

Effect of Gamma Irradiation on Histamine Content of Yellowfin Tuna (*Thunnus albacares*) Fish Muscle

I.H.W. Surendra^{1*}, E.M.R.K.B. Edirisinghe¹ and R.M.N.P. Rathnayake²

¹Department of Physical Sciences, Rajarata University of Sri Lanka, Mihintale, Sri Lanka

²Sri Lanka Gamma Center, Atomic Energy Board of Sri Lanka, Biyagama, Sri Lanka

Food irradiation is a process that has proven to be successful, due to its high effectiveness in inactivating pathogens without deteriorating product quality. Histamine is a causative agent for scombroid foodborne poisoning which effects on the quality of fish products. Therefore present study was conducted to evaluate the effect of gamma irradiation on histamine content in Yellowfin tuna fish fillets. Fish flesh was treated by Co-60 source at doses of 1, 3, 5, 7 and 10 kGy. Initial determinations were made just after irradiation and second determinations were made after storing control and irradiated samples for 24 hours at room temperature (30 °C). The concentration of histamine was detected by using High Performance Liquid Chromatography (HPLC) method. Total bacterial count (TPC) was performed according to the ISO 4833:2003 standard. The highest increment was detected in control sample after 24 hours of storage period and rate of increment of histamine is 9.97%. After 24 hours of storage, irradiated samples showed 2.40, 2.00, 3.00, 8.69 and 7.31% of increment in histamine at 1, 3, 5, 7 and 10 kGy irradiations respectively. However, no any significant difference found between any treatments. As revealed by results of TPC, highest amounts were found in control samples (3.03×10^5 cfu/g initially and 1.44×10^8 cfu/g after 24 hours storage period). In spite of increment in bacterial count in 1 kGy irradiated sample (7.4×10^5 cfu/g), all other samples were not exceeded the maximum level of acceptance in bacterial count (5×10^5 cfu/g) either after 24 hours of storage. The TPC results showed significant reduction after irradiation and within the storage time respect to the control. The results revealed that the low dose (3 kGy) irradiation can implement for the better safety of Yellowfin tuna fish fillets according to the changes in the histamine content and bacterial count.

Keywords: Yellowfin tuna, Histamine, Scombroid poisoning, Bacterial count

Acknowledgement: Financial assistance by National Research Council (NRC) under the research grant no: NRC 15-020 is acknowledged.