COULD CONSUMPTION OF TEA FROM STREET VENDORS POSE A RISK FOR ALUMINIUM ACCUMULATION: A PILOT STUDY

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Introduction

Tea is one of the most sought after non alcoholic beverages in the world containing a broad gamut of active constituents like polyphenols, caffeine, fluoride and many essential minerals. Since tea plants are grown in acidic soils, a number of heavy and trace metals (aluminium, arsenic, cadmium, chromium, copper, lead, manganese, nickel etc are available for uptake by the plant (Wrobel et al., 2000; Cao et al., 2010). Presence of these metals in different types of teas has been widely reported in literature including India (Karak, 2010). All these elements are associated with adverse health effects in humans, if consumed above the permissible limits.

The tea plant is an aluminium (Al) accumulator. There is a growing concern about the harmful effects of Al and its association with various diseases in general and neurodegenerative diseases in particular (Jellinger 2013). A wide range of Al levels in tea has been reported from all over the world including India (Malik et al., 2008). In addition, use of Al cookware (Mohammad et al., 2012; Neelam et al, 2000) and high temperature (Karbouj, 2007) contribute to leaching of Al.

In India there is a frequent practice of drinking tea from street vendors (*Dhabbas*), as it is cheap and easily available. The vessels used by the vendors are made of Al and are not washed in between. Tea which contains iron filings also, is brewed continuously in the same vessel throughout the day. In view of huge consumption of tea from vendors, the consumers may be exposed to high levels of Al.So the present pilot study was planned to estimate Al levels in tea sold by street vendors in Delhi, as it may comprise an important source of exposure.

Methods

A total of 50 milk tea samples (n=40, Control=10) were randomly collected from street vendors from different parts of Delhi and National Capital Region (NCR) for Al estimation. The samples (2.5ml) were collected in thoroughly washed glassware, and digested using supra pure nitric acid (5ml) and hydrogen peroxide (1ml) in Microwave Digestion Unit (Sineo Jupiter) using programme for beverages. The digested samples were then analyzed for Al levels using Inductively Coupled Plasma- Atomic Emission Spectrophotometer (ICP-AES. Jobin Horiba YVON JY2000 2).

Results

Al levels in tea samples were found in the range of 0.002- 0.230mg/ml.Considering a cup contains approximately 100ml tea, there could be an average consumption 0.2- 23mg of Al per cup. The Provisional Tolerable Weekly Intake (PTWI) for Al is 7mg/kg body weight (equivalent to 1mg/kg/day) as per Joint FAO/WHO Expert Committee on Food Additives (JECFA). For a human with an average body weight of 60kg, the PTWI will be equivalent to 420mg. The daily consumption of tea from street vendors is at least 2-3 cups per day. Thus the range of Al consumed weekly will be 4.2-483mg which definitely exceeds the recommended PTWI.

Conclusion

The results of the pilot study indicate high levels of Al in tea obtained from street vendors. Although, Al is absorbed from 0.1 -0.3 % orally, but long term exposure could pose a health risk. Standard guidelines for Al levels in tea and public health warnings are required for consumer safety.

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