Analyses of lead levels in tea

Area of research interest: Chemical hazards in food and feed
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Summary

This study was carried out to address the urgent need to gather more data on levels of lead (Pb) in tea, to inform current EU discussions on a proposed maximum limit of 1 mg/kg Pb in tea ('dried leaves and stalks, fermented or otherwise of Camellia sinensis').

Levels of Pb were quantified in 51 samples of black and green tea leaves.These samples were also analysed as tea liquid (drink), after steeping the tea leaves for both a shorter and a longer brew time, following an agreed protocol. 11 different varieties of dried tea (including a white tea) from different tea growing regions were also purchased and analysed to ensure there was good geographic and tea-type coverage.

Preliminary investigations were carried out on a small number of samples. Firstly, tea bags taken from two packets of tea were analysed to check the level of variation in Pb within each pack. Further studies included investigating: the effect of using deionised water versus tap water to steep the tea; extended brewing times and the effects a second brew (re-steeping) had on Pb levels in the tea liquid.

Research Method

To determine the levels of lead in dried tea and as consumed (brewed tea), 51 tea samples (42 black teas and 9 green teas) comprising of tea bags and loose tea were collected and analysed. To ensure geographical representation and coverage, a further 11 different varieties of dried tea (6 black teas, 4 green teas and 1 white tea) from different growing regions of the world (China, Africa, Japan and India) were also analysed for lead.

For the 42 black teas and 9 green teas in addition to determining the level of lead present in the dried teas, samples of brewed tea were prepared and analysed. To establish if brewing time had an effect on the migration of lead in the tea leaves into the brewed tea, samples of the tea brewed to realistic protocols were taken at timed intervals and analysed to determine the level of lead present.

Results

The study findings showed that the levels of lead in the 51 samples of dried tea varied significantly and ranged from 0.125 to 2.56 mg/kg.

The levels of lead found in the brewed teas were very low with half the results being less than the limit of detection 0.2µg/L (1 µg/L=0.001mg/kg).

Teas brewed for a longer period of time resulted in only a slightly higher level of lead.

The levels of lead found in the additional 11 dry teas ranged from 0.177 to 1.96 mg/kg.

Exposure to lead from the consumption of the brewed teas as tested is not considered to be of concern for consumer health compared to normal levels of exposure to lead from all dietary sources.

Research report
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