Health Risk Assessment of Heavy Metals in Coffee: Exposure Levels among Consumers in Qatar

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Abstract:

Heavy metal contamination in coffee presents notable food safety and public health concerns. This study quantified concentrations of arsenic (As), cadmium (Cd), copper (Cu), cobalt (Co), chromium (Cr), lead (Pb), nickel (Ni), manganese (Mn), and zinc (Zn) in coffee samples from Ethiopia, Papua New Guinea, South America, and Yemen across light, medium, and dark roast levels. Significant variations were observed by geographical origin and roasting degree. Manganese was the most prevalent element, with maximum levels in dark-roasted South American coffee (30.312 µg/kg), followed by Papua New Guinea (23.714 µg/kg) and Ethiopia (14.170 µg/kg). Copper was consistently elevated, peaking at 11.817 µg/kg in South American light roasts, while zinc reached 4.252 µg/kg in Ethiopian samples. Toxic metals were also detected, including cadmium (0.177 µg/kg in Ethiopian light roasts) and lead (3.829 µg/kg in Ethiopian dark roasts), indicating potential long-term health risks. Risk assessment revealed Hazard Index (HI) values below 1 for daily consumption of one to two cups, suggesting no immediate concern. However, Pb and Cd represented the greatest relative risks, with consumption above three cups per day potentially increasing health hazards. These results highlight the importance of continued monitoring and adoption of sustainable practices to mitigate heavy metal contamination.

Biography:

Prof. Reema Tayyem has a bachelor's degree in Biochemistry and a master's and PhD in Human Nutrition. Professor Tayyem has held the position of Head of Clinical Nutrition and Dietetics and Assistant Dean at The Hashemite University for approximately 8 years. She joined Clinical Nutrition and Dietetics at the Hashemite University in 2001 and moved to the Department of Nutrition and Food Technology at the University of Jordan in 2016. Dr Tayyem is now working in the Department of Nutrition Sciences at the College of Health Sciences at Qatar University. She was awarded a UNESCO-L'Oreal Fellowship for Young Women in Life Sciences - 2005. She did her post-doctoral studies at the University of California Cancer Center in San Diego/California/USA. I got research funding from various agencies inside and outside Jordan. Her primary research interest is nutrition and dietary patterns associated with chronic diseases, including cancer, diabetes, cardiovascular disease and other diseases. Professor Tayyem has attended numerous international, regional and national conferences and workshops. She has served or served on the editorial boards of several magazines. She has published more than 200 research papers in peer-reviewed scientific journals. Professor Tayyem has received many awards and honors. She was recently honored by the Samia Manco Award for Outstanding Women in 2020 and was also honored by Talal Abu-Ghazaleh University College for Innovation for her role as Entrepreneur in Nutrition (2020). Besides, she received the International Venus Foundation Awards, Center for Women Empowerment, Outstanding Woman in Nutrition - 2017. Professor Tayyem was also honored for Outstanding Academic Achievements at The Hashemite University (2015). Khalil

Al Salem Award for Best Book in Nutrition and Food Technology “Guide to Healthy Food Preparation and Storage” (2015), and for outstanding academic achievements at the Hashemite University.