

TISSUE-SPECIFIC CADMIUM LEVELS IN YELLOWFIN TUNA CAUGHT FROM SOUTHERN AND WESTERN WATERS OFF SRI LANKA

Dhanushka Dilini Jayaweera^{1*}, Sivashanthini Kuganathan², K.B. Suneetha Gunawickrama³ and Anita Evenset⁴

¹*Faculty of Graduate Studies, University of Jaffna, Sri Lanka*

²*Department of Fisheries, Faculty of Science, University of Jaffna, Jaffna, Sri Lanka*

³*Department of Zoology, Faculty of Science, University of Ruhuna, Matara, Sri Lanka*

⁴*Akvaplan-niva, Fram Centre (High North Research Centre for Climate and the Environment), Tromsø, Norway*

Abstract

Increasing contaminants such as heavy metals in seafood represent a concern for food safety. Therefore, measurement of Cd levels in edible tissues may help adopt a selective consumption that diminishes health risks. This study aims to compare the cadmium (Cd) levels in dark and white muscles, and liver tissues of juvenile yellowfin tuna and evaluate the health risks associated with seafood consumption. Seventy-two fish (Standard length: 50-67cm; Body weight: 0.8 kg - 2.5 kg) caught from the southern and western pelagic coasts in Sri Lanka during the period between April 2021 to May 2022 were analyzed for Cd levels using Inductivity Coupled Plasma Mass Spectrophotometer (ICP-MS). Mean cadmium levels (mean \pm SD; mg kg⁻¹ dry weight) of tissues varied in the following order: liver (13.62 \pm 6.20) > dark muscle (0.52 \pm 0.23) > white muscle (0.42 \pm 0.16). Significant differences (Wilcoxon rank sum test, $p < 0.05$) were found for cadmium levels between dark muscle and liver tissue, as well as white muscle and liver tissues. A significant positive correlation was found between Cd levels in liver tissues and fish weight (Pearson correlation, $r = 0.573$, $p < 0.05$). The measured Cd levels in edible fish tissues (white and dark muscles) were well below from the maximum permissible level (0.2 mg/kg wet weight) established by FAO/WHO. All the Cd levels recorded for liver tissues in this study exceeded the limit set by FAO/WHO and the European Commission. The results depicted that humans should avoid the consumption of yellowfin tuna liver. A human with a body weight of 60 kg can consume up to 4.667 kg of white muscles per week without exceeding the Provisional Tolerable Weekly Intake (PTWI) defined by FAO/WHO. The findings underscore the importance of monitoring tissue-specific Cd levels for safe human consumption of yellowfin tuna.

Keywords: Contaminants, Health risks, Maximum permissible level, Provisional tolerable weekly intake, Tissue-specific

*Corresponding author: dhanu.dilini@gmail.com