



The Benefit of Milk Consumption on Athletes

Review Article

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Abstract

Milk provides nutrition for athletes both during training and during competition. Currently, many athletes are aware that drinking milk can improve athlete performance. Athletes must have knowledge of good nutrition. So that it can be applied in the lives of athletes. The purpose of this study was to find out what benefits can be obtained if athletes consume milk both during competition and training. The research methodology uses secondary data for the last 10 years from various library sources such as Google Scholar. The results of this study are milk can improve the performance of athletes both during matches and training. By consuming milk, the body's health can improve and the body's condition is more prime.

Keywords: *exercise physiology, nutrition, milk, athletes*

INTRODUCTION

Athletes are individuals who need more energy than people in general so that good stamina is needed to support their achievements. Stamina is obtained when they eat nutritious food to produce energy (1). Therefore, to get athletes who excel, nutritional factors need to be considered since the time of coaching at the training site and from the time of the match (2). The amount of energy needed by an athlete depends on the duration, type, and intensity of the exercise performed (3).

Energy is a top priority for athletes and can be used to maintain a balance of tissue, immune, and reproductive functions and optimal performance for athletes. With the intake of energy, fat and muscle mass can be used by the body as a source of energy reserves. Athletes must have a menu that is in accordance with their energy needs and nutritional composition so that the energy produced is balanced. Sources of energy are found in the body's cells, especially muscle cells that are used for activity. One source of energy needed by athletes is through optimizing carbohydrate intake.

To delay fatigue during exercise, athletes need 45-75 grams of carbohydrate intake before exercise, so as to increase glycogen stores by 25-100% (4). These carbohydrates can be obtained not only from food but also from drinks, namely milk. Powdered low-fat cow's milk weighing 50 grams mixed with 500 ml of water contains 244 kl of energy with a carbohydrate content of 40 grams. Sucrose and lactose are carbohydrates found in low-fat milk.

In addition, milk also contains protein. Proper protein intake can help athletes in providing the needs of amino acids in the blood circulation which can provide energy cells for muscles, reduce metabolism in muscles, and increase protein synthesis in muscles. Consuming milk which is rich in protein is one of the efforts to increase protein intake in athletes. Protein can indirectly control body weight and improve metabolism in the body. Substrates in the synthesis of essential and non-essential amino acids can increase body mass index and body composition. Milk rich in protein has a biological value, namely to measure protein quality by calculating the value of Protein Efficiency Ratio (PER). A high PER value is directly related to an increase in body weight in each individual. Increased protein is needed by athletes because athletes are more at risk for damage to muscle tissue, especially during training or during matches. Athletes need protein intake levels exceeding 0.8 g/kgBW/day (5).

In addition to carbohydrates and protein, low-fat milk also has a fat content of 3.75 grams. To keep athletes from being hungry before training, it is necessary to consume fatty acids. Low-fat milk contains vitamins and minerals, namely vitamin B complex which can help in the process of energy metabolism. Milk also contains fatty acids which contain conjugated linoleic acid (CLA) which can stem the growth and development of cancer cells (6).

In general, athletes tend not to consume low-fat milk before training, because athletes and coaches still believe that low-fat milk can reduce athlete performance, such as diarrhea and stomach cramps. Whereas low-fat cow's milk can improve athlete performance because it contains a combination of carbohydrates, protein, fat, vitamins, and minerals that can provide energy during exercise. This knowledge needs to be given to coaches and athletes so that they can provide good nutritional intake to maximize athlete performance. This makes the need for a discussion in the literature regarding the benefits of milk for athlete performance because there are various types of drinks that can be consumed for recovery from sports activities. Therefore, it is important for coaches and athletes to get the right information because good intake will help improve the conditions and abilities of athletes so that they are expected to improve performance. Athletes must also be aware that the required nutritional intake can have an influence on athlete endurance and achievement (7).

MATERIAL AND METHODS

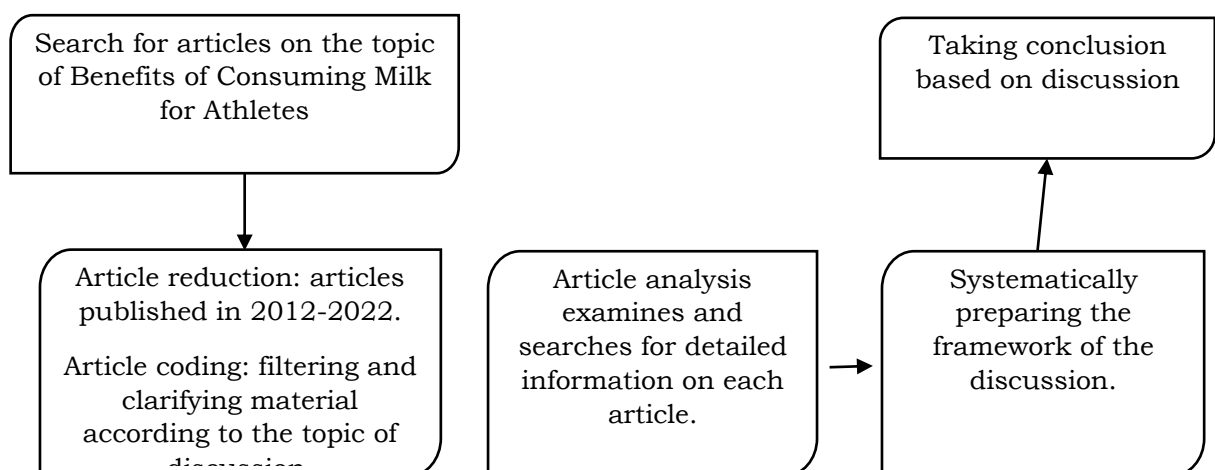


Figure 1. Review Article Steps

Total 15 articles used as data for reviewing scientific articles, this is secondary data. Data published in the last 10 years with the topic of Benefits of Consuming Milk for Athletes from various library sources such as Google Scholar. This analysis includes 4 stages that are carried out sequentially to provide accepted answers to research questions, 1) Stages of Searching and Collecting Materials on the Benefits of Consuming Milk for Athletes, 2) Stages of reduction and coding, screening and clarifying materials according to the topic of discussion, 3) The Analysis and Synthesis stage examines and explores detailed information about the material obtained, 4) The Conclusion Presentation stage is the last stage of the article review process and to state the novelty of the research. The review process can be seen in Figure 1.

RESULTS

The results of this study consist of 1) the benefits of consuming milk for athletes 2) knowing the impact of milk on athletes because not all milk is good for athletes' performance.

Table 1. List of Articles Reviewed

Title and Years of Publication	Source
1. <i>Hubungan Penguasaan Pengetahuan Gizi, Frekuensi Konsumsi Susu Rendah Lemak dengan Status Gizi Atlet Futsal Klub Bluemosphere Kabupaten Jombang. 2021</i>	Gizi UNESA
2. <i>Upaya Penerapan Gizi Atlet Di Sekolah Olahraga Negeri Sriwijaya Sumatera Selatan. 2019</i>	Doctoral dissertation, Diponegoro University
3. <i>Sistem penyelenggaraan dan pengelolaan makanan bagi atlet sepak bola. 2017</i>	Jendela Olahraga
4. <i>Perbedaan Nilai VO₂max dan Jarak Tempuh Lari antara Pemberian Susu Rendah Lemak dan Minuman Olahraga Komersial pada Atlet Sepak Bola. 2015</i>	Doctoral dissertation, Diponegoro University
5. <i>Pendampingan Gizi Atlet Taekwondo Indonesia Untuk Pra-Kualifikasi Olimpiade 2020. 2021</i>	Seminar Nasional & Call of Papers Penelitian dan Pengabdian Masyarakat
6. <i>Pengaruh Susu Kedelai Dan Latihan Fisik Terprogram Terhadap Daya Tahan Otot. 2021</i>	Riyadhoh: Jurnal Pendidikan Olahraga
7. <i>Pengaruh Susu Cokelat, Madu, dan Sari Buah Mangga Terhadap Kadar Glukosa Darah Pada Atlet Bola Basket Purworejo Provinsi Jawa Tengah. 2017</i>	Doctoral dissertation, STIKES Bethesda Yakkum Yogyakarta
8. <i>Perbedaan Nilai VO₂max Dan Jarak Tempuh Lari Antara Pemberian Susu Sapi Rendah Lemak Dan Minum Minuman Olahraga Komersial Pada Atlet Sepak Bola. 2015</i>	Journal of Nutrition College
9. <i>Hubungan Antara Status Hidrasi Serta Konsumsi Cairan Pada Atlet Bola Basket. 2016</i>	Medikora
10. <i>Sistem Energi Dan Kebutuhan Zat Gizi Yang Diperlukan Untuk Peningkatan Prestasi Atlet. 2015</i>	Jurnal Olahraga Prestasi

DISCUSSION

Milk contains many benefits that can improve the quality of the game. One of them is calcium. Athletes really need calcium because it can improve bone health, muscle strength, heart rate, regulate blood pressure, as nerve impulses, regulate fluid balance, regulate fat and energy metabolism, transport nutrients to balance cells and can prevent osteoporosis in athletes.

Adequacy of sports nutrition for athletes is very important to support achievement, therefore it is highly recommended to consume 2-3 glasses of fresh milk per day for athletes. Consuming milk can increase muscle synthesis so that it causes muscle balance to improve. When consuming milk after exercise is combined with resistance training, there is a greater increase in muscle hypertrophy even though milk can be an effective post-exercise drink in endurance activities (8).

Exercises that can improve the body's performance to move optimally can cause muscle glycogen levels to decrease so that the energy source in the muscles decreases and causes fatigue. So that it can reduce the productivity of muscle work ability and muscle strength also decreases (9). A nutrient-dense drink for someone who does strength and endurance training during sports is chocolate milk. The content of milk chocolate is more than dark chocolate and the sugar content is also greater. Milk can improve post-exercise recovery, because it can restore hydration status and electrolyte balance that comes out through sweat after doing sports activities (10).

Athletes really need calcium, especially to improve bone health, muscle strength, regulate blood pressure, heart rate, and conduct nerve impulses, regulate fluid balance, regulate fat and energy metabolism, transport nutrients throughout cells, and also prevent osteoporosis in athletes. The high calcium content in milk can help increase the level of fitness and performance of athletes so that it will help improve performance (11). The calcium needs of athletes tend to be more than those who do not exercise, because the needs of athletes are increasing, so that the provision of milk as a source of calcium will play a role in meeting the needs of athletes and has the potential as sports nutrition. Consuming 500 ml of milk after jumping and sprinting exercises has a positive effect, namely increasing post-exercise muscle function (11).

In a study entitled "The impact of consuming goat's milk on anthropometry, blood pressure, leg muscle strength and calcium in junior footballers" it was found that consuming fresh goat's milk regularly can reduce body weight and BMI in junior soccer athletes. In contrast, consuming goat's milk can increase diastolic blood pressure (within normal limits) and leg muscle strength in junior soccer athletes. Goat's milk can be used as a useful nutrient to improve performance and blood pressure regulation of junior soccer athletes. Adequate sports nutrition for athletes is very important to support achievement, therefore it is highly recommended to consume 2-3 glasses of fresh goat's milk per day for junior athletes (11). In addition, the provision of protein intake contained in soy milk with a dose of 400 ml has an effectiveness in increasing endurance, especially muscle endurance, balanced with programmed physical exercise. Consuming soy milk before a programmed physical exercise can increase muscle endurance, but the results will be more visible if the administration is longer than the given time (8).

Meeting the nutritional needs of athletes must pay attention to several aspects. Aspects of nutritional needs that must be considered are the need for calories, macronutrients, hydration, time, and supplements because they can affect the athlete's game when competing and encourage athletes to maximize their training (3). In another article, milk provides evidence that it can increase the VO_{2max} value and mileage for running better than commercial sports drinks. In low-fat milk there are minerals that are not found in commercial sports drinks, namely calcium and iron. Calcium content will help in contraction muscle and nerve transmission, while the iron content helps in the delivery and use of oxygen in the body as well as coenzymes in energy production.

In addition, low-fat milk also contains micronutrients such as vitamins and minerals that are higher than commercial sports drinks. The vitamin content in low-fat milk includes B complex vitamins such as 1.2 mg thiamin, 15 mg niacin and 1.2 mg riboflavin. When compared to commercial sports drinks, which contain less B complex vitamins, namely 0.2 mg thiamin, 7 mg niacin and 0.1 mg riboflavin.

The content of this B complex vitamin has a role in helping as a coenzyme that optimizes energy production in the body. The higher vitamin B complex content in low-fat milk plays a role in increasing the VO_{2max} value and better running distance in athletes when compared to energy drinks (12).

In addition to nutritional needs, athletes also need to regulate hydration and good fluid consumption. An athlete needs to drink fluids before and after exercise. The need for increased consumption of fluids that can increase body fluids, such as milk, juice, and energy drinks. To avoid or prevent the consumption of fluids that can cause a decrease in body fluids. In addition, it is necessary to educate athletes about knowledge of fluid consumption and hydration status so that athletes can regulate fluid consumption in order to maintain good hydration conditions. An athlete must pay attention to his physical condition every day in order to perform optimally in every match.

CONCLUSION

Efforts to improve athlete performance are very important for athletes who are aiming for a big championship. These efforts can be done by consuming food and drinks that make athletes fit in a match, one of which is milk. Milk can improve an athlete's performance when practicing or competing by consuming these nutritious drinks, athletes can also increase the level of body health that causes prime condition. Various forms of milk variants have developed in this day and age which also have different properties such as goat's milk, cow's milk, soy milk and various flavour milks such as chocolate milk.

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CONFLICTS OF INTEREST

Conflict of interest : Authors state no conflict of interest.

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