Analyze the Histamine level in various positions of the Histamine developed Tuna fish

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Introduction

Sea food processing industry is a high income generating field in Sri Lanka and it brings high foreign exchange to the country. Big eye tuna (*Thunnus obesus*) and yellow fin tuna (*Thunnus albacares*) are the major tuna types which are exported by Sri Lanka to the international market. (FAO, 2014).However the presence of Histamine is the problematic factor inTuna fish processing industry which leads the industry to many health issues and income losses.

Histamine is a chemical compound created from histidine and enteric bacteria are capable of transforming histidine to histamine by the enzyme decarboxylase. Once histamine is formed, it cannot be not destroyed by freezing, cooking, smoking, curing or canning. Histamine level of more than 5mg/100g is classified as unsafe by U.S. Food and Drug Administration. (Ebrahim*et al.,* 2012).Histamine level varies position of the tuna fish body. Hence this research was carried out to identify and analyze the Histamine level in various positions of the Histamine developed tuna fish.

Methodology

Survey was done to select the positions of taking samples from tuna fish. 15 fresh fish processing companies were selected and questionnaire was given. Three positions were selected based on the questionnaire filled by the fish processing companies. Three positions of the tuna fish were selected, beneath the pectoral fin of the fish, near the belly area and the tail end respectively and thirty tuna fish were subjected to Histamine test individually. ELISA method and histaminevertox test kit were used to analyze the histamine levels in the tuna fish.Sample preparation, sample extraction, sample dilution and Histamine testing are the major steps done in ELISA method. Collected data were analyzed by using Minitab 17 software.Highest mean values and variance values were taken from those positions. Non parametric Mann-Whitney test was done to find out the significant different among positions.

Results and Discussion

Highest mean values and variance values were taken from those positions.

High Histamine was recorded in the belly area due to the most of the bacteria which responsible for converting Histidine to Histamine, lived in the gut of tuna fish. Through poor post-harvest techniques, low hygiene practices, bad catching method, bad killing methods and bad handling methods could expose the gut material to the fish muscles and so enteric bacteria easily release the Histidine decarboxylase enzyme to Histidine free specific amino acid and then forming Histamine (Koohdar*et al.,* 2010).This reaction cannot be stopped and can only be controlled. Usually low histamine levels could be observed from gilled and gutted fish because gilled and gutted fish had

low probability to contaminate by histamine forming enteric bacteria (Ebrahim*et al.,* 2012).Very low Histamine level was recorded in the tail area because effect of enteric bacteria which lived in the tail was very low because of that ability to bacterial contamination also very low and histamine also very low.

Table1. Comparison of mean, median, variance and standard deviation of histamine levels of tuna fish body

Position of the fish body	Mean	Median	Standard deviation
Beneath the pectoral fin	22.97 ppm	19.70 ppm	19.15
Near the belly area	25.74 ppm	18.30 ppm	26.44
Tail end	9.20 ppm	05.80 ppm	10.82

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Though belly area of the fish had high probability for forming Histamine in Tuna fish, most of the sea food companies preferred to take sample from beneath the pectoral fin. After taking sample from belly area small hole could be seen. It could reduce the good appearance of the products and more meat had to be removed to take the good quality of the products. Therefore sea food companies rather preferred beneath the pectoral fin of Tuna. Samples had to be taken out from deepest areas of those positions. It could increase the effectiveness of the test.

Conclusion

Highest Histamine value was recorded near the belly area of the tuna fish therefore best position for taking sample for Histamine test was near the belly area. Next Highest Histamine value was recorded beneath the pectoral fin and next best position for taking sample for Histamine test was beneath the pectoral fin.

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