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Immediate and intermediate effect of lactose intake on physical fitness

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Abstract
The purpose of the present study was to observe the effect of consumption of Lactose (Sugar composed of galactose and glucose) on athletic performance of B.A. students of Govt. College Sampla, Rohtak. Total 10 students were selected for this study. The age ranged from 18 to 24 years. There were five boys and five girls selected as subjects. In this study AAPHER youth fitness test was applied to check and observe the energy level and the effect on performance of athletes. In order to analysis the data statistical technique ANOVA was used. The level of significance was set at 0.05. It was concluded that Lactose sugar is a not an important source of immediate or intermediate energy and decreases sports performance, however there was an increase in performance after 4 hours of Lactose sugar intake when compared to immediate performance.

Keywords: AAPHER, ANOVA, glucose, lactose

Introduction
Lactose is a simple sugar which is an important energy source in living organism and is a component of many carbohydrates. It is carried through the bloodstream to provide energy to all cells in the body. Ingested lactose is absorbed directly into the blood and results in a rapid increase in blood glucose. Lactose is derived from the latin word Lac which means milk and the -ose denotes sugar.

Lactose has a percentage of around 2-8% in milk. It is white in appearance and water soluble, non-hygroscopic solid with a mildly sweet taste. Lactose is a disaccharide which means it is made up of two compounds galactose and glucose. Both the compounds are used in experiments to visualize the difference in lactose contents of different dairy products such as whole milk, lactose free milk, buttermilk, yogurt etc. The sweetness of lactose is 0.2 to 0.4 in relation to 1.0 for table sugar (Sucrose). The sweetness of glucose is 0.6 to 0.7, sweetness of fructose is 1.3, galactose is 0.5 to 0.7, maltose is 0.4 to 0.5. The complete digestion of Lactose in small intestine has a caloric value of 4kcal/g and in addition it has an effect on digestion of various minerals such as calcium and magnesium. Sugar has been available in the Human diet since ancient times. While the effect of sugar on sports performance is inconclusive, the effects of sugar on endurance performance are most certainly conclusive. However, when blood sugar is maintained, endurance performance improves. The simplest way to maintain blood sugar is by taking on board a simple sugar-based drink during exercise. Most of the research is based on the use of glucose, a simple monosaccharide. The present study is conducted to find the immediate effect and post 4 hour effects of lactose sugar on physical fitness performance.

Methodology
The purpose of the present study was to measure the effect of Lactose (Sugar composed of galactose and glucose) on athletic performance. The control group chosen for this study was not allowed to take part in rigorous training except warming up with mild exercises and some stretching. A short warm up period of 10 minutes was given to each variable for each test. Selected variables from AAPHER Youth fitness test were chosen for this study.

Components - Tests
Strength endurance of arms and shoulder - Pull-ups
Agility - 4x10 yards shuttle run
Explosive power - Standing Broad Jump
Speed - 50-yard dash

Pre-Test was conducted before two day and Post Test was conducted after 4 hours on the same day. To measure the effects, the subjects were given measured quantities of Lactose drink of 300 ml milk with fat percentage of 6-7% and the test were conducted immediately and after 4 hours.

Statistical Technique Used

The statistical techniques are the only source to analyze and interpret the data collected precisely. The statistical techniques used in the analysis of the data are given in the brief summary. In this study ANOVA test is used. The level of significance was set at 0.05.

Data Analysis

Table 1: 50 M. Girls

Subject	Control	Lactose intake	After four hours
A	9.13 a	10.25 a	9.07 b
B	9.98 c	10.22 a	9.02 a
C	9.16 b	10.89 c	9.02 a
D	9.17 b	10.72 b	9.06 b
E	9.13 a	10.80 bc	9.03 a

Table 2: 50 M. Boys

Subject	Control	Lactose intake	After four hours
A	8.21 a	10.22 a	8.18 a
B	8.35 a	10.25 a	8.19 a
C	8.98 b	10.30 a	8.20 a
D	9.07 c	10.30 a	8.20 a
E	8.30 a	10.31 a	8.19 a

Means Followed by similar alphabet within the column do not differ significantly (P<0.05)

50m - The test was performed to measure the speed of the athletes with or without consumption of sucrose.

- The pre-test item was performed without consumption of any food and (control) readings were recorded.
- The test was again performed after consumption of lactose drink and the performance of athletes drastically decreased and the readings were recorded.
- After 4 hours the reading was again recorded which showed the increase on performance of athletes.

Table 3: Broad Jump (Girls)

Subject	Control	Lactose intake	After four hours
A	5.2 a	5.0 a	5.8 a
B	5.4 a	5.2 a	5.8 a
C	6.2 c	5.2 a	6.5 b
D	6.1 c	5.2 a	6.2 b
E	5.6 ab	5.0 a	5.8 a

Table 4: Broad Jump (Boys)

Subject	Control	Lactose intake	After four hours
A	7.8 c	7.2 cd	8.1 c
B	7.0 a	7.1 cd	7.20 a
C	7.2 b	6.9 b	7.4 b
D	7 a	6.3 a	7.1 a
E	7.1 a	7.3 d	7.1 a

Means Followed by similar alphabet within the column do not differ significantly (P<0.05)

Broad Jump- It is the test battery of AAPHERED youth fitness test which measure the explosive strength of legs.

- After consumption of lactose the readings of samples were recorded which showed the decrease in performance of the athlete.
- After 4 hours the test was again performed by same samples. The performance of the samples varied. The leg strength of the athletes was recorded as higher when compared with that of Pre-Test Control group readings.

Table 5: Pull Ups (Girls)

Subject	Control	Lactose intake	After four hours
A	1 a	2 a	3 a
B	1 a	2 a	3 a
C	5 b	6 b	7 b
D	1 a	2 a	3 a
E	2 a	3 a	3 a

Table 5: Pull Ups (Boys)

Subject	Control	Lactose intake	After four hours
A	7 b	8 a	10 a
B	4 a	8 a	9 a
C	7 b	12 b	15 b
D	10 c	8 a	14 b
E	7 b	10 ab	10 a

Means Followed by similar alphabet within the column do not differ significantly (P<0.05)

Pull ups- It is the test item performed to measure the muscular endurance of the arms and shoulder girdle in pulling the body upward.

- Where the Lactose was given to the samples the readings were recorded which showed the increase in path of the athlete resulting in higher performance.
- The test item was again performed after 4 hours on the same subjects to observe the effect of Lactose on the athlete's performance. It was found that the performance improved when compared with the Control groups readings

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Table 6: Shuttle Run (Girls)

Subject	Control	Lactose intake	After four hours
A	27 ab	27.88 a	25.43 a
B	31.88 b	28 a	25.89 a
C	26.28 a	27.88 a	25.72 a
D	26.28 a	27.89 a	25.87 a
E	28 ab	27.89 a	25.43 a

Table 7: Shuttle Run (Boys)

Subject	Control	Lactose intake	After four hours
A	21.23 a	25.02 b	20.80 a
B	22.28 ab	23.10 a	21.35 b
C	25.88 c	26.05 c	23.37 c
D	24.47 b	25 b	24.05 d
E	25.05 c	26.10 c	23.30 c

Means Followed by similar alphabet within the column do not differ significantly (P<0.05)

Shuttle Run-The test battery of AAPHERED test is performed to measure agility or change of direction.

- The test was performed with consumption of lactose on the same subjects, and the performance of the athletes increased.
- Again, the test was performed after 4 hours. The readings were recorded on same subjects who showed

the decrease in performance of athlete after 4 hours of consumption of glucose.

Discussions and Findings

While the effect of Lactose Sugar on sports performance is inconclusive and further studies are required, the effects of Lactose sugar on endurance performance are most certainly conclusive. However, when blood sugar is maintained, endurance performance improves. The simplest way to maintain blood sugar is by taking on board a simple sugar-based drink during exercise. Most of the research is based on the use of glucose, a simple mono saccharide. Most research would suggest a two to five percent impartment in performance lasting longer than one hour when you ingest a simple sugar such as glucose. The present study is aligned with the previous studies which have highlighted the impact of glucose during games and events by Joseph Ll Ventura *et al*, in the Effect of prior ingestion of glucose or fructose on the performance of exercise of intermediate duration. It was found that there was a significant difference or the performance of athletes after intake of glucose sugar. Consumption of glucose sugar resulted in the increase in immediate performance for various test conducted whereas when the test was again conducted after 4 hours that showed the decrease in performance of athletes.

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