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ASSESSMENT OF TRACE ELEMENTS IN CAMEL (*Camelus dromedarius*) MEAT, HUMP AND LIVER CONSUMED IN SAUDI ARABIA BY INDUCTIVE COUPLED PLASMA MASS SPECTROMETRY

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ABSTRACT

This study focused on the determination of trace elements in camel meat consumed in Abha and Khamis Mushyt cities in the Kingdom of Saudi Arabia (KSA). Trace elements were measured by inductively coupled plasma mass spectrometry (ICP-MS). In total, 25 samples of the liver, neck, shoulder, thigh and hump of five camels were collected from local slaughterhouses in the two cities. Ten elements were measured in each sample: V, Cr, Mn, Co, Ni, Cu, As, Se, Cd and Pb. The mean concentrations (µg/g wet weight) of the trace elements were V (0.03), Cr (0.28), Mn (0.89), Co (0.04), Ni (0.47), Cu (2.21), As (0.01), Se (0.37), Cd (0.05) and Pb (0.71) in all organs. For Cu and Pb, the highest concentrations were observed in liver (7.48) and hump (1.32), respectively. Statistical analysis showed a significant difference ($p < 0.05$) for V, Ni and As in the hump and all other organs and Co, Cd and Pb in the hump and all other organs, except the liver. For Cr, no significant difference ($p > 0.05$) was observed between the hump, shoulder and neck. A significant difference ($p < 0.05$) was observed for Mn and Cu in the liver and all other organs. For Se, no significant difference ($p > 0.05$) was observed between the liver, shoulder and neck. A similar distribution of elements was observed in all organs with high concentrations of essential elements (Cu, Se, Mn, Ni, Co and V) and lower concentrations of toxic elements (As, Cd, Cr and Pb), except that Pb in the hump was high. Generally, positive correlations were observed for elements in all organs. However, no correlations were observed for As/V and Cu/Co in the liver and hump, respectively. All organs had positive correlations related to toxic elements. The statistical analysis showed a significant difference ($p < 0.05$) for correlations between all organs and the liver regarding V, Mn, Co, Cu, Se and Cd. Cu had the highest estimated dietary intake (EDI) values (µg/kg bw day, where bw is the average body weight) in the liver (20.90), shoulder (2.37), neck (2.23), thigh (3.27) and hump (2.12). The hump had the highest Pb value (3.68). Moreover, the hazard quotients (HQs) for all elements were less than 1, except the HQ > 1 for Pb in the hump. Therefore, we concluded that consumption of a camel's hump could lead to adverse health effects in humans due to exposure to high levels of Pb. A comprehensive study with larger number of samples is required to confirm the results of this study based on limited number of samples.

Key words: Camel, EDI, HQ, ICP-MS, meat, trace elements