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Selected metal contents of tea produced in different regions of Sri Lanka

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‘Ceylon Tea’ is considered as the best in quality among all the teas produced in the world, becoming one of the main income sources of the country. In some instances, changes in the level of metals in tea and other food had been observed due to many reasons. As the accumulation of heavy metals can cause health risks, frequent analysis is strongly advised by regulating authorities. The objective of this study was to determine selected heavy metal levels in Ceylon tea and to assess whether the contents are safe and also to assess whether there are differences between teas produced in different regions of Sri Lanka. In this study, tea samples (0.500g, 6 samples each from a region) from seven tea growing agro-ecological regions of Sri Lanka, known as, Nuwara Eliya, Dimbula, Uva, Uda Pussallawa, Kandy, Ruhuna and Sambaragamuwa were analyzed for selected metal contents using Flame Atomic Absorption Spectrometry. Microwave digestion was used for sample decomposition. The data were statistically analyzed using Minitab 19 software package. The mean concentration (mg kg^{-1}) of metals analyzed in Ceylon tea samples was found to be as follows: Copper (8.93 to 24.85), Iron (120.3 to 220.85), Zinc (24.13 to 45.63), Chromium (4.95 to 8.95), Nickel (6.13 to 11.33) and lead content was below the limit of detection in FAAS (0.134). According to the results, metal contents follow the order of $\text{Fe} > \text{Zn} > \text{Cu} > \text{Ni} > \text{Cr} > \text{Pb}$. However, metal levels in tea did not exceed the levels recommended by WHO. Results of one way ANOVA indicated that there were significant differences in the mean levels of metal in tea among different regions of production. Dendrogram constructed based on metal content showed three clusters with Nuwara Eliya tea clustering into one group. In conclusion, Sri Lankan tea is safe for consumption with respect to the metals analyzed and there were significant differences in metal contents in tea grown in different regions of Sri Lanka. A larger number of tea samples along with the soil samples from each region should be analyzed to arrive at better conclusions on identifying the region of production.

Keywords: Ceylon tea, Heavy metals, Microwave digestion, FAA spectrometry, Dendrogram