

**INTERNATIONAL COFFEE ORGANIZATION
POSITIVELY COFFEE PROGRAMME**

COFFEE, EXERCISE AND PERFORMANCE

Exercise plays a part in all our lives whether we are playing the occasional game of football with the children, using exercise to help fight the battle of the bulge, or, if we are elite athletes, amazing all around us with the kind of breathtaking performances we saw at Athens this summer.

Caffeine is part of the naturally occurring group of stimulants found in leaves, nuts and seeds of a number of plants. Common dietary sources include coffee, tea, chocolate and a variety of soft drinks and sports drinks. The caffeine content of various foodstuffs is given below.

Table 1. Caffeine content of various foodstuffs

Foodstuff	Serving size	Caffeine content (mg)
Coffee*	150 ml	50 -120
Tea*	150 ml	15-50
Chocolate Drink**	250 ml	10
Milk Chocolate**	50g	40
Caffeinated Soft Drinks	330 ml	40 -100

(from Maughan 1999)

* Values for coffee and tea vary widely depending on the source and method of preparation.

** In addition to caffeine, chocolate contains theobromine, which has an insignificant effect compared to caffeine.

So what is the effect of caffeine on different types of exercise?

Although the mechanism whereby caffeine may aid performance is not fully understood, there is substantial research that concludes that caffeine does improve physical performance. Its effect also appears to be widespread across a diverse variety of sports and exercises. Studies have also been wide ranging and have included well-trained athletes and relatively sedentary individuals of both sexes and different age groups.



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One of the most comprehensive and recent reviews (Doherty and Smith 2004) looked at 39 published studies. Of these, 21 involved endurance exercise, 12 used short duration and high-intensity exercise and the remaining 6 used a graded exercise test. Including all these data, caffeine improved performance by 12.4%, relative to the placebo trials and this was shown to greatest effect in those who undertook exercise for a longer duration at any one time.

There are also a number of studies that show the beneficial effects of drinking coffee and/or caffeine ingestion on high intensity exercise. These include improved performance on a 1500 m run (Wiles 1992) and Anselme (1992) showed that anaerobic power in a cycling test was improved by the ingestion of the equivalent of two cups (250mg) of caffeinated coffee. Cycling was also the sport studied more recently by Bell (2001) when caffeine (5mg/kg) was shown to improve performance in a high intensity cycling test.

The beneficial effect has also been demonstrated in swimming trials. Collomp (1992) showed that in a swimming test (2x100m) there was improved performance after ingestion of 250 mg of caffeine.

What is the effective amount of caffeine?

Recent studies used small amounts of caffeine (1-2mg/kg). In many studies, coffee was used whilst others have used caffeine. However, they all show that small amounts of caffeine are effective in improving exercise performance significantly and these smaller amounts, as little as 90mg caffeine, are not associated with any unwanted side effects.

Caffeine and fluid requirements

The diuretic effect of caffeine is often overstressed, particularly in situations where dehydration is a major issue. This affects particularly competitions held in hot, humid climates where the risk of dehydration is high and is more important for endurance athletes where dehydration has a greater effect on performance.

Athletes competing in these conditions are often advised to increase their intake of fluid but also advised to avoid tea and coffee because of their mild diuretic effect. Current research, however, shows that, not only is this mild diuretic effect insignificant during exercise (Armstrong, 2002), but the negative effects caused by cutting such drinks from the diet may be more damaging (Maughan and Griffin, 2003). Conclusions from published studies show that intakes of less than 300mg caffeine a day will not affect levels of body's fluids.



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Conclusion

In many of these studies, where performance was improved by the ingestion of caffeine or drinking coffee, there was also the additional benefit of an associated reduction in the sensation of fatigue.

Given the various initiatives aimed at promoting physical activity to improve health, anything that encourages participation by reducing the discomfort and fatigue most people feel when exercising, has enormous potential implications for improving public health. Caffeine, in the form of coffee or as a pure ingredient, has that ability.

References

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