

*Coffee Counts!*



*Refresh & Hydr8*

## **Revealing the Science Behind Coffee and Fluid Balance**



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It is widely believed that the consumption of caffeine containing beverages such as coffee causes dehydration. This belief has arisen for two reasons. First, early experiments on caffeine showed that it promoted urine production in the short-term i.e. had a short-term diuretic effect. Second, it was assumed that short-term diuretics must necessarily cause dehydration in the longer-term i.e. cause an imbalance between the processes of fluid loss and the processes of fluid intake. This assumption is not correct. In addition, short-term measurements of urine production cannot measure fluid balance in the longer-term so other techniques must be used.

### **Caffeine as a diuretic**

Early studies showed an effect of caffeine on short-term urine production. In a Randomised Controlled Trial (RCT) often cited in medical textbooks in support of the idea that caffeine containing beverages promote dehydration, the effects of a single 250 mg dose of caffeine on 3-hour urine volume were compared with a placebo. Urinary volume increased in response to caffeine<sup>1</sup>.

However, in a more recent RCT where the effects of a single dose of either 114 mg or 252 mg caffeine on 24-hour urine volume were compared with water, urinary volume was found to be unchanged. Hence caffeine has no effect on 24-hour urine production but rather shifts the pattern of urine production to earlier in the day. This is hardly evidence for a diuretic action of caffeine over and above that of water<sup>2</sup>.

### **Caffeine as a dehydrating agent**

Available techniques for assessing hydration status have recently been reviewed<sup>3</sup>. Several of these techniques have been used to compare effects of

intakes of 0, 3 and 6 mg caffeine/kg body weight/day over a 5-day period. There were no effects of caffeine dose on urine osmolality, urine specific gravity, urine colour, 24-hour urine volume or sodium and potassium excretion. Accordingly there was no evidence for an effect of caffeine on hydration status in the longer-term<sup>4</sup>.

## Conclusions

It is not hard to understand where the reputation of caffeine as a diuretic originally came from although it is hard to understand why this reputation persists in the light of more recent scientific evidence<sup>5,6</sup>. In addition, it is not clear why it is assumed that diuretics are necessarily also dehydrating agents. If this were true water would also have to be considered as a dehydrating agent which is a contradiction in terms.

It can be concluded that caffeine, at levels found in 4-5 cups of coffee per day, is no more a diuretic than water over a 24-hour period and has no dehydrating effects over a 5-day period. In the light of the available scientific evidence, it is not surprising to discover that coffee is recognised as an important source of fluid in the diet by the British Dietetic Association (BDA) and the British Nutrition Foundation (BNF) and will help keep you hydrated<sup>7,8</sup>.

## References

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