THE SHORT TERM EFFECTS OF L-ARGININE ON BLOOD LACTATE LEVELS AND PERFORMANCE DURING SUBMAXIMAL EXERCISE

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Abstract

Introduction: L-arginine is a non-essential amino acid that’s precursor to synthesizing Nitric Oxide (NO). It is responsible for regulating blood pressure and improving vascular efficiency and tolerance, along with improvement in vasodilation. It promotes blood flow, increases blood flow to active exercise tissues, maintains blood pressure and improves cardiac function during submaximal exercise. These effects on greater movement of substrates, lactate and ammonia are related to muscle fatigue which delays exercise performance. Studies have shown that L-arginine supplementation has been a beneficial treatment for individuals who have hypertension, chronic heart failure, type 2 diabetes, and other types of cardiovascular diseases. Purpose: The purpose of this study was to evaluate the effects short term consumption of L-arginine had on the body’s blood lactate levels and individual’s performance.

Methods: Subjects: 5 college male students from UTA
- Moderately active
- Healthy individuals

Instrumentation:
- Monark Cycle Ergometer, Polar Heart Monitor, Lactate Plus Meter

Testing:
- Single blind study.
- Subjects came in for two trials, one per week.
- Subjects consumed 6 g of L-arginine (12 capsules) or 12 capsules of Placebo (Cornstarch) for 5 consecutive days prior to testing.
- Upon arrival RHR, blood pressure, and blood lactate levels were taken.
- Seat height was adjusted accordingly to the height of the subject/
- Workload was adjusted to have subjects reach 75% of their age-predicted heart rate maximum.

1 minute warm-up.
- Subjects cycled for 20 minutes at 75% of their age-predicted heart rate maximum.
- Subjects had to maintain a minimum or 60 rpm during this 20 minute bout
- Heart rate, rate of perceived exertion, blood pressure, and blood lactate were taken at every 10 minutes.
- Total distance cycled was observed upon finishing the 20 minute exercise.
- Testing protocol for trial 1 was also repeated for trial 2.

Results: Blood Lactate - No significant changes were seen in blood lactate (p = 0.17), despite the intake of L-arginine. The placebo was 6.5 ± 1.40 mmol/L while L-arginine was 5.14 ± 1.39 mmol/L.
- Heart Rate - No significant difference (p = 0.29) from 116.28 ± 38.61 bpm with placebo to 119.75 ± 42.05 bpm with supplementation.
- Distance - There was no change in distance, despite supplementation. The distance with the placebo was 7.68 ± 2.60 km while L-arginine distance was 7.69 ± 2.09 km.
- Rate of Perceived - There was no significant change in RPE (p = 0.10) with the placebo 8.1 ± 2.6 to the supplement 7.2 ± 2.09.

Conclusions

This experiment yielded no significant difference between the placebo (corn starch) and the supplement (L-arginine) with heart rate, RPE, distance, and blood lactate during short term submaximal exercise. However, there was a slight decrease in blood lactate and rate of perceived exertion between the placebo and the supplement during submaximal exercise. This may suggest that over time, nitric oxide may eventually have significant results with submaximal exercise. Studies have shown improvements when taking nitric oxide for a longer period of time. Future research should consider this.