

Coffee in moderation does not cause dehydration in habitual consumers

25 April 2015

A research team from the [School of Sport and Exercise Sciences at the University of Birmingham](#), UK, found that moderate daily coffee drinking did not lead to dehydration in young adult men. No differences in the body fluid balance were found between coffee and water consumption. The researchers suggest that, while caffeine in large quantities can dehydrate, drinking coffee in moderation provides similar levels of hydration as water in regular coffee drinkers.

The human body is comprised of a large proportion of fluid – about 60% in the average adult male, but this depends on age, gender, and health status. For proper organ function, fluid status is carefully controlled by a range of hormones, and the amount of consumed fluid affects hydration of bodily tissues. Keeping bodily fluids within a healthy range is vital, and dehydration occurs with a loss in body mass of between 1% and 3%. The [current guideline from the European Food Safety Authority \(EFSA\) for water intake](#) is 2.5 litres per day for an adult male, although there is no scientific consensus on how much is actually needed.

The scientific community has been debating for over 80 years whether caffeinated drinks, such as coffee – with an average cup having 100-140 milligrams (mg) of caffeine – have an effect on fluid balance. Caffeine affects the hormones that control fluid balance, and, if consumed in large doses (over 500 mg), it has a diuretic (fluid loss) effect. This is particularly noticeable in people who do not drink caffeinated drinks regularly. However, it is not clear whether the body gets used to caffeine exposure and if the diuretic effect gets reduced. In that case, drinking coffee would add to keeping the body hydrated instead of the other way around.

The researchers conducted a randomised cross-over study on 50 healthy males (mean age 28 years) who are regular coffee drinkers (3-6 cups daily). In this type of study design, participants underwent two trials, which in this case lasted three days. In one trial, the intervention consisted of four 200 millilitres (ml) cups of coffee (controlled-strength, containing 4 mg of coffee per kilogram of body weight). In the other, which was the control, it consisted of four 200 ml cups of water. After a wash-out period of 10-days of normal eating and drinking, they swapped over. During both trials, each participant had an individually prescribed controlled diet, based on their normal eating and drinking patterns. All foods and drinks were provided. Participants kept a food diary for the trial days, so the researchers could analyse everything the volunteers consumed during this period. Simultaneously, hydration status was assessed using a range of validated hydration assessment techniques including the double-labelled water method (currently the most reliable test for measuring body fluid fluctuations), and blood and urine tests for detecting markers of hydration. Body mass was also measured before and after the intervention.

No significant change in total body water was found between coffee and water consumption. Body weight showed a slight decrease over the three days for both trials, but the difference (0.2%) was not enough to suggest dehydration. The markers of hydration in blood and urine showed no difference, except for higher

excretion of sodium in the urine during the coffee trial compared to the water trial.

The current findings do not support the notion that caffeinated drinks should be avoided to ensure a healthy hydration status, at least for young healthy males that drink coffee regularly. It seems that within this subgroup of the population, moderate coffee drinking can actually contribute to daily fluid requirements without compromising adequate hydration. The researchers state that their findings should be reflected in public health guidelines on hydration.

For further information:

[Killer SC, Blannin AK, Jeukendrup AE \(2014\). No evidence of dehydration with moderate coffee intake: A counterbalanced cross-over study in a free-living population. PLOS ONE 9\(1\):e84154. Doi:10.1371/journal.pone.0084154](https://doi.org/10.1371/journal.pone.0084154)