# Multi-Element Detection in Green, Black, Oolong, and Pu-Erh Teas by ICP-MS

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#### Abstract

The contents of various elements in green, black, oolong, and pu-erh teas were measured by ICP-MS. The dependence of the dissolution rate of each element on the extraction time and the number of infusion was determined. By calculating the estimated daily dietary intake as a result of consuming 15 g of tea leaves a day, it was revealed that Cr and Mn exceeded the adequate intake for one day.

organic anion such as malate, citrate exist in the cytoplasm of the

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### 5 H I H U H Q F H V

- 1. Welna M, Szymczycha-Madeja A, Pohl P (2013) A comparison of samples preparation strategies in the multi-elemental analysis of tea by spectrometric methods. Food Research International 53 922-930.
- 2 Cao H, Qiao L, Zhang H, Chen J (2010) Exposure and risk assessment for aluminium and heavy metals in Puerh tea Sci Total Environ 408 2777-2784.
- 3 Walczyk T (2001) The potential of inorganic mass spectrometry in mineral and trace element nutrition research. Fresenius J Anal Chem 370:444-453
- 4. Salahinejad M, Aflaki F (2010) Toxic and essential mineral elements content of black tea leaves and their tea infusions consumed in Iran. Biol Trace Elem Res 134: 109-117.
- 5. Mehra A, Baker CL (2007) Leaching and bioavailability of aluminium, copper and manganese from tea (Camellia sinensis). Food Chemistry 100, 1456-1463

- 6 Pytlakowska K, Kita A, Janoska P, PoÅ, owniak M, Kozik V (2012) Multielement analysis of mineral and trace elements in medicinal herbs and their infusions Food Chem 135 494-501.
- Mossion A, Potin-Gautier M, Delerue S, Le Hécho I, Behra P (2008) Effect of water composition on aluminium, calcium and organic carbon extraction in tea infusions. Food Chemistry 108: 1467-1475.
- 8 Street R, Drabek O, Szakova J, Mladkova L (2007) Total content and speciation of aluminium in tea leaves and tea infusions. Food Chemistry 104: 1662-1669.
- 9 Chan EWC, Lim YY, Chew YL (2007) Antioxidant activity of Camellia sinensis leaves and tea from a lowland plantation in Malaysia. Food Chemistry 102: 1214-1222.
- 10 Karak T, Bhagat RM (2010) Trace elements in tea leaves, made tea and tea infusion: A review. Food Research International 43 2234-2252
- Salahinejad M, Aflaki F (2010) Toxic and essential mineral elements content of black tea leaves and their tea infusions consumed in Iran. Biol Trace Elem Res 134: 109-117.
- 12 Lv H-P, Lin Z, Tan J-F, Guo L (2013) Contents of fluoride, lead, copper, chromium, arsenic and cadmium in Chinese Pu-erh tea. Food Research International 53 938-944.
- 13 Sofuoglu SC, Kavcar P (2008) An exposure and risk assessment for fluoride and trace metals in black tea. J Hazard Mater 158: 392-400

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