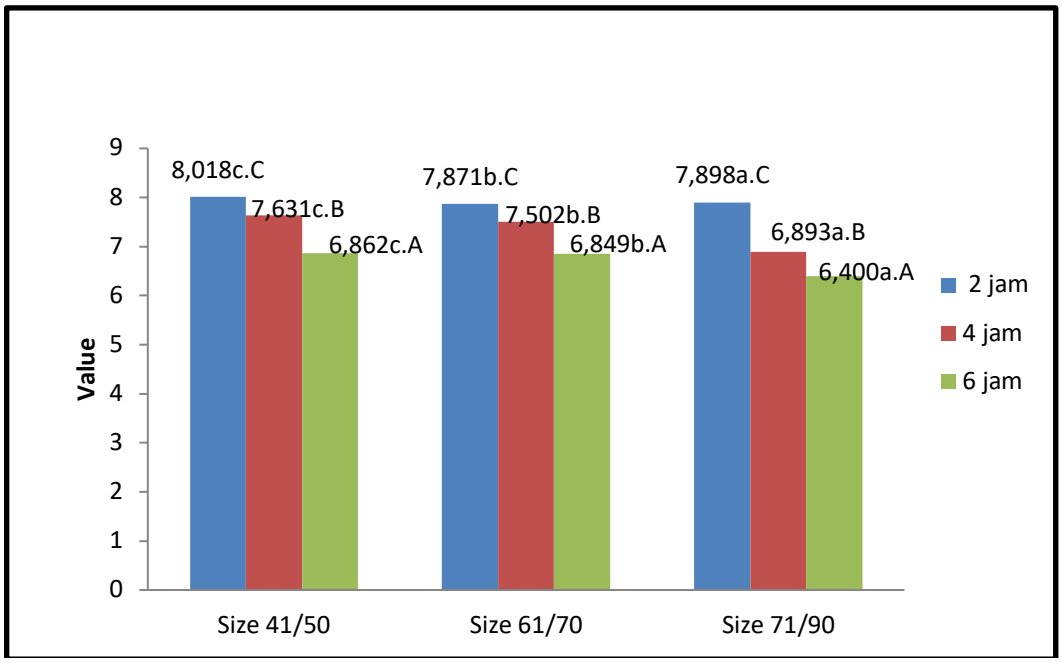

Figure 1. Average sensory values (appearance)

Smell

The effect of soaking time causes changes in the smell of cooked shrimp, this is caused by soaking the shrimp for too long. It can be seen in Figure 2 a decrease in the odor value with a shrimp soaking time of more than 2 hours. This is because shrimp have a less fresh odor and a phosphate aroma can be smelled. It can be seen that the effect of size with soaking time affects the odor. The desired odor value is 7 based on SNI.

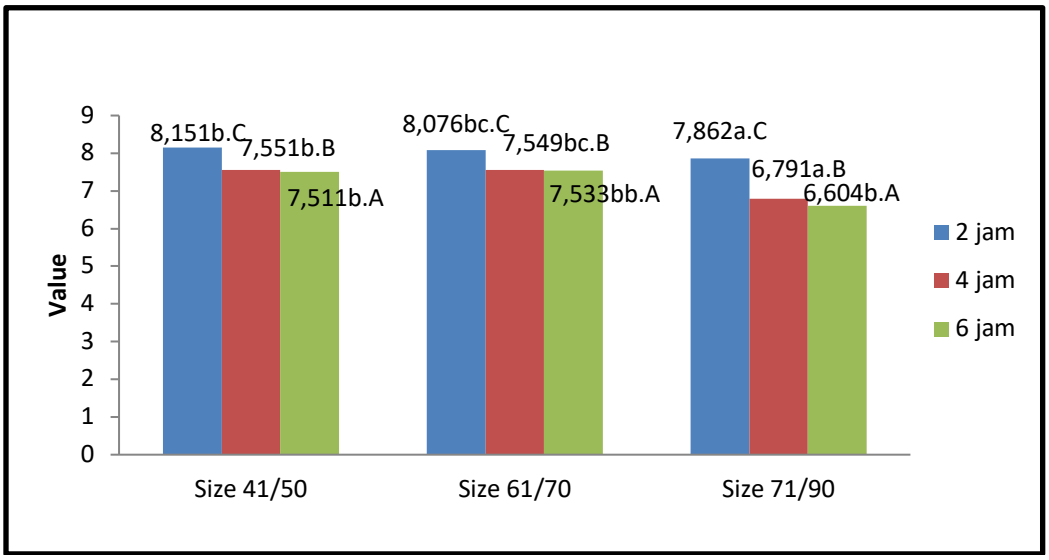

Figure 2. Average sensory value (Smell)

Taste

Taste is a very influential factor in determining whether the final product is liked or disliked. Although other hedonic test parameters are good, when the taste is less liked, it can be concluded that the product is rejected. It can be seen in Figure 3 that the difference in size and different soaking times affect the taste value. The taste value permitted by the quality standard based on SNI is 7.

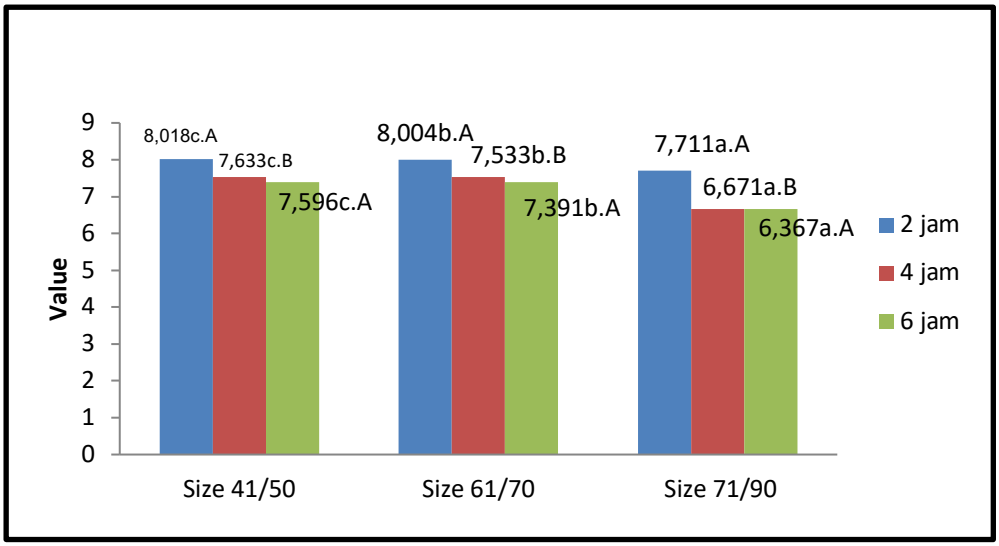

Figure 3. Average sensory value (Taste)

Texture

Food texture can be interpreted as a way of arranging and combining various component elements and structures into microstructures and macrostructures. It can be seen in Figure 4 that different sizes and different soaking times affect changes in texture values, the permitted texture value according to SNI quality standards is 7.

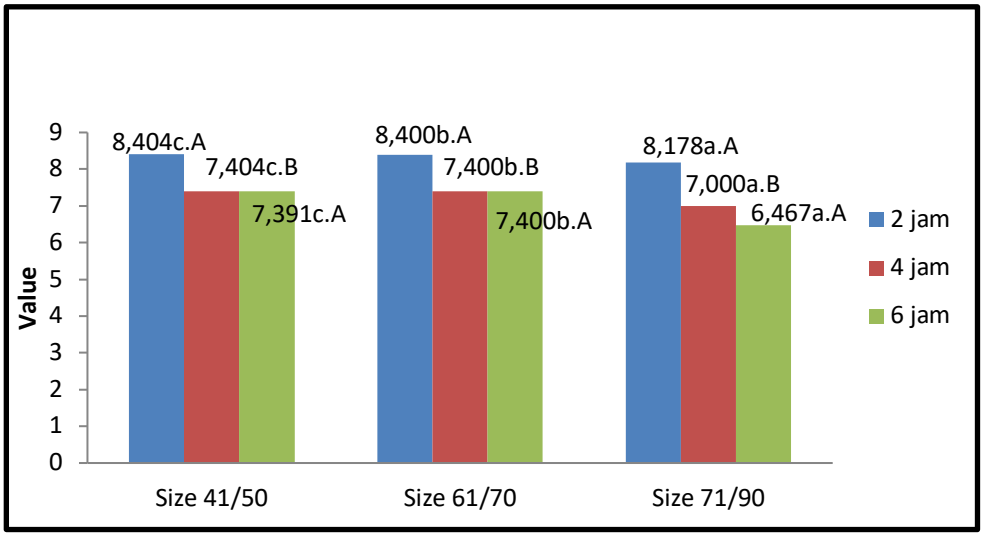

Figure 4. Average sensory value (texture)

DISCUSSION

Organoleptic testing of fishery products has an important role, so it is used as one of the elements in quality assessment and has been regulated in the Indonesian National Standard (SNI) (Sholehah & Hafiludin, 2022). It can be seen that the decrease in appearance value when the shrimp is soaked for more than two hours has a pale pink flesh appearance, this is because the shrimp is soaked for too long. It can be seen that the treatment of the length of soaking on the size greatly affects the appearance value. The desired appearance value based on SNI is 7. From the results of observations, the results for the appearance value of shrimp with different sizes have met the standards and are accepted by the panelists. However, for shrimp size 71/90 with a soaking period of 6 hours, it has not met the standard with an average value of 6.4. This means that the shrimp size 71/90 with a soaking period of 6 hours was rejected by the panelists. The effect of different sizes and soaking times can be seen to have significantly different results, this is caused by chemical interactions between food components and additives, such as phosphates can affect the water binding capacity and color of the product (Indrajaya, 2011).

Based on the results of odor observations in Figure 2, the odor values of shrimp with different sizes have met the standards. However, for shrimp size 71/90 with a soaking time of 6 hours, it has not met the standard with an average value obtained of 6.604 with the specific shrimp being slightly rotten. This means that shrimp with a size of 71/90 with a soaking time of 6 hours were rejected by the panelists. The odor that appears is generally caused by volatile protein compounds and is smelled by the panelists (Sholehah & Hafiludin 2022).

From the observation of shrimp soaking with different sizes and different soaking times, most of them have met the quality standards. The results in Figure 3 show that the panelists like shrimp with sizes 41/50 and 61/70. However, shrimp with a size of 71/90 with a soaking time of 6 hours has not met the standard with an average value obtained of 6.367, this is because the taste of the shrimp is rather bland, slightly bitter and salty. According to Nasran (1991),

giving salt in small amounts will give a salty taste to the product, but if given in excessive amounts, it will cause an excessive salty taste.

From the observation of shrimp soaking in Figure 4. with different sizes and different soaking times meets the quality standards except for the soaking of shrimp with a size of 71/90 with a time of 6 hours has not met the standard with an average value obtained of 6.467, this is because the texture is elastic, less compact and chewy. Shrimp with a size of 71/90 and a soaking time of 6 hours were rejected by the panelists. Textural changes in shrimp are one indication of its freshness, marked by a body that begins to soften. In addition, there is a color change that reduces the quality of the shrimp and makes it less acceptable organoleptically by consumers (Maulidani *et al.,* 2020).

CONCLUSION

The processing stages of frozen raw peeled shrimp PND (Peeled and Deveined) have been in accordance with the SNI standard for frozen raw peeled shrimp (SNI 3457-2014). Soaking shrimp with different soaking times and sizes obtained different percentage weight gain results, namely for size 41/50 the weight gain of shrimp with soaking for 2 hours (8.737%), 4 hours (12.798%) and 6 hours (15.427%), shrimp with size 61/70 the weight gain with soaking for 2 hours (11.494%), 4 hours (14.21%), and 6 hours (1.423%) and shrimp size 71/90 the weight gain with soaking time of 2 hours (14.539%), 4 hours (17.044%) and 6 hours 19.637. The quality of frozen raw peeled shrimp products PDN (Peeled and Deveined) based on organoleptic tests of fresh shrimp and final products has met the standards. The sensory quality of frozen raw peeled shrimp PDN the smaller the size of the shrimp and the longer the soaking time the more it is rejected because based on the parameters of appearance, odor, taste and texture the average sensory value obtained is below standard. The quality of shrimp based on microbiology (ALT, *E.Coli Salmonella, and V.chollerae*) and chemistry (antibiotics) has met the standards.

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DAFTAR PUSTAKA

[BSN]. Badan Standarisasi Nasional (2006). Air Minum Dalam Kemasan. SNI - 01 – 3553-2006. Jakarta: Badan Standarisasi Nasional.

[BSN]. Badan Standarisasi Nasional (2006). Es Untuk Penanganan Ikan Bagian I : Spesifikasi. SNI 01-4872.1-2006. Jakarta: Badan Standarisasi Nasional.

[BSN]. Badan Standarisasi Nasional (2006). Udang Segar-Bagian 2 : Persyaratan Bahan Baku. SNI 01-2728.1-2006. Jakarta: Badan Standarisasi Nasional.

[BSN]. Badan Standarisasi Nasional. (2006). Pengujian Mikrobiologi (ALT). SNI-01-2332-2006. Jakarta: Direktorat Jendral Perikanan.

[BSN]. Badan Standarisasi Nasional. (2014). Udang Kupas Mentah Beku. SNI 3457:2014. Jakarta: Direktorat Jendral Perikanan.

[BSN]. Badan Standarisasi Nasional. (2016). Udang Masak Beku. SNI 3458:2016. Jakarta: Direktorat Jendral Perikanan.

Hafina, A., Sipahutar, Y. H., & Siregar, A. N. (2021). Penerapan GMP dan SSOP pada pengolahan udang vannamei (*Litopenaeus vannamei*) kupas mentah beku peeled deveined (PD). *Aurelia Journal, 2*(2), 117–131.

Harahap, F. R., Kardhinata, E. H., & ZNA, H. M. (2017). Inventarisasi jenis udang di perairan

Kampung Nipah Kecamatan Perbaungan Kabupaten Serdang Bedagai Sumatera Utara. *BIOLINK (Jurnal Biologi Lingkungan Industri Kesehatan, 3*(2), 92–102.

Indrajayadi, I. (2011). *Penggunaan polifosfat untuk mereduksi susut masak selama produksi skala industri udang putih (Litopenaeus vannamei) beku di PT. Centra Pertiwi Bahari Lampung* [Master's thesis, Institut Pertanian Bogor].

Kusuma, F. E. P., & Sari, L. K. (2021). Analisis daya saing ekspor udang Indonesia ke delapan negara tujuan terbesar tahun 2000–2019. *Seminar Nasional Official Statistics, 12*(1), 695–704.

Lestari, R. A., Patadjai, A. B., & Azis, M. A. (2023). Pengaruh konsentrasi dan lama perendaman dengan menggunakan sodium tripolyphosphate terhadap karakteristik mutu produk udang kupas mentah beku peeled and deveined. *JSIPi (Jurnal Sains dan Inovasi Perikanan, 7*(1), 63–72.

Maulidani, N. I., Swastawati, F., & Suharto, S. (2020). Pengaruh perendaman larutan cuka (asam asetat) dengan konsentrasi yang berbeda terhadap residu formalin pada udang vaname (*Litopenaeus vannamei*). *Jurnal Ilmu dan Teknologi Perikanan, 2*(2), 50–56.

Sholehah, I. H., & Hafiludin, H. (2022). Nilai organoleptik (sensori dan bobot tuntas) produk perikanan di Balai Pengujian Mutu Hasil Perikanan (BPMHP) Semarang Jawa Tengah. *Juvenil: Jurnal Ilmiah Kelautan dan Perikanan, 3*(3), 53–60.

Said, N. I. (2011). Disinfeksi untuk proses pengolahan air minum. *Jurnal Air Indonesia, 3*(1).

Gunandi, Sumardika, P., Basino, Bestynar, K. S., & Mugi, M. (2014). *Penanganan udang pasca panen*. Jakarta: STP Press.

Suwetja, I. K. (2011). *Biokimia hasil perikanan*. Jakarta: Media Prima Aksara.

Verdian, A. H., Witoko, P., & Aziz, R. (2020). Komposisi kimia daging udang vanamei dan udang windu dengan sistem budidaya keramba jaring apung. *Jurnal Perikanan Terapan, 1*(1), 1–4.

Wardah, & Supandi, T. (2014). *Mikrobiologi pangan: Teori dan praktik*. Yogyakarta: Andi Yogyakarta.

Yuniarti, T., Prayudi, A., Supenti, L., Suhrawardan, H., & Martosuyono, P. (2021). Produksi dan profil kimia hidrolisat protein dari hasil samping pengolahan udang segar. *Jurnal Perikanan Universitas Gadjah Mada, 23*(1), 63–69.