

## EFFECT OF BEETROOT SUPPLEMENTATION ON 5 KM TIME TRIAL PERFORMANCE

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### Abstract

The objective of the study was to examine the effect of 15 days of beetroot supplementation on 5 km time trial performance in trained distance runners of University level. Thirty trained distance runners (15 males and 15 females) were selected for the present study. Fifteen subjects were randomly assigned to one of two groups. The first group (Experimental Group) consumed the beetroot juice daily (250 ml/day) and the second group (Control Group) did not consume beetroot juice. Both the groups underwent a regular athletics training programme. All the subjects were tested on a 5 km time trial performance before supplementation of beetroot juice and after 15 days of supplementation of beetroot juice. In order to find out the effects of beetroot supplementation on 5 km time trial performance, Descriptive Statistics and Analysis of Covariance (ANCOVA) was used. The level of significance was set at 0.05 level. Fifteen-days of beetroot supplementation was proved to be effective ( $f$  value of 13.777,  $p < .05$ ) in enhancing performance on 5 km time trial of experimental group in comparison of control group.

**Keywords:** Enhance, Runner, Juice and Diet

### Introduction

Nutritional supplements are used for many purposes. They can be added to the diet to boost overall health and energy; to provide immune system support and reduce the risks of illness and age – related conditions; to improve performance in athletic and mental activities; and to support the healing process during illness and disease. However, most of these products are treated as food and not regulated as drugs are. Nutritional supplements include vitamins, minerals, herbs, meal supplements, sports nutrition products, natural food supplements, and other related products used to boost the nutritional content of the diet. The beetroot, also known as the table beet, garden beet, red beet or informally simply as beet, is one of the many cultivated varieties of beets. The usually deep red roots of beetroot are eaten either boiled or roasted as a cooked vegetable, or cold as a salad after cooking and adding oil and vinegar, or raw and shredded, either alone or combined with any salad vegetable. A large proportion of the commercial production is processed into boiled and sterilized beets or into pickles. In the Eastern Europe, beet soup, such as borscht, is a popular dish. In Indian cuisine, chopped, cooked, spiced beet is a common side dish.

Main purpose of this study was to examine the effect of 15 days of beetroot supplementation on 5 km time trial performance in trained distance runners of University level players.

### Methodology

#### Subjects

Thirty trained athletes (15 males and 15 females) of 18 to 28 years of age were selected for the present study. One experimental and one control groups were made consisting of males and females.

#### Variables

In this study beetroot supplementation was considered as independent variables and 5 km time trial performance was considered as dependent variable.

#### Treatment

In this study, 250 ml of beetroot juice was given to each subject in afternoon after lunch at 2.00 p.m. to the subjects of experimental group for 15 days without any gap in between.

#### Statistical Analysis

In order to find out the effect of beetroot supplementation on a 5 km time trial performance, Descriptive Statistics and Analysis of Covariance (ANCOVA) was used. The level of significance was set at 0.05 level.

### Findings

**TABLE – 1**  
DESCRIPTIVE STATISTICS OF 5 KM TIME TRIAL PERFORMANCE OF EXPERIMENTAL GROUP AND CONTROL GROUP IN PRE-TEST AND POST-TEST

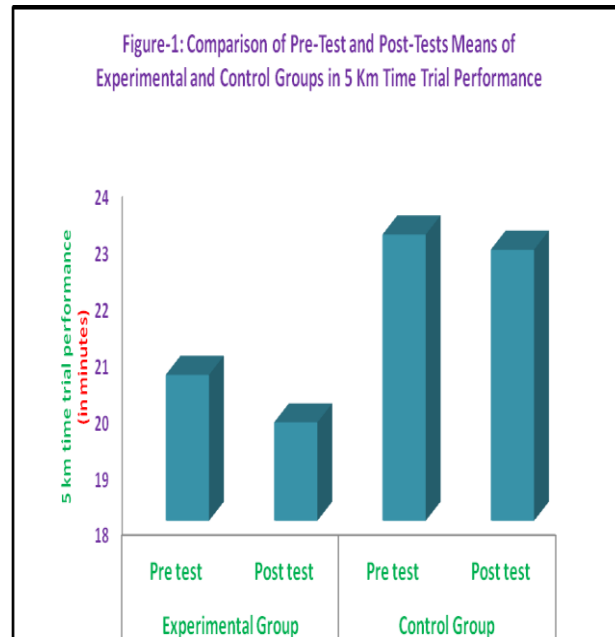
Descriptive Statistics	Different Groups			
	Experimental Group		Control Group	
	Pre test	Post test	Pre test	Post test
Mean	20.591	19.745	23.080	22.812
Std. Error Mean	.752	.683	1.354	1.377
Std. Deviation	2.913	2.647	5.246	5.334
Variance	8.491	7.009	27.531	28.457
Skewness	.695	.635	.247	.319
Kurtosis	-.728	-.990	-1.502	-1.567
Range	8.87	7.37	15.00	14.97
Minimum	17.28	17.05	16.50	16.48
Maximum	26.15	24.42	31.50	31.45

**TABLE – 2**  
ANALYSIS OF VARIANCE OF COMPARISON OF MEANS OF EXPERIMENTAL GROUP AND CONTROL GROUP IN RELATION TO 5 KM TIME TRIAL PERFORMANCE

Observation	Source of Variance	Sum of Squares	df	Mean Square	f
Pre Test	Between Groups	46.451	1	46.451	2.579
	Within Groups	504.308	28	18.011	
Post Test	Between Groups	70.533	1	70.533	3.978
	Within Groups	496.525	28	17.733	

\*Significant at .05 levels  $f_{(1, 28)(0.05)} = 4.196$

In relation to pre test, table 2 revealed that the obtained 'f' value of 2.579 was found to be insignificant at 0.05 level, since this value was found lower than the tabulated value 4.196 at 1, 28 df. In relation to post test, insignificant difference was found among experimental and control group pertaining to 5 km time trial performance since f value of 3.978 was found insignificant at .05 level.

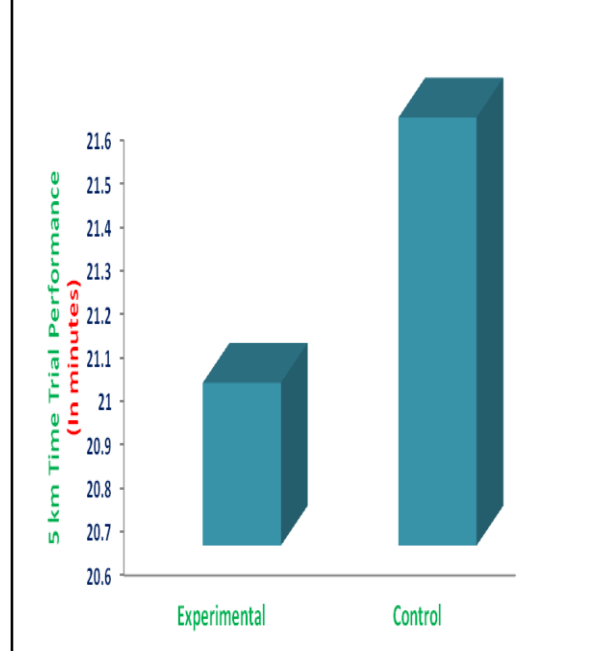


**TABLE – 3**  
ADJUSTED POST TEST MEANS OF EXPERIMENTAL GROUP AND CONTROL GROUP IN RELATION TO 5 KM TIME TRIAL PERFORMANCE

Groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Experimental	20.974	.114	20.741	21.207
Control	21.584	.114	21.350	21.817

Covariates appearing in the model are evaluated at the following values: pretest = 21.8357.

**Figure-2: Comparison of Adjusted Post-Test Means of Experimental Group and Control Group in 5 Km Time Trial Performance**



**TABLE – 4**  
ANALYSIS OF COVARIANCE OF COMPARISON OF ADJUSTED POST TEST MEANS OF EXPERIMENTAL GROUP AND CONTROL GROUP IN RELATION TO 5 KM TIME TRIAL PERFORMANCE

Source of Variance	Sum of Squares	df	Mean Square	f	Sig.
Contrast	2.553	1	2.553	13.78*	.001
Error	5.004	27	.185		

\*Significant at .05 levels  $f_{(1, 27)(0.05)} = 4.196$

Table 4 revealed that the obtained 'f' value of 13.777 was found to be significant at 0.05 level, since this value was found higher than the tabulated value 4.21 at 1, 27 df.

**Discussions and conclusions**

Various studies have been conducted to see the effect of beetroot supplementation on endurance related activities. In the present study, significant improvement was found in 5 km time trial performance after 15 days of beetroot supplementation. Nutritional supplements are typically used for their actual or anecdotal physiological effects in increasing performance and endurance, health maintenance or preventing injuries as revealed by three studies conducted by Armsey and Green (1997), Lawrence et al (2002) and Kreider et al. (2004). The above mentioned studies revealed the effect of supplementation, but studies do not clarify the type of nutritional supplements. Specific studies also been conducted to see the effect of beetroot supplementation on endurance related activities. It has recently been shown that dietary nitrate

supplementation with beetroot juice reduced  $VO_2$  during sub-maximal exercise as revealed by Lansey et al. (2011) and improved 10-km time-trial performance in trained cyclists as revealed by Cermak et al. (2012).

Present study supports the above mentioned studies since time trial performance in trained cyclists and 5 km time trial performance are of similar nature of activities. Study conducted by Bailey et al. (2009), Larsen et al. (2010), Bescos et al. (2011) and Lansey et al. (2011) clearly revealed the cause of improvement in endurance exercise performance. Beetroot contain high nitrate and nitrate intake has been linked with beneficial effects, including enhanced endurance exercise performance.

In the present study, improvement in 5 km time trial performance after beetroot supplementation might be due to presence of nitrate and nitrate has been linked with endurance related activities.

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