

# **Toxic Elements Safety Assessment of Omega-3 Pharmaceutical Supplements used for Pregnant Women in Jordan**

By  
**Hadeel Nayef Dakheel Alhesa**

Supervisor  
**Dr. Ala`A. Alhusban**

**Al-Zaytoonah University of Jordan, 2024**

## **Abstract**

This study aimed to assess the potential contamination by toxic metals including Pb, Cd, As, Al, and Hg in omega-3 pharmaceutical supplements prescribed for pregnant women in Jordan. Gynecologists recommend these products due to their positive outcomes for pregnant women and the fetus. In the Jordanian market, there are only 20 registered products for pregnant women in JFDA that contain omega-3 fatty acids and are prescribed regularly for pregnant women during the middle stages of their pregnancy, especially in the second and third trimesters. To investigate the toxic metal content of omega-3 products, the wet digestion technique using nitric acid at high temperatures was used to eliminate the organic matter in the samples which will facilitate metal detection using atomic spectroscopic techniques. The developed open wet digestion procedure accuracy was assessed using a Certified Reference Material to investigate the recoveries of each metal. The results indicated that Hg was below the limit of qualification, and the recovery% for Pb, Cd, As, and Al were 92%, 88%, 107%, and 93%, respectively. Following digestion, metal levels in samples were assessed using validated Inductively Coupled Plasma - Optical Emission Spectrometry (ICP-OES) with a Limit of Detections (LODs) of (Al) 0.006 mg/kg, (Pd) 0.005 mg/kg, (As) 0.0017 mg/kg, (Hg) 0.008 mg/kg, and (Cd) 0.0025 mg/kg. Both Pb and Cd were detected in 25% of the samples of omega-3 products, whereas As was only detected in 5% of the samples. Al was found in 50% of

the assessed samples. In addition, none of the assessed omega-3 pharmaceutical products had detectable Hg levels. Data were compared based on World Health Organization (WHO) guidelines for heavy metal levels. Most pharmaceutical omega-3 products (Pd, Cd, As, Al, and Hg) had levels under permitted hazardous metal limits. Moreover, pharmaceutical omega-3 products did not exceed the regulatory authorities' daily tolerated intake of metals. It can be assumed that the registered omega-3 products intended for use by pregnant women in Jordan consumption are safe within the allowable daily dosage.

**Keywords:** Omega-3 product, Safety Assessment, Pregnant and Fetus, Toxic Element, ICP- OES, Open Wet Digestion.