

Effect of Dose-Dependent Gamma Irradiation on the Fatty Acid Profile of Mud Crab, *Scylla Serrata*: A GC-FID Study

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Abstract : Mud crab, *Scylla Serrata*, a commercially important shellfish with high global demand appears to be the rich source of dietary fatty acids. Its increased production through aquaculture and highly perishable nature would necessitate improved techniques for their proper preservation. Optimized irradiation has been identified as an effective method to facilitate safety and extended shelf life for a broad range of the perishable food items including finfishes and shellfishes. The present study analyzed the effects of dose-dependent gamma irradiation on the fatty acid profile of the muscle derived from the candidate species (*S. serrata*) at both qualitative and quantitative levels. Wild grown, average sized, intermolt male *S. Serrata* were gamma irradiated (^{60}Co , 3.8kGy/ hour) at the dosage of 0.5kGy, 1.0kGy and 2.0kGy using gamma chamber. Total lipid extracted by Folch method, after methylation, were analyzed for the presence fatty acids adopting Gas Chromatograph equipped with flame ionization detector by comparing with the authentic FAME reference standards. The tissue from non-irradiated *S. serrata* showed the presence of 12 SFA, 6 MUFA, 8PUFA and 2 TF; PUFA includes medicinally important ω -3 FA such as C18:3, C20:5 and C22:6 and ω -6 FA such as γ - C18:3 and C20:2. Dose-dependent gamma irradiation reduced the number of detectable fatty acids (10, 8 and 8 SFA, 6, 6 and 5MUFA, 7, 7, and 6 PUFA and 1, 1, and 0 TF in 0.5kGy, 1.0kGy and 2kGy irradiated samples respectively). Major fatty acids detected in both irradiated and non-irradiated samples were as follows: SFA- C16:0, C18:0, C22:0 and C14:0; MUFA - C18:1 and C16:1and PUFA- C18:2, C20:5, C20:2 and C22:6. Irradiation doses ranging from 1-2kGy substantially reduced the ω -6 C18:3 and ω -3 C18:3. However, the omega fatty acids such as C20:5, C22:6 and C20:2 could survive even after 2kGy irradiation. Significantly, trans fat like C18:2T and C18:1T were completely disappeared upon 2kGy irradiation. From the overall observations made from the present study, it is suggested that irradiation dose up to 1kGy is optimum to maintain the fatty acid profile and eradicate the trans fat of the muscle derived from *S. serrata*.

Keywords : fatty acid profile, food preservation, gamma irradiation, scylla serrata

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