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EXTENDED ABSTRACT

The Impact of Beetroot Juice Consumption on Swimming Performance in Young Active Males

Putera Irfan Al-Hafiz Mohd. Radzi[1*] & Nurul Ain Abu Kasim[1]
[1]*Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Negeri Sembilan Branch, Seremban Campus, Negeri Sembilan, MALAYSIA*
Corresponding author: puterdzi9@gmail.com

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I. Introduction

Beetroot juice, rich in dietary nitrates, has gained attention for its potential to enhance athletic performance through improved oxygen efficiency. While its effects are well-documented in endurance sports, limited data exist regarding its influence on anaerobic aquatic activities. This study investigates whether acute beetroot juice supplementation improves 50-meter swimming performance and perceived exertion among young active males.

II. Methods

Nineteen active males (aged 21–25) completed two 50-meter freestyle swim tests in a single-blind, randomized, crossover design. Participants consumed either 70 mL beetroot juice (400 mg nitrate) or a placebo 2 hours before each trial, with a 2-day washout. Swim times were recorded via stopwatch; perceived exertion was assessed immediately post-swim using the Borg RPE scale (0–10). All data were collected by the researcher.

III. Results and Discussion

The descriptive statistics of swimming time and Rating of Perceived Exertion (RPE) among participants before and after beetroot juice supplementation are shown in Table I. A total of 19 participants took part in the study. The mean pre-test time was 93.16 seconds with a standard deviation (*SD*) of 25.85, while the post-test time slightly decreased to 92.97 seconds (*SD* = 28.23). The minimum swimming time recorded was not stated, but the median was 90.52 seconds in the pre-test and 91.25 seconds in the post-test.

For RPE, the mean pre-test score was 6.00 (*SD* = 1.94), which decreased to 5.11 (*SD* = 1.20) in the post-test. This shows that participants felt less exertion after consuming beetroot juice. The mean difference in time was -0.191 seconds, and for RPE it was -0.895.

Table I
Descriptive Statistics for Swimming Time & RPE

Variable	N	Mean	SD	*Median*	*SE*
Pre Test Time (sec)	19	93.16	25.85	90.52	5.929
Post Test Time (sec)	19	92.97	28.23	91.25	6.477
Pre Test RPE	19	6.00	1.94	6.00	0.446
Post Test RPE	19	5.11	1.20	5.00	0.275
Time Difference (sec)	19	-0.191	10.13	-1.79	2.325
RPE Difference	19	-0.895	1.05	-1.00	0.241

Table II shows the results of the paired samples t-test. The statistical analysis revealed that there was no significant difference between pre- and post-test swimming time (p = 0.936), with a very small effect size (d = 0.0188). However, a significant reduction in RPE was found (p = 0.002), with a large effect size (d = 0.8533), indicating that beetroot juice had a strong impact in lowering perceived exertion. There was no significant relationship between changes in time and changes in RPE (p = 0.756).

Table II
Paired Sample T-Test for Swimming Tiem & RPE

	t-value	df	p	Mean diff	SE diff	Effect Size
Pre Test Time vs Post Test Time	0.0819	18.0	0.936	0.191	2.325	0.0188
Pre Test RPE vs Post Test RPE	3.7196	18.0	0.002	0.895	0.241	0.8533
Time Difference vs RPE Difference	0.3151	18.0	0.756	0.704	2.235	0.0723

Table III shows the results of the Shapiro-Wilk test of normality. All variables tested had p-values less than 0.05, indicating that the data violated the assumption of normality. This includes swimming time, RPE, and their differences. Despite this, the paired t-test was used due to its robustness in small samples.

Table III
Normality Test (Shapiro-Wilk) for Swimming Time & RPE

	W	p
Pre Test Time - Post Test Time	0.418	< 0.001
Pre Test RPE - Post Test RPE	0.833	0.004
Time Difference - RPE Difference	0.451	< 0.001

IV. CONCLUSIONS

While beetroot juice did not significantly improve 50-meter swim times, it notably reduced perceived exertion among young active males. These findings suggest potential benefits for subjective effort reduction, though not for short-distance performance enhancement. Future research should explore chronic supplementation or longer-distance events.

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