Supplement mix boosts female athlete performance

22 July 2015, by Rob Payne

The exercise test required athletes to perform a simulated 60-minute team-sport game with repeated-sprints done prior to the game, midway through and immediately afterwards. Credit: Oscar Rethwill

Loading caffeine and sodium phosphate has been shown to improve female athlete's repeated-sprint abilities, even during periods of late-match fatigue.

The work by University of Western Australia and Edge Hill University in the UK found that those who took a combination of the two supplements performed better than those who took only one or a placebo.

"Improvement in exercise performance from ingesting these two different substances is thought to be a result of different mechanisms associated with each supplement's effect on the body," UWA Professor Karen Wallman says.

"Basically, they complement one another."

Specifically, caffeine is thought to improve performance due to adenosine receptor antagonism, leading to reduced sensations of effort and pain, improved neural firing rates and increased alertness.

Sodium phosphate enhances 2,3-diphosphoglycerate concentration in red-blood cells, allowing for greater uploading of oxygen to peripheral tissues and more efficient oxygenation of exercising muscles.

It also helps with 'buffering'—the neutralising of hydrogen ions in the body.

"A large number of hydrogen ions, and hence lower pH, in the working muscles of the body is linked with fatigue and impaired performance," Prof Wallman says.

In the study, 12 competitive female netball, basketball and soccer players completed four separate randomised trials with each trial consisting of different supplements: caffeine; sodium phosphate; caffeine and sodium phosphate; and placebo.

The athletes ingested sodium phosphate four times daily for six days prior to testing, while caffeine was ingested one hour prior to testing.

Athletes tested via simulated team game

The exercise test required athletes to perform a simulated 60-minute team-sport game with repeated-sprints done prior to the game, midway through and immediately afterwards.

Those who took caffeine and sodium phosphate had the fastest sprint times across the trials, while those taking sodium phosphate alone were almost as effective in late trials.

Prof Wallman says this may be due to increased phosphate pools, as ingesting sodium phosphate would provide the body with more phosphate to rebuild phosphocreatine and adenosine triphosphate stores—the source of all energy in the body.

They found caffeine alone resulted in no improvement to repeated-sprint ability, contradicting previous studies.

Prof Wallman says this might be due to the women in the current study having less muscle-mass per kilo of body mass than the men in previous studies.

As caffeine is thought to improve the activation of muscle contraction, having less mass reduces potential effect.

"It is possible that women may need a different dose of caffeine than men," Prof Wallman says.

More information: "Effects of sodium phosphate and caffeine ingestion on repeated-sprint ability in male athletes." DOI: dx.doi.org/10.1016/j.jsams.2015.04.001

Provided by Science Network WA