Analysis of Heavy Metals in Omega-3 Fish Oil Soft Gels Commercially Available in Sri Lankan Market

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Heavy metals (HM) in commercial fish oil (CFO) are one of the major non-clinical disadvantages which may challenge health benefits arising from the omega-3 fatty acids present in CFO. This study focused on the determination of HM levels (Arsenic, Cadmium, Lead, and Mercury) in twelve omega-3 CFO available in the Sri Lankan market and ensuring their safety for human consumption. The levels of As, Cd, Pb, and Hg in CFO were investigated using Inductively Coupled Plasma-Mass Spectrophotometry (ICP-MS) after microwave digestion. The As levels were ranged from 0.004 -3.029 mg/kg in CFO-9 and CFO-7 while Cd were varied from 0.003 – 0.080 mg/kg in CFO-3 and CFO-1 respectively. CFO-6 reported the lowest Pb (0.043 mg/kg) while CFO-1 reported the highest Pb (0.239 mg/kg). The highest Hg level was found in CFO-1 at 0.003 mg/kg and CFO-12 accounted lowest Hg level (0.001 mg/kg). When compared with Omega-3 Trade Association standards (<0.1 mg/kg for each metal) maximum accepted level (MAL) for As were exceeded in CFO-2, CFO-7, and CFO-12 while CFO-1 and CFO-2 exceeded MAL for Pb. Moreover, in all samples, Cd, Pb, and Hg levels were below the MAL values (1.0, 3.0, and 0.1 mg/kg, respectively) recommended by the European Pharmacopeia. Even though As and Pb values of some samples exceeded the MAL, the calculated daily intakes for As, Cd, Pb, and Hg in all CFOs were below the permissible daily intakes recommended by Food and Agriculture Organization and World Health Organization, thus indicating that the studied CFO brands are safe for human consumption.

Keywords: *commercial fish oil, heavy metals, ICP-MS*