

Thesis Title                      Effects of Varied Dosages of Caffeine on  
   Exercise Performance

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#### ABSTRACT

The effects of varied dosages of caffeine on exercise performance were investigated in twenty healthy males, following exercise to exhaustion on a bicycle ergometer. All subjects were similarly caffeine naive and were instructed to refrain from caffeine and avoid strenuous exercise prior to testing. Each subject participated in the three trials by receiving caffeine 10 mg/kg, 15mg/kg or a placebo (CA10, CA15, P respectively). Treatments were allocated in a randomized single-blind experimental design.

Pre exercise, pulmonary function test including VC, FVC, FEV<sub>1</sub>, and MMEF revealed no statistically significant different among the placebo and the caffeine trials. The subjects then began pedalling at a work rate of 0 kpm/min for 2 minutes, and the work rate was increased 150 kpm/min every 2 minutes until the highest work rate was reached. The time from starting work to exhaustion was used as the indicator for endurance performance.

Heart rate, Blood pressure and respiratory rate were measured during rest, exercise and recovery period. Expiratory air was collected for measuring volume and analysing for O<sub>2</sub> and CO<sub>2</sub> concentration. V<sub>T</sub>, V<sub>E</sub>,

$\dot{V}O_2$ ,  $\dot{V}CO_2$ ,  $\dot{V}_E/\dot{V}CO_2$ ,  $\dot{V}_E/\dot{V}CO_2$ ,  $O_2$ -pulse and R-value were calculated. HR max,  $\dot{V}O_{2max}$  and  $O_2$  pulse max were determined.

The blood pressure in the caffeine trials were significantly higher ( $p < 0.05$ ) than that in the placebo trial at rest and at the work rate of 0, 150, 300 kpm/min. Blood pressure in the CA15 trial was also significantly higher ( $p < 0.05$ ) than that in the CA10 trial at rest and at work rate of 0 kpm/min. However, it was found that at work rate 300 kpm/min,  $O_2$ -pulse in the CA10 trial was significantly higher ( $p < 0.05$ ) than that in the P trial. At the highest work rate,  $\dot{V}CO_2$  in the CA15 trial was significantly lower ( $p < 0.05$ ) than that in the P trial.  $\dot{V}_E/\dot{V}CO_2$  in the CA15 trial was also significantly higher ( $p < 0.05$ ) than that in the P trial. The other values on ventilatory and circulatory measurements were not statistically significant comparing among the three trials.

The highest work rate in the three trials were 900 kpm/min. In the P, CA10, CA15 trials, two, five and five subjects could reach the higher work rate of 1050 kpm/min respectively. It was found that the time to exhaustion in both caffeine trials were significantly longer than that in the placebo trial.

At the highest work rate, the heart rate of the three trials were 172.91, 171.31, 172.57 beats/min. It was hard to conclude to be HR max. So it is reported as HR,  $\dot{V}O_2$  and  $O_2$  pulse at the highest work rate. These need further investigation.

In conclusion, high dose of caffeine (10 and 15 mg/kg) tended to increase work performance and also statistically prolonged the time to exhaustion. Both effects were not different comparing between the two dosage of caffeine.