

A randomised cross-over trial to evaluate the impact of tea on measures of hydration

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• Introduction

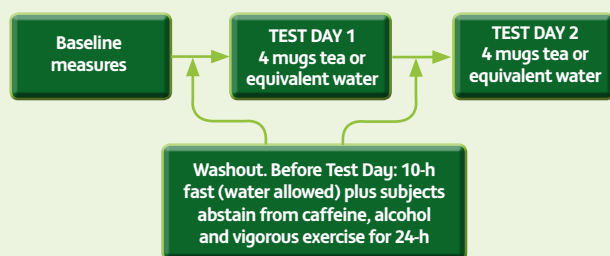
There is a view in the popular press that caffeinated drinks, such as tea, have an adverse effect on hydration.

While studies on caffeine pills have produced inconsistent results¹, those on caffeinated drinks, at caffeine intakes of 114-420mg/d, have found no significant impact on hydration^{2,3}. However, there have been no randomised controlled trials on tea, as consumed.

The present trial aimed to assess the impact of 4 x 240ml mugs of black, i.e. regular tea, on blood and urine measures of hydration. The control condition was a similar volume of boiled water. Four mugs is slightly above average daily tea intakes in the UK.

• Methods

- Ethical approval gained from Reading Independent Ethics Committee. Informed consent obtained from participants.
- Exclusion criteria were: female, >55y or <20y, significant chronic illness, medication which may impact on hydration markers, excessive caffeine intake (>10 cups coffee/d), allergy to test ingredients, smoking.



- Baseline measures were 24-h urine and blood sample.
- During Test Days, blood taken at 0, 1, 2, 4, 8 and 12 hours, and 24-h urine collected.
- Test drinks (standardised mug of tea vs. boiled water) presented at 0, 2, 6, and 10 hours. Total volume = 960ml per condition.
- Standard meals provided in laboratory during Test Days.
- Outcome measures URINE: total volume, creatinine, osmolality, electrolyte concentration.
- Outcome measures BLOODS: electrolyte concentration, total protein, urea, creatinine, osmolality.

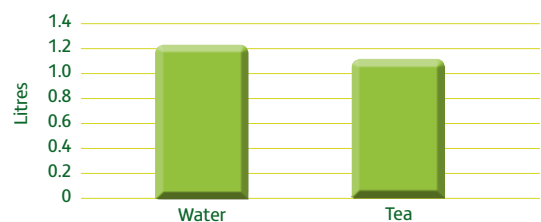
• Conclusion

- Drinking four mugs of tea over one day was equally hydrating to drinking an equivalent volume of water.
- Therefore, tea can make a contribution to daily fluid requirements.

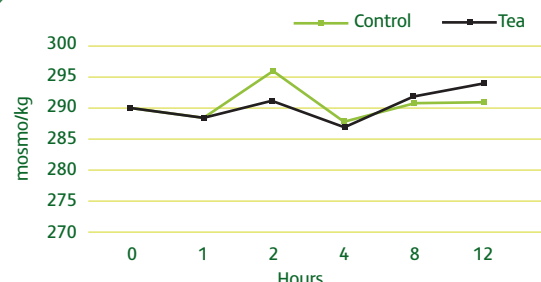
• Results

- PARTICIPANTS: 21 men (mean age 36y; mean BMI 25.8) began the study; 19 completed all conditions. All data included in analysis (factorial ANOVA approach within PROC MIXED in SAS).
- **No significant differences** were found between the tea and water conditions (all P>0.05).

24-hour urine volume after 4 cups of tea vs. water



Blood osmolality after 4 cups of tea vs. water



• Discussion

- The findings of this trial agree with previous research on caffeine pills and caffeinated drinks which demonstrated no adverse effects on hydration when participants consumed a moderate caffeine intake (114-420mg/d).
- Caffeine levels were not measured in the current study but would have been in the region of 200mg per day.
- We will examine the impact of 6 mugs of tea in a further trial.

• References

1. Ruxton CHS (2008). *Nutr Bull* **33**, 15-25
2. Grandjean AC et al. (2000). *J Am Coll Nutr* **19**, 591-600.
3. Fiala KA et al. (2004). *Int J Sport Nutr Ex Metab* **14**, 419-429.