



Summer Meeting, 14–17 July 2014, Carbohydrates in health: friends or foes

## Fluoride content of UK retail tea: comparisons between tea bags and infusions

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Tea provides around 70% of adult fluoride (F<sup>-</sup>) intakes in the UK, with mean intakes estimated as 540 ml daily for all adults, and 662 ml for older adults<sup>(1)</sup>. A recent analysis<sup>(2)</sup> concluded that the F<sup>-</sup> content of some economy tea bags was too high, risking F<sup>-</sup> intakes which may exceed safe limits, assuming a daily tea intake of 1L. However, the infusions were made up using 2 g of tea in 100 ml, whereas a typical serving of tea is generally 3.125 g of tea in 240 ml<sup>(3)</sup>. This, plus the long brewing time of 2–30 minutes may have overestimated F<sup>-</sup> content. Therefore, the present study set out to investigate the F<sup>-</sup> content of UK tea bags using a more typical infusion method and based on average tea intakes.

Retail samples of tea bags, i.e. 28 black, 10 decaffeinated and 11 speciality (white, green, single estate black), were obtained from UK-based tea manufacturers and retailers. For total F<sup>-</sup>, three tea bags were selected at random from each lot and, after combining, were ashed at 600°C. The ash was cooled, acid digested and the solution cooled to approximately 20°C. A total ionic strength adjustment buffer was added to correct the pH and the sample was measured for F<sup>-</sup> using an ion selective electrode. For infused F<sup>-</sup>, three tea bags were added separately to individual beakers after which 240 ml of freshly boiled de-ionized water was added. 40 seconds later, the tea bags were squeezed gently against the sides of the beakers and removed. The three individual brews were combined, stirred and cooled to approximately 20°C before aliquots were taken and F<sup>-</sup> content measured as for total F<sup>-</sup>. The entire process was carried out in triplicate. The results are shown below.

		Blended black	Decaffeinated black	Speciality
Total F <sup>-</sup> (mg/kg)	Mean	1082	1200	769
	Range	(540–1700)	(750–1800)	(25–1300)
Total F <sup>-</sup> (mg/bag)	Mean	3.38	3.75	2.40
	Range	(1.68–5.31)	(2.34–5.62)	(0.07–4.06)
Infused F <sup>-</sup> (mg/L)	Mean	4.91	6.64	3.06
	Range	(2.14–9.33)	(2.91–8.25)	(1.0–3.06)
Infused F <sup>-</sup> /serving (240 ml)	Mean	1.18	1.59	0.73
	Range	(0.51–2.23)	(0.69–1.98)	(0.24–0.73)
EDFI 540 ml		2.65	3.59	1.65
EDFI 662 ml		3.25	4.40	2.03
EDFI 662 ml + fluoridated water		3.91	5.06	2.69

Key: EDFI, estimated daily F<sup>-</sup> intake assuming mean (540 ml) and upper (662 ml) daily tea consumption

Compared with the previous analysis<sup>(2)</sup>, our study found higher F<sup>-</sup> levels per kg but similar F<sup>-</sup> levels per L, despite the different brewing method. However, estimates of F<sup>-</sup> intake, based on 540 ml or 662 ml tea per d, were lower and remained below the EU Upper Limit of 7 mg per day<sup>(4)</sup> even assuming use of fluoridated water in the brew. This suggests that typical tea drinking in the UK does not pose a risk for health and, indeed, may provide benefits for dental health given EU approved health claims for fluoride<sup>(5)</sup>.

This work was funded by the Tea Advisory Panel, which is supported by an unrestricted educational grant from the UK Tea & Infusions Association.

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