

## **Exogenous Ketones Do Not Improve Cognitive Performance Measures During a Dual Stress Challenge in Healthy College-Aged Males**

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### **ABSTRACT**

Different occupations require mental clarity under physically stressful environments. Recent studies have shown ketone salt supplementation improves cognitive capacity during exhaustive exercise. **PURPOSE:** The purpose of this study was to investigate the effects of acute supplementation of ketone salts on cognitive performance during a dual stress challenge (DSC) with aerobic exercise. **METHODS:** Sixteen (n=16) recreationally active healthy college-aged males (aged 21.9± 1.9 years, mass of 80.6± 7.4kg, height of 175.8± 8.6 cm and VO<sub>2</sub> peak of 40.5± 8.4 (ml•kg<sup>-1</sup>•min<sup>-1</sup>) participated in this placebo-controlled, triple-blinded, counter balanced, cross-over design study. The subjects completed a total of 4 trials; Trial one was a VO<sub>2max</sub> (GXT). The participants then completed 3 dual stress trials with the first trial serving as a familiarization. The DSC consisted of arithmetic challenges and Stroop Color Word (SCW) test from the 10-minute mark to the 30-minute mark of the trial at 60% VO<sub>2</sub>peak. Subjects were required to ingest 250ml of a mixture consisting of 18.1g of beta-hydroxybutyrate (β-OHB) 60 minutes and 15 minutes prior to the dual stress challenge. Blood glucose and ketone levels were measured 60 minutes and 15 minutes before the trial, then again 15 minutes into the trial, and then once more immediately after the trial. Measures such as heart rate, rate of perceived exertion, and amount of correct and incorrect answers for the DSC were measured during testing as well. **RESULTS:** Glucose levels were significantly (p< 0.05) higher in placebo group 15 min prior to and 15 min into exercise. There was a significant increase in heart rate and RPE during exercise but no difference between treatments. There was no significant difference in cognitive performance between treatments. **CONCLUSION:** Exogenous ketone salts increase blood ketone levels, decrease blood glucose levels, and do not elicit an improvement in cognitive performance measures during a DSC paired with aerobic exercise. Future studies should further investigate the impact of ketone ingestion on cognitive performance during prolonged exercise or high intensity exercise.