

The effect of a dual regimen of exercise and coconut water (*Vita-Coco*) supplementation on strength performance

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Introduction

Studies have shown that regular exercise as well as antioxidant-rich supplements may reduce expression of reactive oxygen species associated with oxidative stress.^{1,2} Coconut water, containing ample vitamin C as well as other antioxidative factors, has been praised for its ability to rehydrate individuals during periods of exercise but also to reduce inflammation associated with oxidative stress in chronic health conditions.³ The present study in rats addresses the role that both coconut water supplementation and moderate exercise, through forced swimming, may concurrently play in reducing oxidative stress. We hypothesized that this dual regimen would increase latency to fall in the wire hang test due to greater endurance capacity and lessened fatigue.

Methods

Four male Fisher rats, weighing between 223 and 241g, were used for this study. The wire hang test was performed to determine latency to fall (sec) on day 1 and again after completion of the treatment regimen on day 9. For the wire hang, bubble wrap was laid 2in high on the tabletop. The wire was 70cm above the tabletop. Each rat had two trials with roughly 30sec in between each trial, and the average was taken as mean latency to fall. The rats were fed coconut water daily for 9 days. On days 2, 4, 7, & 8 the rats had two 1.5 min exercise sessions in a pool, the average depth of which was 26 inches and temperature was 22°C. During days 1 & 2 coconut water was administered through a syringe, with limited success. For the remainder of the study, 200mL was administered through water bottles within their cages. The estimated daily intake after 30 minutes was recorded as the difference between initial and final measured quantities in the water bottle. The goal was for the rats to drink at least 3mL of coconut water per day. All experiments were approved by the Simmons College Institutional Animal Care and Use Committee under guidelines established by the National Research Council.

Results

All values below are reported as mean \pm SEM. Test analyses indicated that performance on the wire hang, as measured in latency to fall (sec), decreased from baseline day 1 testing (8.25 \pm 2.28sec) to final day 9 testing (4.75 \pm 1.20sec). Mean coconut water intake per day increased substantially over the study period of nine days from 2.00mL to 12.25mL (Figure 1). There was little difference in mean coconut water intake between rats (1=8.22mL, 2=10.89mL, 3=10.11mL, 4=10.89mL). The mean weight gain over the 9 days differed among the rats (1=6.0g, 2=9.0g, 3=10.0g, 4=11.5g). Finally, in assessing weight gain in four rats not included within our experiment, mean weight gain was substantially greater than that of our study rats (Figure 2).

Figure 1: Mean daily coconut water intake over 9 days

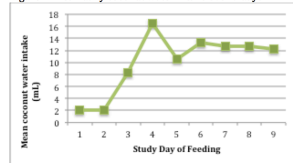
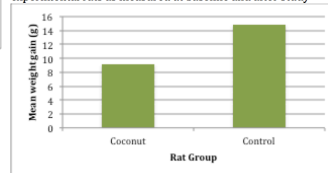


Figure 2: Difference in mean weight gain between control and experimental rats as measured at baseline and after study



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Conclusions

Previous studies have shown that antioxidants may be used to improve moderate exercise performance. The results of this study did not support our hypothesis that antioxidants in coconut water in conjunction with an exercise regimen would increase physical endurance. The baseline latency to fall in the wire hang test was roughly twice as long as the final latency time, which may be attributed to improper experimenter technique in the baseline trials and/or reduced fear of falling in the final trials. The subjects of our study had lower weight gain as compared to rats not exposed to lifestyle changes, which may be due to the added exercise regimen or increased satiety from coconut water supplementation. There was a positive association between the amount of coconut water consumed and mean weight gain among the four individual rats. Limitations of this study may explain our antithetical results. The period of dietary supplementation was extremely short as compared to other studies of this nature, and our method for administering coconut water was inconsistent. Our study may have benefited from a between group rather than within group design, and should have included other tests of endurance in addition to the wire hang. Future directions should improve upon our limitations in creating a research design that better answers questions regarding the effect of a dual regimen of coconut water supplementation and exercise on physical endurance.

Literature Cited

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