

A preliminary study on the fat content and fatty acid composition of three species of tuna

K A A U Karunarathna* and M V E Attygalle

Department of Zoology, University of Sri Jayewardanapura, Nugegoda

Nine species of tuna have been recorded from the waters around Sri Lanka. The species used in this study were Skipjack (*Katsuwonus pelamis*), Yellow fin tuna (*Neothunnus macropterus*) and Frigate mackerel (*Auxis thazard*). These three species are commercially important and are dominant in the tuna catches made in Sri Lanka. Fish fat is receiving increasing attention as a source of C20 and C22 carbon omega-3 fatty acids, which has profound implications for health and disease. Skipjack, Yellow fin tuna and frigate mackerel were brought from Pitipana, Negombo landing site, for a period of six months. Total fat and free fat contents were determined by Majonnier method and Soxhlet extraction method respectively. For Gas Chromatography (GC) analysis of fatty acids, fats

were extracted from Bligh and Dyer method and Fatty Acid Methyl Esters (FAME) were prepared and injected (sample size-1.2µml) into the GC (Supelco wax 10, Initial and Final temperatures 220°C and Injector and Detector temperatures 250°C, temperature programmed for linear increase of 5°C/min). FAME was then identified from previously prepared standard (cod liver oil). Concentration of each FAME was calculated as a percentage of total FAMEs. Depending on the fat content of the muscle these three species can be classified as follows. Yellow fin tuna and Frigate mackerel having 2.75% and 3.39% fat respectively can be considered as low fat fish (2 –4%), while Skipjack having 4.21% fat can be considered as a medium fat fish (4 –8%). The ratios of SFA (saturated fatty acids): MUFA (mono unsaturated fatty acids): PUFA (poly unsaturated fatty acids) in the three species were as follows, Skipjack 54:29:17, Yellow fin tuna 16:42:42 and Frigate mackerel 39:23:39. The proportion of Eicosapentaenoic acid (EPA, 20:5 ω-3) and Docosahexaenoic acid (DHA, 22:6 ω-3) in the fat of the Yellow fin tuna (3.62% and 27.7%) and Frigate mackerel (4.42% and 19.5%) were high compared to Skipjack (1.17% and 3.82%). ω-6 fatty acids were not detected in the oil of Skipjack and Yellow fin tuna, while Frigate mackerel recorded only about 0.7%. Skipjack recorded the highest fat content of the 3 species studied, but its proportion of SFA was high compared to the other species. Yellow fin tuna and Frigate mackerel recorded lower fat contents, but their proportions of unsaturated fatty acids were high. Yellow fin tuna recorded the highest proportions of the nutritionally important omega –3 fatty acids, EPA and DHA.