

The Influence of Green Apples on the Lactic Acid Level After Physical Activity

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ABSTRACT

This study aims to determine the effect of eating green apples to lactic acid levels after taking physical activity. This study used an experimental research method, with several samples of 15 sport science faculty students selected by random sampling. The data analysis technique used is descriptive, data normality test, and paired T-test using SPSS 21. Based on the detailed analysis result, it found that the pre-test group obtained a mean value of 8.46, the standard deviation of 1.06, a minimum value of 7.30, a maximum value of 10.70, with a sum of 126.90. The post-test group had an average value of 6.77, a standard deviation of 0.44, a minimum value of 6.10, a maximum value of 7.70, several 101.60. For the normality test results, the pre-test measurement found the Asymp value = 0.83 ($p > 0.05$) and the post-test measurement with the Asymp value = 0.91 ($p > 0.05$) so all data are distributed normally. To the test of the hypothesis, a paired t-test was performed, and the difference between the pre and post-test was 1.69 with $p = 0.00$. There was a significant difference between the pre-test and post-test groups. Therefore, it concluded that there was an effect of giving green apples to lactic acid levels after doing physical activity.

Keywords: Green apples, lactic acid level, physical activity

1. INTRODUCTION

Physical exercise and food intake have a close relationship because, without food, humans cannot exercise physically. Energy during training is extracted through two pathways, aerobic and anaerobic. The application of this energy system is very dependent on the intensity of the exercise [1]. Furthermore, in physical activity with high strength, the muscles contract in anaerobic conditions, so that the provision of ATP occurs through the anaerobic glycolysis process. This results in increased levels of lactate in the blood and muscles. Lactate can be the end product of anaerobic metabolism, which takes place without oxygen. Lactic acid is the result of carbohydrate metabolism without using oxygen (anaerobic metabolism). The production process occurs in muscle cells when oxygen supply is insufficient to support energy production. The fact shows that during physical exercise, there will be an increase in lactate levels in the blood and muscles [2]. These lactates accumulate in the blood and become a fundamental problem in physical performance because it causes chronic fatigue and decreases physical performance. Excess lactic acid causes discomfort and pain in the muscles. Also, the accumulated lactic acid will increase heart rate and make it seem out of breath. Therefore,

someone who does physical exercise requires intake that can reduce levels of lactic acid in the body [3].

Green apples that contain potassium and sodium with almost the same amount of banana could play a significant role in the mechanism of muscle fatigue by reducing the lactic level in the muscle. To support physical exercise, we need fruits that can restore tissue [4]. Green apples have high antioxidants and are rich in fiber. Red or green skin contains quercetin, which can help protect against heart disease and allergies. The nutritional content of green apples in 100 grams are ; 6-gram calcium, 58 cal energy, 0.3-gram protein, 0.4 grams fat, 14.9-gram carbohydrate, phosphorus, sodium, magnesium, iron, vitamin A, vitamin B complex, vit.C, crude fiber (pectin), phenolic acid, potassium, flavonoid and phytochemical [5].

Green apple is rich in minerals. Minerals are one of the essential elements in maintaining overall body endurance. Minerals are divided into two types, namely macro and micro metals. Macrominerals are minerals that the body needs in amounts of more than 100 mg/day, while microcrystals are required less than 100 mg/day. Macrominerals are sodium, chloride, potassium, calcium, phosphorus, magnesium, and sulfur, while those that

include micro minerals, such as iron, zinc, iodine, and selenium [6].

Lactic acid is the final product of anaerobic glycolysis. It will reduce the pH in the muscles and blood. Further, this pH reduction will obstruct the work of glycolytic enzymes and interfere with other chemical reactions in muscle cells. It will result in weaker muscle contractions, and eventually, the muscles will experience fatigue. Large amounts of lactic acid produced by muscles during physical training are converted to pyruvic acid and then broken down into carbon dioxide and water in the mitochondria [7]. However, lactic acid can be diffused out of the muscles and into the blood, recycled, and processed as a source of energy by other tissues. Another way of using lactic acid as power is by releasing it from the blood into the liver; in the liver, lactic acid will be converted to glycogen through glycolysis. Its glycogen will break down into glucose, which enters the blood and transports back to the muscles to be used in glycolysis or stored as glycogen [8].

2. METHOD

The sample in this study consisted of 15 people who are students in the 4th-semester faculty of Sport Science. Samples are selected by a random sampling method. The example on the first day only consumed water and performed physical activity in the form of a shuttle run, and then lactic acid level was measured. The second day, the students were given 150 grams of green apples, then half an hour later, physical activity in the form of a shuttle run was performed. After the last activity, lactic acid examination was carried out again.

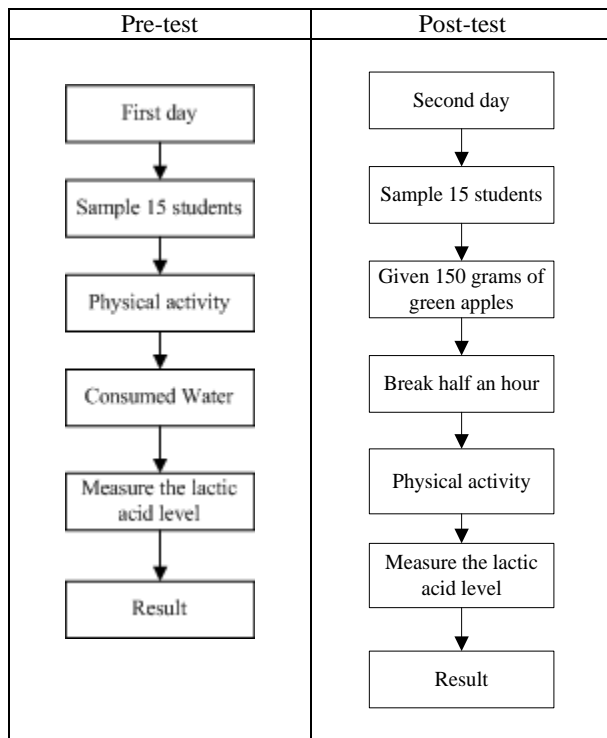


Figure 1 Method

In the pre-test and post-test, these students have been given different treatments. At the pre-test, they were not given a green apple during practice, and at the post-test each of them were given a green apple. The provision of green apples aims to compare levels of lactic acid in athletes. The training provided is also the same; namely, shuttle runs in both pre-test and post-test.

3. RESULTS

3.1. Descriptive Analysis

Description of the data is intended to interpret and give meaning to the data in a row as in the following table:

Table 1. Statistical descriptive analysis of the effect of giving green apples to lactic acid levels after physical activity.

	Pre-test	Post-test
Mean	8.46	6.77
Std. Deviation	1.06	0.44
Minimum	7.30	6.10
Maximum	10.70	7.70
Sum	126.90	101.60

From the table 1, overview of the initial data in the study which obtained is as follows:

1. From the pre-test group, the mean value is 8.46. The standard deviation is 1.06; a minimum amount is 7.30, a maximum amount is 10.70, sum 126.90.
2. From the post-test group, the mean value is 6.77; a standard deviation is 0.44, a minimum amount is 6.10, a maximum amount is 7.70, a sum of 101.60.

Based on a descriptive statistical analysis of the effect of giving green apples to lactic acid levels after physical activity, there was a known decrease in each measurement item with a mean value at pre-test 8.46. At the post-test, a significant reduction occurred in having a mean value of 6.77.

3.2. Data Normality Test

Data normality test is a test conducted to identify the same data in a group of data or test variables. This test useful to determine whether the data that has been used is typically distributed or taken from the average population.

Table 2. Summary of normality test results on the effect of administering green apples to lactic acid levels after physical activity.

	Pre-test	Post-test
N	15	15
Absolute	0.16	0.14
Positive	0.16	0.14
Negative	-0.13	-0.08
Kolmogorov-Smirnov Z	0.61	0.55
Asymp. Sig. (2-tailed)	0.83	0.91

Based on table 2 above, it shows that that tests the normality of the data are as follows:

1. Pre-test measurement data, Asymp value = 0.83 ($p > 0.05$)

2. Post-test measurement data, obtained Asymp value = 0.91 ($p > 0.05$)

From the results of the above tables, it can be concluded that all data follows normal distribution or distributed normally.

3.3. Paired T-test

Table 3. Effect of the effect of giving green apples to levels of lactic acid after physical activity

Variable	Difference	(p) Sig. (2 tailed)	Info
Pre-test – Post-test (8.46 - 6.77)	1.69	0.00	Significant

From the calculation results in the table above, the difference which was obtained before and after administering green apples (pre-post-test) is 1.69 with a p-value = 0.00. As the p-value is < 0.05 , it can be said that there are significant differences between pre-post-test before and after treatment in the group. There is a significant decrease in lactic acid levels. The value was decrease by 1.69. This value is derived from the difference from the measurement of lactic acid levels at the pre-test and post-test. The average amount of analysis of lactic acid levels during the pre-test was 8.46 by only drinking water during physical exercise. The average value of measurement of lactic acid levels during the post-test was 6.77. The action was given during the post-test by providing a green apple during physical exercise. It shows that green apple can help relieve pain in muscles and restore energy during physical activity.

4. DISCUSSION

Measurement of lactic acid levels is one of the important parameters in determining the bioenergetic performance of muscles. Muscle performance is closely related to training and nutritional intake, which in turn will support athletes' readiness to compete. Supplements become popular among the athletes because of the claim that it can restore fitness, increase endurance and strength, reduce body fat, and increase immunity. Nowadays, the uses of supplements that some people claimed capable of restoring the fitness and endurance of athletes including doping have been closely monitored because they can have an adverse effect on the body. Several natural supplements derived from nature have been used as significant sources of energy to the athletes, including latundan Banana. By conducting this research, it is hoped to find other natural ingredients that can also have a similar role.

From the research conducted by the author, it is found that green apple is also beneficial for muscle recovery after physical exercise. The treatment given in the study for two days was that on the first day, the sample was given physical exercise. Then after physical exercise, without consuming green apples, the athlete's lactic acid levels were measured with averaged 8.46 mg/dl. On the second day, after physical exercise, the sample consumed green apples. After that lactic acid level of the athletes

measured again with the average result of 6.77 mg/dl. The results of this study indicate that there is a decrease in lactic acid levels by 1.69 mg/dl which means that the sample muscle recovers faster if the sample consumes green apples.

5. CONCLUSION

Based on the results of the data and discussion of this study, it can conclude that there is a significant effect on the administration of green apples to the levels of lactic acid after physical activity. The levels of lactic acid after physical activity have proven significantly lower after the sample given green apple intake.

Giving green apples is highly recommended for those who have strenuous physical activity to maintain levels of lactic acid in the body during exercise. By keeping levels of lactic acid in the certain expected amount, fatigue, and adverse effects that occur in the body can be prevented.

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