



## REVIEW OF RESEARCH



### BETROOT SUPPLEMENTATION IMPROVES ONE KM TIME TRIAL PERFORMANCE OF UNIVERSITY RUNNERS



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#### ABSTRACT:

The purpose of the present study was to investigate effect of beetroot juice on one km time trial performance of University runners. Thirty trained distance runners (15 males and 15 females) were selected for the present study. Fifteen subjects were randomly assigned to one of the two groups. The Experimental Group consumed 250 ml beetroot juice daily for 15 days and the Control Group did not consume any juice. Both the groups underwent a regular athletics training programme. All the subjects were tested for one km time trial performance before supplementation of beetroot juice and after two weeks of supplementation of beetroot juice, in order to find out the effects of beetroot juice supplementation on one km time trial performance. Descriptive Statistics and Analysis of Covariance (ANCOVA) was used. The level of significance was set at 0.05 level.

Present study demonstrate that two weeks of supplementation of beetroot juice was proved to be effective ( $F$  value of 5.510,  $p < .05$ ) in enhancing one km time trial performance of experimental group.

**KEYWORDS :** trial performance , Descriptive Statistics and Analysis of Covariance.

#### INTRODUCTION:

Dietary enhancements are utilized for some reasons. They can be added to the eating regimen to help in general wellbeing and vitality; to give safe framework support and to decrease the dangers of sickness and age – related conditions; to improve execution in athletic and mental exercises; and to help the mending procedure during ailment and infection. Be that as it may, a large portion of these items are treated as nourishment and not directed as medications. Wholesome enhancements incorporate nutrients, minerals, herbs, feast supplements, sports sustenance items, normal nourishment supplements, and other related items used to support the dietary substance of the eating regimen.

Healthful enhancements might be intended to give specific help to competitors. A portion of these comprise of high-protein items, for example, amino corrosive enhancements, while different items contain supplements that help digestion, vitality, and athletic execution and recuperation. Individuals taking part in exceptional athletic movement may have expanded requirements for water – solvent nutrients, cell reinforcements, and certain minerals, including chromium. Sports drinks contain mixes of electrolytes that body loses during effort and perspiring, just as nutrients, minerals, and execution – supporting herbs.

Beetroot supplementation has shown physiological effects and it has assumed that it can also lead to increased athletic performance by supporting cardio vascular system. Physical activity, athletic performance, and recovery from exercise are enhanced by optimal nutrition. Nutritional requirements should be take care by athlete and there should be appropriate selection of food and fluids, timing of intake, and supplement choices for optimal health and exercise performance. Training programs should also includes assessment of body composition, strategies for weight change, athletes' nutrient and fluid needs, special nutrient needs, the use of supplements and nutritional ergogenic aids. During times of high physical activity, energy and macronutrient needs have to be taken care of. Rich vegetable diet has many benefits. All vegetables contain nitrate and it is found in large amount in beetroot and green leafy vegetables. Consumption of vegetables has been thought to help in protection against various diseases like cardiovascular disease. The Beetroot juice which contains nitrate has been reported to increased plasma nitrate concentration, which leads to decrease blood pressure and inhibits platelet aggregation.

Studies have been conducted to find out effect of beetroot supplementation on endurance related activities. Nutritional supplements are typically used for their actual or anecdotal physiological effects in increasing performance and endurance, health maintenance or preventing injuries. The aim of the present study is to investigate the efficacy of nitrate rich beetroot juice on one km time trial performance.

## 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 One km time trial performance was considered as dependent variable.

### Statistical Analysis

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

### Treatment

In this study, beetroot juice (250 ml/day for two weeks) was given to the subjects of experimental group in afternoon after lunch at 2.00 p.m.

## FINDINGS

**Table – 1**  
**Descriptive Statistics of One 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	3.288	3.094	3.428	3.364
Std. Error of Mean	.108	.0953	.195	.182
Std. Deviation	.418	.369	.757	.707
Variance	.175	.136	.574	.501
Skewness	.542	-.554	.085	.179

Std. Error of Skewness	.580	.580	.580	.580
Kurtosis	.267	-1.294	-1.726	-1.520
Std. Error of Kurtosis	1.121	1.121	1.121	1.121
Range	1.58	1.01	1.94	1.92
Minimum	2.54	2.51	2.46	2.43
Maximum	4.12	3.52	4.40	4.35
N	15	15	15	15

Table – 2

Analysis of Variance of Comparison of Means One Km Time Trial Performance of Experimental Group and Control Group in relation to

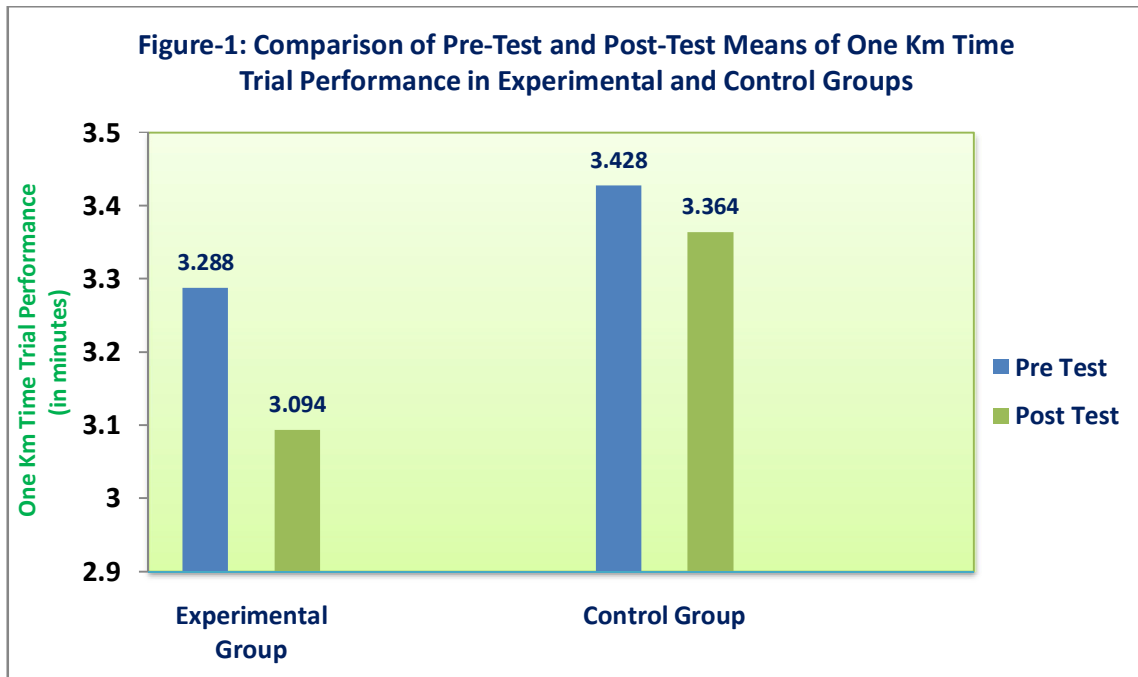
Observation	Source of Variance	Sum of Squares	df	Mean Square	f	Sig.
Pre Test	Between Groups	.146	1	.146	.389	.538
	Within Groups	10.487	28	.375		
Post Test	Between Groups	.544	1	.544	1.707	.202
	Within Groups	8.924	28	.319		

Insignificant at .05 levels

f value required to be significant at 1, 28 df = 4.196

In relation to pre test, table 2 revealed that the obtained *f* value of 0.389 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.

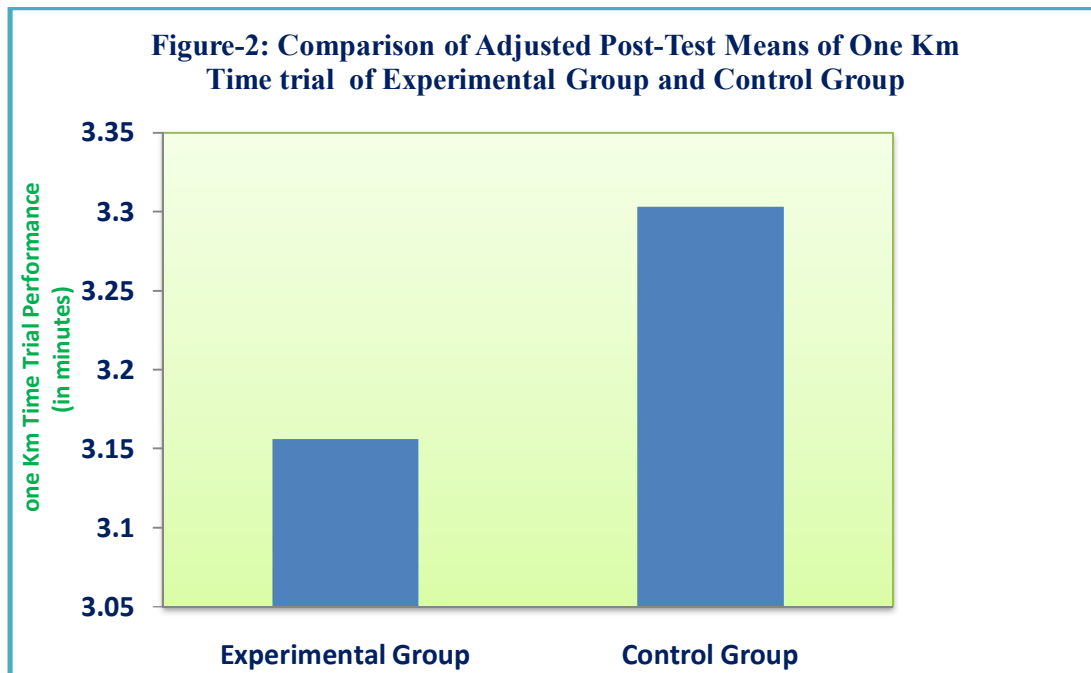
In relation to post test, insignificant difference was found among experimental and control group pertaining to One km time trial performance since *f* value of 1.707 was found insignificant at .05 level.



**Table – 3**  
**Adjusted Post Test Means of One Km Time Trial Performance**  
**in Experimental Group and Control Group**

Groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Experimental	3.156 <sup>a</sup>	.044	3.066	3.246
Control	3.303 <sup>a</sup>	.044	3.212	3.393

Covariates appearing in the model are evaluated at the following values: pretest = **3.3583**.



**Table – 4**  
**Analysis of Covariance of Comparison of Adjusted Post Test Means of One Km Time Trial Performance in**  
**Experimental Group and Control Group**

Source of Variance	Sum of Squares	df	Mean Square	<i>f</i>	Sig.
Contrast	.159	1	.159	5.510*	.026
Error	.778	27	.029		

\*Significant at .05 level  
*f* value required to be significant at 1, 27 *df* = 4.21

Table 4 revealed that the obtained '*f*' value of 5.510 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*.

**DISCUSSION:**

The result of the present study revealed that two weeks of supplementation of beetroot juice was proved to be effective (*f* value of 5.510, *p* < .05) in enhancing one km time trial performance of experimental group. Dietary nitrate supplementation with beetroot juice reduced VO<sub>2</sub> during sub maximal

exercise (Lansley et al. 2011) and improved 10-km time-trial performance in trained cyclists (Cermak et al. 2012). Improved endurance exercise performance have been reported by many researchers (Bailey et al. 2009, Larsen et al. 2010, Bescos et al. 2011 and Lansley et al. 2011)

A diet rich in vegetables and fruits has been found a beneficial impact on several body functions. These effects may be attributing to the high inorganic nitrate (NO<sub>3</sub><sup>-</sup>) content of vegetables, particularly leafy greens and beetroot. NO<sub>3</sub><sup>-</sup> can be reduced to nitrite and converted to nitric oxide (NO), which affects hemodynamics and muscles metabolic functions. However, evidence is emerging that dietary NO<sub>3</sub><sup>-</sup> supplementation may also positively impact the physiological responses to exercise. In detail, it has been found that beetroot juice can enhance NO production in the skeletal muscle, which leads to increased blood flow and improved muscle oxygen delivery. Therefore nitrate is considered as a key ingredient in reducing oxygen consumption.

### CONCLUSIONS:

In conclusion, BR juice supplementation using 250 ml for two weeks showed an improvement in one km time trial performance.

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