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Cu (Cuprum) Pollution Effect from Shrimp Processing

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Abstract. Litopenaeus vannamei shrimp is a type of aquaculture shrimp, easily maintained in fresh water, short-lived, at a lower cost compared to other types of shrimp cultivation. So vannamei shrimp is more available in traditional markets. The cultivation of vannamei shrimp uses fisheries technology in its feed, which is a cuprum (Cu) mixture. The study was conducted by taking samples of Litopenaeus vannanmei species purchased in 8 traditional markets spread throughout the city of Surabaya. Each market is taken 5 random samples of shrimp with relatively the same size and condition. Then it is processed by steaming, boiling, frying and burning. Determination of Cu heavy metal content in shrimp is carried out using atomic absorption type AA 3e00 Variant Tech tron (AAS), with a few additional 50 ml glass cups, 10 ml volumetric flask, 5 ml polyethylene vial, 10-100 effendorf micropipette µl and analytical balance. There was a significant difference between boiling (p = 0,000) and steamed (p = 0,001) with shrimp in raw conditions. Whereas for processing by grilling (p = 0.989), and by frying (p = 0.078) showed insignificant results. This means that there is no significant difference in Cu content in shrimp, between raw conditions and processing by being grilled and fried.

1 Introduction

Shrimp is one of the main commodities of Indonesian aquaculture, so it is expected to support the country's economy from the fisheries sector. In addition to cultivation technology, it is known that this shrimp has a market both at home and abroad and is a major factor in increasing the growth of shrimp farming in Indonesia. Based on production volume, in the last 5 (five) years national shrimp production showed a positive growth trend with an average annual growth of 15.7 Percent(1).

Litopenaeus vannamei shrimp (better known as vannamei shrimp) is a type of cultivated shrimp. It is a type of shrimp that is easily maintained in fresh water, short-lived, at a lower cost compared to other types of shrimp cultivation. So that this type of shrimp is more available in traditional markets, with prices relatively cheaper when compared to other types of shrimp, both living and dead. The cultivation of vannamei shrimp uses fisheries technology in its feed, which is a cuprum (Cu) mixture(2,3).

Copper content, Cu is the second highest in the head and skin profile of shrimp. Cu plays an important role in oxygen-carrying hemocyanins which are the same as hemoglobin in vertebrate blood. However, it can become toxic when it exceeds a certain threshold. Cu is the cheapest and most commonly used pesticide in the aquaculture industry and other aquatic systems(4). Most of the

pesticides in aquaculture use copper as the active ingredient that can contribute to the presence of copper in the aquatic environment because it settles on the pond bottom(5).

2 Materials And Methods

This research uses a laboratory test design by providing household treatment in Litopenaeus vannamei, there were steamed, boiled, fried and grilled. The results will be analyzed for differences in the levels of Cu heavy metals. Using shrimp originating from 8 traditional markets, with each market taken 5 sample shrimp. This study used a cross-sectional approach, data collection for all variables is done at one time, in order to obtain relatively homogeneous shrimp.

3 Results And Discussion

The results of examination of Cu content in Litopenaeus vannamei shrimp showed that in raw conditions Cu content had an average of 12.7 ppm, with a deviation of 0.98 ppm. Based on the regulations of the Indonesian Food and Drug Supervisory Agency, it states that the maximum limit of heavy Cu metals in fish food and the results of its processing is 20 ppm(6). So that it can be stated that the Cu content in vannamei shrimp raw conditions is still within the safe limits allowed.

Table 1. Cu Content In Litopenaeus vannamei Based on Household Treatment

Market Source	Cu content (ppm)				
	Raw	Steamed	Boiled	Fried	Grilled
B1	12,75	11,98	8,59	11,06	11,62
B2	12,76	9,92	9,79	13,21	10,67
K1	14,92	12,67	10,76	11,87	13,62
K2	12,32	10,87	10,84	11,45	13,98
K3	11,77	11,23	9,98	12,07	13,76
K4	12,02	9,98	10,72	11,23	14,01
K5	13,44	11,12	11,03	11,98	12,34
K6	11,84	8,81	10,21	11,43	11,76
Average	12,73	10,82	10,24	11,79	12,72
Difference		1,91	2,49	0,94	0,01

Table 1 shows that the average Cu content after processing shows different results. The best results with the lowest Cu content are processed by boiling, with an average difference in Cu content of 2.49 ppm compared to the raw condition. Processing by steaming also shows good results, because it can reduce Cu content from raw conditions by an average of 1.91ppm. While processing by frying successfully reduces the Cu content in vannamei shrimp by an average of 0.94 ppm. However, grilled processing does not show a real reduction, because it is only able to reduce the average Cu content by 0.01 ppm.

Table 2. Statistical Difference in Cu Content

(I) treatment	(J) treatment	Sig.	Mean Difference (I-J)	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Raw	Steamed	.001	1.90500*	.51824	.8529	2.9571
	Boiled	.000	2.48750*	.51824	1.4354	3.5396
	Fried	.078	.94000	.51824	-.1121	1.9921
	Grilled	.989	.00750	.51824	-1.0446	1.0596

To ascertain the results of Cu content in Litopenaeus vannamei shrimp, a statistical test was carried out. So that it can be seen that the significant difference in Cu content between the processing results compared with the raw conditions. Based on table 2 it is known that significant differences were obtained from the results of processing by boiling (p = 0,000) and steaming (p = 0.001). Whereas the

processing that shows the results of Cu is not significant, namely by frying (p = 0.078) and grilled (p = 0.989).

4 Conclusion

The results of the study of differences in the residual Cu levels in shrimp in the Surabaya traditional market based on household treatment, there was significant differences in the Cu content in Litopenaeus vannamei shrimp. The best processing of Litopenaeus vannamei shrimp is by boiling or steaming because it can reduce copper significantly. The worst processing of Litopenaeus vannamei shrimp is by grilled, because it does not cause a significant difference in Cu content compared to raw shrimp.

Significance Statements

This study discovers the potential effect of Cu pollution risks among consumer of vannamae shrimp. This study help the researchers and communities to understand and manage the Cu pollution in initially reducing the Cu hazard before generate seriously health and environment problem. Thus, a new feed technology and regulation of shrimp feed need to be applied as the instrument for decision makers to set good Cu elimination program in shrimp.

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References

[1] Kementerian Kelautan dan Perikanan (KKP). BUDIDAYA UDANG MASIH SANGAT POTENSIAL [Internet]. 2018 [cited 2019 Jul 29]. Available from: https://kkp.go.id/djpb/artikel/8688-kkp-budidaya-udang-masih-sangat-potensial

[2] Asih AYP, Irawan B, Soegianto A. Effect of copper on survival, osmoregulation, and gill structures of freshwater prawn (*Macrobrachium rosenbergii* , de Man) at different development stages. Mar Freshw Behav Physiol. 2013 Mar;46(2):75–88.

[3] Martínez A, Romero Y, Castillo T, Mascaró M, López-Rull I, Simões N, et al. The Effect of Copper on the Color of Shrimps: Redder Is Not Always Healthier. McGraw K, editor. PLoS ONE. 2014 Sep 17;9(9):e107673.

[4] Chen W-Y, Ju Y-R, Lin C-J, Tsai J-W, Chen S-C, Liao C-M. Environmental stochasticity promotes copper bioaccumulation and bioenergetic response in tilapia. Stoch Environ Res Risk Assess. 2015 Aug;29(6):1545–55.

[5] European Commission, Directorate-General for the Environment, University of the West of England (UWE), Science Communication Unit. Sustainable aquaculture. [Internet]. Luxembourg: Publications Office; 2015 [cited 2019 Jul 29]. Available from: http://bookshop.europa.eu/uri?target=EUB:NOTICE:KHBB14004:EN:HTML

[6] BPOM. Batas maksimum Cemaran Logam dalam Makanan. DIREKTUR JENDERAL PENGAWASAN OBAT DAN MAKANAN; 1989.

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