



# The Effect of Cytomax Sports Drink on Blood Lactate Levels in a 400 m Run.

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## Abstract

**INTRODUCTION:** During short term exercise, lactic acid is formed as a byproduct of glycolysis. It forms from pyruvate when oxygen is not present in the muscles. Lactic acid then diffuses from the muscles into the blood and is broken down into lactate and hydrogen ions. This excess of hydrogen ions causes the blood pH to lower, unless it is buffered by the body. Many substances such as sodium bicarbonate, superoxygenated water, and caffeine have been tested as buffers, but none has been found to be both safe and effective. A new product, Cytomax performance drink claims to be a buffer.

**PURPOSE:** The purpose of this study was to determine the effect of Cytomax Performance drink on blood lactate levels following a 400 m run.

**METHODS:** Seven female UTA student-athletes ages 19.6 ± 1.3 years volunteered to participate in this study. Height was 179.3 ± 4.3 cm, weight was 70.7 ± 6.1 kg, and body fat was 20.9 ± 3.8 %. Each subject participated in two 400 m run trials. One was done after the consumption of Cytomax Performance Drink and the other after consumption of the placebo, diluted Minute Maid lemonade. During both trials blood lactate was measured immediately upon arrival, 30 minutes after consumption of the drink, and 5-7 minutes post exercise. Heart rate and rating of perceived exertion were also measured for both trials.

**RESULTS:** Post exercise blood lactate was lower with the Cytomax (8.7 ± 2.2 mmol/L) than with the control (10.2 ± 3.1 mmol/L), but the result was not significant,  $t(6) = 0.969$ ,  $p = 0.370$ . RPE values were 15 ± 2 and 14 ± 2 for the Cytomax and placebo, respectively. These results were not significant,  $t(6) = -0.330$ ,  $p = 0.752$ . Heart rate values were 153 ± 16 for the Cytomax, and 152 ± 12 for the placebo. These results were also not significant,  $t(6) = -0.074$ ,  $p = 0.943$ .

**CONCLUSION:** Although Cytomax did lower post exercise blood lactate, the difference was not significant, and therefore this study did not find a relationship between consumption of Cytomax Performance Drink and blood lactate that would classify Cytomax as a buffer.

## Purpose

The purpose of this study was to determine the effect of Cytomax Performance Drink on blood lactate levels following a 400 m run

## Methods

**Subjects:**

Seven female UT Arlington athletes volunteered to participate in this study. They were aged  $19.6 \pm 1.3$  years. Their weight was  $70.7 \pm 6.1$  kg, height was  $179.3 \pm 4.3$  cm, and body fat percentage was  $20.9 \pm 3.8$ . All subjects were in good shape and exercised regularly.

**Experiment Protocol:**

A randomized experiment was conducted. Each participant visited the laboratory a total of three times. The purpose of the first visit was to sign informed consent documents, and to take height, weight, and skinfold measurements to determine body fat percentage. Body fat percentage was measured using the three site method. At this time, subjects were instructed to refrain from food and drinks for 2 hours prior to their two testing dates.

Subjects were randomly assigned to either group A or B. Group A received the intervention first and then the placebo, group B received the placebo first and then the intervention. The purpose of this was to rid the study of any bias that might occur, such as the subjects being

## Methods (cont'd)

used to the protocol the second time and consequently having a faster time.

On the first day of testing the subjects again reported to the lab. A resting blood lactate measurement was then taken. All blood lactate analysis was done using the Accusport Portable Lactate Analyzer. Each subject was given a 16 oz drink in a red plastic cup—either Cytosport Performance Drink Cool Citrus or the control diluted Minute Maid Lemonade—and asked to consume it. The diluted lemonade was 6 oz. of lemonade and 10 oz. of water to get the caloric intakes of the drinks as close as possible. Subjects were blinded. After consuming the entire drink subjects sat quietly 30 minutes to allow absorption.<sup>6</sup> Another blood lactate measurement was taken at the end of 30 minutes. A resting heart rate value was also recorded at the end of the 30 minutes.

Subjects were allowed to jog and stretch on their own to warm-up sufficiently before running. They then ran a 400 m sprint at their top speed. Following completion, exercise heart rate and RPE were recorded. A final blood lactate measurement was taken within 5-10 minutes of the subject's completion of the 400 m run<sup>5</sup>.

At least one week after the first day of testing, each subject returned to the laboratory for a second day of exercise. The second day was exactly the same as the first, except that the subjects who got the lemonade the first time got the Cytosport drink and vice versa. After each subject performed a second 400 m run, and a final blood lactate had been measured, they were finished with the study.

## Results

Table 1. Means and Standard Deviations from Experiment Data

	Cytomax	Control
RPE	15 ± 2	14 ± 2
Baseline Blood Lactate (mmol/L)	3.3 ± 1.3	3.4 ± 1.1
Post Exercise Blood Lactate (mmol/L)	8.7 ± 2.2	10.2 ± 3.1
Heart Rate (bpm)	153 ± 16	152 ± 12
Exercise Time (seconds)	99.3 ± 13.3	100.7 ± 14.8

## Results (cont'd)

All means and standard deviation values are listed in Table 1. Ratings of perceived exertion increased slightly from the control to the Cytomax, but this difference was not significant,  $t(6) = -0.330$ ,  $p = 0.752$ . As expected, baseline blood lactate was not significantly different between the control and the Cytomax  $t(6) = 0.206$ ,  $p = 0.844$ . Post exercise blood lactate was lower with the Cytomax than with the control, but this result was not significantly different,  $t(6) = 0.969$ ,  $p = 0.370$ . Heart rate was a little higher with the Cytomax drink, but not significantly higher,  $t(6) = -0.074$ ,  $p = 0.943$ . Exercise time was a little lower for the Cytomax than the control, but again, not enough to be significant,  $t(6) = 0.331$ ,  $p = 0.752$ .

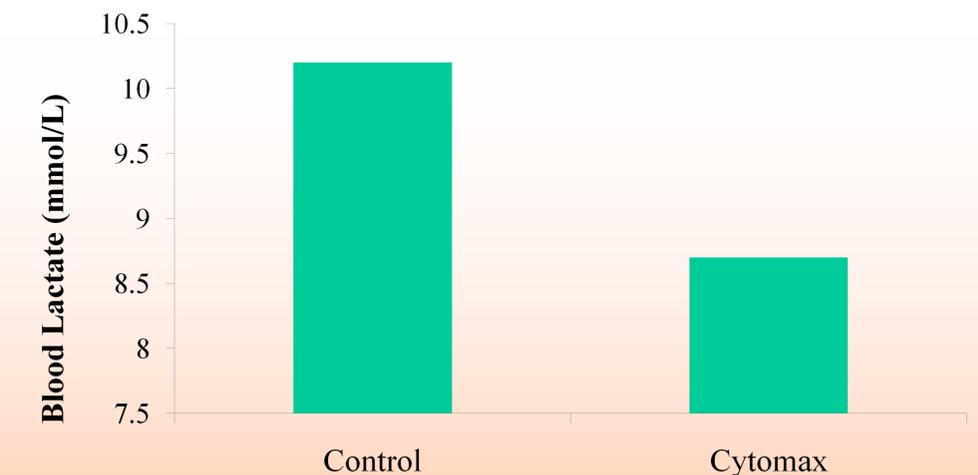


Figure 1. Comparison of Post-Exercise Blood Lactate in Control vs. Cytomax

## Conclusions

Cytomax's claims to lower RPE also were not supported, as RPE actually went up from the placebo to Cytomax. Although Cytomax did lower post exercise blood lactate, the difference was not significant, and therefore this study did not find a relationship between consumption of Cytomax Performance Drink and blood lactate that would classify Cytomax as a buffer.