



**The Effect of Tebuh Sari Drinking After Training on Hydration Status and Blood
Glucose Levels of Football Athletes PSDKU Aru**

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Abstract:

The purpose of this study was to determine the effect of giving sugarcane juice after exercise on hydration status and blood glucose levels of PSDKU Aru soccer athletes. This type of research is an experimental research Pre-Experimental Design, namely one group pretest-posttest design. In this design, the testee will be given a test before being given treatment. The results showed that 1) the administration of sugarcane juice after it could restore blood glucose levels. 2) Giving sugarcane juice is better to maintain hydration status.

Keywords: Sugarcane juice, drinking, blood, hydration, glucose, football

INTRODUCTION

An athlete's achievement is strongly influenced by the athlete's own performance. The best performance of athletes must be maintained during matches and training. Athletes' performance is related to various things, namely their abilities, athlete's psychology when competing, athlete's body fitness, exercises carried out before the match and athlete's nutritional regulation. Proper nutritional regulation can improve athlete performance, especially regulation of carbohydrate intake as a source of energy in the body. When carbohydrate stores in the body in the form of blood glucose, liver glycogen, and muscle glycogen decrease, fatigue will occur in athletes.

The availability of glucose in the blood is very important for athletes after exercise, because it is to restore liver and muscle glycogen stores and overcome fatigue. Glucose in the blood can be seen by taking blood samples of athletes before and after exercise. Carbohydrate intake after exercise and competition is very important to restore the availability of blood glucose for the process of glycogen resistance.

Charney et al (Mahan & Stump, 2008) said the highest muscle glycogen resistance was when carbohydrates were in large quantities (1 to 1.85g/KgBW/hour). After exercise there is an increase in glucose transport which helps the process of glycogen resistance, but will decrease rapidly if there is no carbohydrate intake immediately after exercise to return to

normal values. An alternative way to provide post-workout carbohydrates is to use a carbohydrate-containing drink.

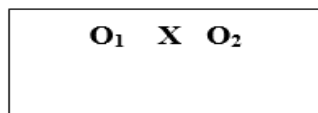
In addition, fluid/electrolyte requirements are very important for *performance* endurance. Water is the main component, because every cell and tissue is in it. Fluids circulating throughout the body also include dissolved minerals known as electrolytes. Electrolytes help regulate fluid levels within and between cells, and are essential for the proper functioning of tissue cells, including muscle tissue. Impaired water balance and temperature regulation can harm a person's body functions. For example, mild dehydration can interfere with physical activity or achievement, while severe dehydration can cause heatstroke and even death (Irianto, 2007).

During and after training or competition, athletes will generate heat generated by muscle contraction during exercise. When body temperature increases, appetite decreases, and hydration occurs and it is difficult to immediately consume carbohydrate-rich foods after exercise so that other sources of carbohydrate intake are needed besides food. An alternative way to provide carbohydrate intake after exercise is to use drinks that contain carbohydrates. Drinks with carbohydrate sources can be obtained from natural or synthetic sources. One of the natural sources of drinks that contain carbohydrates is sugar cane juice.

Sugarcane juice is a natural liquid source of carbohydrates that is often consumed in tropical and sub-tropical regions. In addition to having a fairly high carbohydrate content, sugarcane juice also contains vitamins and minerals

RESEARCH METHODS

This type of research is an experimental study of *Pre-Experimental Design*, namely *one group pretest-posttest design*. In this design, the testee will be given a test before being given treatment. In this way, the results of the treatment can be known more accurately, because it can compare the conditions before and after being given treatment. This design can be described as follows: (Sugiyono. 2009)



O_1 = Pretest (before treatment)

O_2 = Posttest (after treatment)

The effect of *treatment* given can be calculated by $=(O_2 - O_1)$

Based on the research design above, it can be explained that in this study there is one group experiment. The experimental group was previously given *pretest* to determine hydration status and initial blood glucose levels. After that, sugarcane juice was given, then *aposttest* to determine the effect of sugarcane juice on hydration status and blood glucose levels of athletes.

RESULTS AND DISCUSSION

Hypothesis of the effect of drinking sugar cane juice on hydration status

Based on the results of the analysis using the t-test, the results can be seen in the following table:

Table 1. *Pretest* and *Posttest* on Hydration Status Based on Weight Data

No	Drinks	<i>Pretest</i>	<i>Posttest</i>	t_{ht}	t_{tb}	Sig.	Difference
1	juice	50.1571	2.086	5.129	0.36667	0.001	50.5238

Table 2. *Pretest and Posttest on hydration status based on Urine color data*

No	Beverage	<i>Pretest</i>	<i>Posttest</i>	t_{ht}	t_{tb}	Sig,	Difference
1	juice	4,3333	2,335	4,6190	0,28571	030	2,086

Effect of drinking sugar cane juice on hydration status

The t-test was used to test the hypothesis which reads "There is an effect of sugarcane juice on hydration status in PSDKU Aru soccer athletes", based on the results of the *pre-test* and *post-test*. If the results of the analysis show a significant difference, the administration of sugarcane juice has an effect on hydration status. The conclusion of the study is declared significant if the $t_{count} > t_{table}$ and the *sig* is less than 0.05 ($Sig < 0.05$).

From the results of the t-test it can be seen that t_{count} 5.129 and t_{table} 2.086 (df 20) with a p significance value of 0.000. Because t_{count} 5.129 $>$ t_{table} 2.086, and a significance value of $0.000 < 0.05$, this result indicates that there is a significant difference. Thus the alternative hypothesis (H_a) which reads "There is an effect of drinking sugar cane juice on the hydration status of PSDKU Aru soccer athletes", is accepted. From the *pretest* it has an average of 50.52, then at the *posttest* average reaches 50.16. The magnitude of the effect of giving mineral glucose water to the hydration status is 0.73%.

The hypothesis of the effect of drinking sugar cane juice on blood glucose levels

Based on the results of the analysis using the t test, the results can be seen in Table 9 as follows:

Table 3. *Pretest and Posttest on Blood Glucose Levels*

No	Drink Type	<i>Pretest</i>	<i>Posttest</i>	t_{ht}	t_{tb}	Sig.	Difference
1	drink	80.9524	81.7143	3.700	2.086	0.001	(-) 0.76190

The effect of drinking sugar cane juice on blood glucose levels

The t-test was used to test the hypothesis which reads "There is an effect of drinking sugar cane juice on blood glucose levels of PSDKU Aru soccer athletes", based on the results of the *pre-test* and *post-test*. If the results of the analysis show a significant difference, the administration of sugarcane juice has an effect on blood glucose levels. The conclusion of the study is declared significant if the $t_{count} > t_{table}$ and the *sig* is less than 0.05 ($Sig < 0.05$).

From the results of the t-test, it can be seen that the t_{count} 3.700 and the t_{table} 2.086 (df 20) with a p significance value of 0.001. Because t_{count} 3.700 $>$ t_{table} 2.086, and a significance value of $0.001 < 0.05$, this result shows that there is a significant difference. Thus the alternative hypothesis (H_a) which reads "There is an effect of giving sugar cane drinks on blood glucose levels in athletes" is accepted. From the *pretest* it has an average of 80.95, then at the *posttest* average reaches 81.71. The magnitude of the effect of drinking water cane juice on blood glucose levels is 0.94%.

DISCUSSION

The discussion of the results of this study provides further interpretation of the results of the data analysis that have been presented. Based on the hypothesis testing, the conclusions of the analysis are: (1) there is an effect of drinking sugar cane juice on hydration status and blood glucose levels. The discussion of the results of the analysis can be explained further as follows.

Effect of drinking sugar cane juice on hydration status and blood glucose levels

Based on the results of the analysis showed that there was an effect of drinking sugar cane juice on hydration status and blood glucose levels in soccer athletes PS.PSDKU Aru

The human body consists mostly of fluids. Water contained in body fluids is necessary for the effectiveness of nerves and muscles. Strenuous physical activity results in a buildup of lactic acid and a lot of body fluids will come out through sweat. Fluids are important in maintaining balance and the body's metabolic processes. If the fluid intake into the body is less than the expenditure, the body will experience disturbances or dehydration (Hamidin, 2010).

Giving carbohydrate fluids can help replace lost fluids and electrolytes. Carbohydrates are quickly absorbed into the body because of their good osmolarity and to help replace body fluids. Carbohydrate fluids which are similar to body fluids facilitate absorption, and immediately replace water lost from the body after physical activity (Atmaja, 2009).

Dehydration causes depletion of adenosine tri phosphate (ATP) and phosphocreatin which causes muscle fatigue so that it can reduce work productivity. Prolonged dehydration can lead to impaired kidney function. Kidneys are organs that play a major role in the process of regulating body fluids. In addition, dehydration can also affect a person's weight due to sweat and urine that comes out during activities. 3 Normal body fluids which contain electrolytes and minerals cannot be replaced only by giving water during work. Giving carbohydrate fluids can increase energy intake and bind to remain in the cell.

During exercise there is an increase in the use of blood glucose in the muscles, so that the production of endogenous glucose (EGP) increases. Increased glucose uptake during exercise is caused by activities such as increased glucose breakdown, capillary blood flow, and glucose transport in working muscles. Therefore, it is necessary to drink a replacement drink containing body fluids and glucose during exercise. Giving glucose during exercise can also reduce the speed of EGP so that there is no drastic decrease in blood glucose levels during exercise (Bahri, 2012).

Giving glucose during exercise is important because glucose can prevent a drop in blood glucose levels that is too drastic during exercise. At the time of exercise, the body will break down muscle glycogen into glucose to produce energy so that blood sugar rises at the beginning of the period of dehydration. This blood glucose level needs to be maintained by adding carbohydrates or sugar to drinks to replace body fluids (Casa, 2000).

It is important to add glucose or carbohydrates in a drink to replace body fluids, but the amount must also be appropriate and not excessive. According to Casa (2000), the recommended limit for adding glucose is no more than 8%. This is because the addition of more than 8% glucose can induce insulin action so that blood glucose levels will actually decrease. Excess glucose can also slow down the process of water absorption by the body.

During exercise, the body will break down muscle glycogen into glucose to produce energy so that the athlete's blood sugar increases at the beginning of the rehydration period. This blood glucose level needs to be maintained by adding carbohydrates or sugar to drinks to replace body fluids. However, the addition of more than 8% glucose will induce insulin action so that blood glucose levels will decrease. In addition, excess glucose can also slow down the process of water absorption by the body (Casa et al, 2000).

Based on the results of the analysis, it turns out that sugar cane juice is better for maintaining the player's hydration status with an average value of 50.16 and a decrease in body weight percentage of only 0.73%.

Research conducted by Sawka & Mountain (2000), a person with high activity and sweating as much as 3 liters / hour can cause weight loss of 1-8%. In addition, the electrolyte content that is lost with sweat is also a lot. Starting in 1973, isotonic drinks were developed that can replace fluids and electrolytes.⁵ In this study, subjects experienced an average weight loss of -0.1 ± 0.2 kg during five days of work. But after being given a drink in the form of liquid

carbohydrates, the average body weight of the subjects increased by 0.1 ± 0.2 kg during five days of work.

Energy needs during exercise can be met through energy sources stored in the body, namely through burning carbohydrates, burning fat, and breaking down protein around 5%. Among the three, stored protein is not a source of energy that can be used directly by the body. New protein will be used if carbohydrate or fat stores are no longer able to produce the energy needed by the body (Irawan, 2007).

The main source of glucose for muscle activity comes from muscle glycogen stores themselves. When glycogen stores are depleted, the body performs glycogenolysis and gluconeogenesis (both carried out in the liver) to maintain a steady supply of glucose.

CONCLUSIONS AND SUGGESTIONS

Based on the results of the research and the results of data analysis that has been carried out, the following conclusions are obtained.

1. Giving sugarcane juice after can restore blood glucose levels.
2. Giving sugarcane juice is better to maintain hydration status.

Suggestions

Based on the results of the study, the coaches and other researchers were given suggestions that to increase blood glucose levels athletes may drink drinks containing carbohydrates such as munam juice sugar cane.

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