

Abstract

# Mercury Content in Fish Oil Food Supplements and Associated Health Risk <sup>†</sup>

Ljilja Torović <sup>1,2,\*</sup> , Jelena Banović Fuentes <sup>1</sup>, Nataša Stanojković <sup>2</sup>, Danijela Lukić <sup>2</sup> and Mirjana Djermanović <sup>3,4</sup>

<sup>1</sup> Department of Pharmacy, Faculty of Medicine, University of Novi Sad, 21000 Novi Sad, Serbia; 990d15@mf.uns.ac.rs

<sup>2</sup> Institute of Public Health of Vojvodina, 21000 Novi Sad, Serbia; natasa.stanojkovic@izjzv.org.rs (N.S.); danijela.lukic@izjzv.org.rs (D.L.)

<sup>3</sup> Faculty of Medicine, University of Banja Luka, 78101 Banja Luka, Republic of Srpska, Bosnia and Herzegovina; mirjana.djermanovic@med.unibl.org

<sup>4</sup> Institute of Public Health of the Republic of Srpska, 78101 Banja Luka, Republic of Srpska, Bosnia and Herzegovina

\* Correspondence: ljilja.torovic@mf.uns.ac.rs

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**Abstract:** The market for fish oil supplements is growing significantly, as fish oil is one of the best-known sources of beneficial long-chain polyunsaturated fatty acids. However, along with the potent health benefits, first of all regarding the reduction of cardiovascular disease risk, the consumption of fish oil could also pose a potential health risk. Namely, fish positioned higher in the food chain, such as shark, swordfish, tuna, mackerel, etc., are known to bioaccumulate mercury. Indeed, consumption of fish is the main source of mercury exposure for humans, specifically of the most toxic form of mercury, methylmercury (MeHg). In the human organism, MeHg manifests a wide spectrum of adverse health effects, collectively known as Minamata disease. The objective of this study was to assess the health risk of mercury exposure through fish oil supplement consumption. The total mercury content of 42 fish oil supplements available on the markets of the Republic of Serbia and the Republic of Srpska was determined by a direct mercury analyzer. A risk assessment was conducted for the adult population, taking into account the recommended intake of supplements and the toxicological profile of MeHg: an oral reference dose (RfD) of 0.0001 mg/kg bw/day and a tolerable weekly intake (TWI) of 0.0013 mg/kg bw. Since MeHg accounts for up to 75–98% of the total mercury content in fish, the precautionary principle was applied, meaning that the total mercury content was considered equal to MeHg. The total mercury content in supplements ranged from 0.001 to 0.0057 mg/kg, which is far below the maximum level for food supplements of 0.1 mg/kg. The mean ( $\pm$ standard deviation) of mercury content was  $0.0019 \pm 0.0009$  mg/kg. The corresponding consumer mean exposure was  $0.042 \pm 0.039\%$  of the RfD, with a maximum at 0.24%, and in the case of TWI,  $0.023 \pm 0.021\%$ , with a maximum at 0.13%. Thus, the risk from mercury in fish oil supplements was negligible, even for pregnant and nursing women who need to protect their children from the extremely harmful developmental neurotoxicity of MeHg. However, the presence of other lipophilic environmental pollutants, such as polychlorinated biphenyls, dibenzodioxins, and dibenzofurans, should be investigated.

**Keywords:** mercury; fish oil; food supplement



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