

# A Study of Sports Nutrition and Dietary Supplements Athletes

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**Abstract – In today's tight race for the top spots, a well-rounded approach to training and nutrition, including the appropriate selection of foods, timing of meals, and supplements, is essential. An athlete's degree of athletic performance is directly influenced by their nutritional state; one of the most essential dietary considerations for physically active individuals is making sure they have enough energy to do their favorite activities. Fatigue, recurrent sickness, and decreased performance are all symptoms of an energy-deficient diet and the study which discussed about Nutrition, Important of Sports Nutrition, Supplementation, and The Importance of Nutrition for Athletes, Assessment of Intake and Dietary Quality in Athletes, Are Improvements Needed, Health and Fitness, Nutrition & Health Are Closely Related, Sports Foods, Factors Influencing Diet Choices of Athletes.**

**Keyword – Athletes, Nutrition**

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## INTRODUCTION

Sports nutrition has gotten a lot of attention in the last few decades, and it's only going to gain more attention in the future since it's so critical to an athlete's performance, and it may even be life or death. Many processes in the body are affected by diet, including energy generation and recuperation after activity. Supplements and their impact on human health and performance are a fascinating topic in sports nutrition. The adequate intake of calories, carbohydrate, and protein may be achieved with the use of dietary supplements. Supplements to the diet, rather than substitutes for a healthy one, there is some evidence to suggest that some nutrients and/or dietary supplements may aid athletes' training and/or performance, although this is not true for the vast majority of the supplements now offered to athletes. Some of the most essential sports nutrition supplements fall into the following categories: Nutritional supplements for athletes as well as protein and amino acid supplementation are included in this category.

Adequate caloric intake, macronutrients, and micronutrients are required for athletes undergoing performance-enhancing training in order to protect the athlete's health and well-being as well. Teen athletes in particular may need more nutrients to satisfy their training demands and also to support their growth and development. Growing tissues, such as skeletal muscle, need energy, which is a nutrient

requirement. Muscle growth throughout childhood and adolescence needs more energy and protein to replenish losses from exercise, maintain a net protein balance, and promote normal growth and development, in addition to the stimulation of sports training. Carbohydrate intake may need to be increased to satisfy the energy needs of training and repair muscle glycogen reserves between training sessions depending on the amount of exercise training. Athletes in their teens should consume anywhere from 5 to 7 grammes of protein per kilogramme of body weight per day, depending on their exercise volume. It has become critical to teach young athletes about these fundamental requirements and the conflicting pressures of sports and personal development.

Dietary intake of energy, as well as macronutrient and micronutrient consumption capacity and body composition manipulation, are critical components of an athlete's diet. There are several ways to determine how much energy an athlete consumes from their diet: food records, food frequency surveys, and multi-pass 24 hour meal recalls. All of these approaches have significant drawbacks, with a predisposition toward underreporting intakes. Recording intakes may be improved by providing extensive education on the objective and processes of documenting intakes. There are a number of factors that affect an athlete's energy needs throughout the year, such as the amount of time they spend training and how intense their

workouts are. The effects of cold or heat, anxiety, stress, high altitude, certain physical injuries, particular medicines or prescriptions (e.g. caffeine, nicotine), increases in fat-free mass, and potentially the lacteal phase of the menstrual cycle may all raise energy requirements over the typical baseline. The follicular phase of the menstrual cycle, age, and the loss of fat-free mass (FFM) all reduce energy needs.

## Nutrition

The goal of nutrition science is to better understand how food affects the body's metabolism and physiological reactions. Integrative metabolism, a branch of nutrition research that studies the relationship between food and health through the lens of biochemical processes, is also being developed.

Compounds such as water, protein amino acids, fat fatty acids, DNA/RNA, and carbohydrates make up the human body (e.g. sugars and fibre). Carbon, hydrogen, oxygen, nitrogen, and phosphorous are all constituents of these compounds, and they may or may not include minerals like calcium, iron, or zinc. There are several salts and electrolytes in the world. A wide variety of chemical compounds and elements may be found in the human body as well as in the food we consume (e.g. phospholipids, hydroxyapatites).

A person's body is made up of the substances ingested and absorbed via the skin. There is a primary role for the digestive system in making food accessible to the billions of cells of the body, save in the unborn baby. About seven liters of liquid, referred to as digestive juices, depart the internal body and enter the lumen of the digestive system during an average adult's digestion. [3] Chemical connections between ingested chemicals are broken and the conformation and/or energetic state of those compounds/elements are modulated in part by the digestive fluids. However, the digestion process helps release numerous chemicals and elements into the bloodstream intact, and the intestines reabsorb the majority of it; otherwise, the body would quickly dry; this procedure helps release them from the juice (hence the devastating effects of persistent diarrhea).

Before and after digestion, as well as the chemical makeup of the meal and waste, must be taken into consideration while doing research. If the excrement is compared to what was eaten, the substances and components that were ingested may be identified. Finding the difference between the pre-ingestion and post-ingestion phases may help identify the impact that the absorbed materials has. When food intake and waste analysis are meticulously tracked over a long period of time, the impact may be seen. This sort of experiment involves a large number of variables (such as confounding factors). A good science of human nutrition is a relatively recent field

of study since it is time-consuming and costly to conduct scientifically accurate nutritional research

## Important Of Sports Nutrition

For endurance sports, proper nutrition is essential, with particular emphasis on dietary adjustments. It is believed that early physical training is the most effective way to prevent weight gain, improve motor skills, and enhance overall well-being in adolescence and adolescence [6]. Athletes are expected to be well-nourished, free of injury, focused, and ready to compete at the end of the competition. When it comes to sports nutrition, it's not only about calorie intake or protein intake for muscle growth or carbohydrate intake for energy. Sports nutrition and diet have long piqued the public's curiosity because of the impact they may have on athletic performance. It is important for sports nutrition specialists to provide general suggestions to meet the particular needs of each athlete in terms of health and sports nutrition, nutrient and food choices, body weight and body composition, and other factors.

An athlete trains and competes on a regular basis in order to push their bodies to their limits. Athletes require a steady supply of energy to keep up with the demands of their activity or sport. Athletes need to eat well in order to have the energy they need to do their sport. Strength, training, performance, and recuperation are all impacted by the diet that athletes consume. Sport nutrition is more than just the sort of food you consume; it's also when you eat it that matters. Even their level of performance and capacity to recuperate after an exercise are affected. To prepare for a game or contest, an athlete must pay particular attention to what and when he consumes in the hours leading up to it. Sports nutrition has a critical influence in performance. Before, during, and after a competition, athletes must have access to the proper nourishment. They mentioned that from fuelling to recovery, muscle growing weight and producing proper diet provide the finest foundation for success in any activity. In terms of nutrition, post-workout and pre-workout meals are the most crucial, but we must be very cautious about what the athlete eats during the day. In general, an athlete should eat at least two hours before to any physical activity, and the meal should be heavy in carbs, low in fat, and moderate in protein. During an athlete's workout routine, carbohydrates are the primary source of energy. Muscle development needs enough protein intakes.

## Supplementation

Competing athletes need a certain combination of nutrients in their diets that can only be provided by a well-balanced diet. It is a relatively recent discovery that certain nutrients may help athletes perform better and gain an advantage in competition. Erogenic aids, often known as

performance-enhancing aids, are commonly advertised on dietary supplements. In order to achieve your training goals, it's essential that you pay attention to your diet. A "wonder meal" or supplement will not satisfy all of your nutritional requirements if you succeed. Protein is the primary source of energy for the body; vitamins and minerals are found in a wide range of meals. Maintaining a healthy weight, being physically active, and developing optimal nerve-muscle reflexes are all benefits of eating the correct foods. Even the finest physical training and coaching won't go you very far if you don't eat the correct nutrients. The athlete's innate ability for optimum performance must be supported by nutritional and medicinal assistance. For athletes, particularly female teens, iron consumption should be a primary concern. Due to the dangers of sports anaemia, Nutritional needs and the physiological impacts of exercise serve as the foundation of this dietary supplement. Sporting performance may be improved by using the supplement if it is employed to satisfy a physiological or nutritional aim in the sport. When it comes to dietary supplement usage, the primary focus is on helping athletes better understand and meet their nutritional demands in a particular sporting context; for example, by teaching them how to properly consume the supplement while competing.

### **The Importance of Nutrition For Athletes**

High-level athletes are much more physically active and have other lifestyle traits, such as extensive training regimens and periodization that are distinct from the general population. Adequate energy and nutrient intake (AI) is thus critical for this group to enable optimum training or competition performance, adaptability, and recovery, as well as to avoid health concerns. In order to achieve these requirements, special nutritional consumption guidelines have been developed for training and competition. It's not always possible to meet the required daily calorie intake because of an athlete's specific energy budget. Athletes' nutritional needs vary widely. One of the most apparent explanations is that different sports have different dietary requirements, especially in terms of macronutrients and overall calorie consumption. Athletes in several sports are unable or prohibited from consuming the proper types and quantities of food at the proper times due to rules or regulations imposed on the sport. If you're in a competition, the level of exertion or the regulations that govern your activity may be to blame. It might be difficult to organize one's food in before to, during, and after physical activity. Even gastrointestinal (GI) discomfort may prevent an individual from adhering to an exercise-related diet's nutritional guidelines. For the record, top-athletes are a tiny and elite group of people that demonstrate inter-individual variability both physically and mentally, making them a unique breed. Some athletes may be lured to follow eating fads or consume items that claim to increase their performance. Commercial pressure might also play a

role. It's not uncommon for companies to support teams or individual athletes since they see them as an appealing target audience for promoting the sales of their goods. Sports nutrition poses a unique set of issues for sports nutritionists, coaches, and most importantly athletes themselves. The fact that some athletes have difficulty adhering to dietary guidelines or achieving their own specific nutritional objectives is also comprehensible.

Dietary needs for athletes may typically be shown as a three-tiered pyramid to simplify understanding. Athletes, according to this paradigm, need to put their efforts first and foremost towards ensuring that their basic nutritional needs are met. They may supplement their normal diet with sport-specific nutrition if necessary, such as when basic meals are inconvenient or unobtainable. In the pyramid, dietary supplement usage is positioned at its highest point. The purpose of this concept is to educate athletes on how to make sound dietary decisions.

### **Assessment of Intake and Dietary Quality in Athletes, Are Improvements Needed**

Food records are often used to characterize athletes' daily nutritional consumption in contemporary practice. Food records and 24-hour recalls are typically favored by scientists to determine real consumption for research reasons. To get an idea of a group's nutritional consumption, researchers have employed meal diaries for three to four days or seven days, as well as several 24-hour recalls. However, the applicability of these techniques varies greatly depending on the community studied. Errors may occur in any self-reported diet evaluation approach. Using the 24-hour recall has the benefit of not altering intake since it is not changed by awareness, as is the case with the usage of a meal record. In order to get a valid estimate of food consumption, researchers choose the five-step, multiple-pass, 24-hour recall procedure. Although athletes are typically expected to report food consumption with the same or even higher quality than the general population, there are no studies to verify this assumption.

The appropriateness of a diet is often assessed using a variety of methodologies in sports nutrition literature. Inconsistent outcomes may have occurred from this. If, for example, prior research reported different deficiencies, this might be due to changes in dietary reference levels. The use of the estimated average requirement (EAR or AR) is chosen as a reference and has been advocated for a long time now. Thus, studies employing RDI, RDA, or AI as dietary reference values (DRVs) instead of EAR, may have inflated the reported insufficiency of the dietary intakes. It is also common practice to compare DRVs with the mean intake in most circumstances. Instead of utilizing

the median, it is preferable to use the cut-off technique or a probability strategy.

When it comes to the modern athlete, college education and intense training and competition schedules are typically combined. Methodological issues might arise as a result of such a way of living. In order to capture the wide range in food intake generated by the wide range of activity intensities experienced on training days vs days of study, rest, and recuperation, many days of dietary registration of a large population is required. Sports-related variables including the time of year, day of the week, and training load can affect daily intake, which might result in mistakes if they are not taken into consideration.

The amount of research in athletes comparing current methodologies and information on the validity of self-reported nutritional intake in top athletes is quite low. There is a pressing need for a scientifically proven technique for athletes to consume their food,

### Health and Fitness

As defined by the World Health Organization (WHO), "Health is the total physical, emotional and social well-being, not only the absence of sickness or disability." Since 1948, this has been the accepted definition. Having a healthy body, mind, and spirit is something that we all strive to achieve at some point in our lives. Maintaining good health requires that we eat a diet rich in important nutrients. The easiest part to grasp is the state of one's physical health. Emotional and psychological well-being may be described as an individual's ability to utilize her or his cognitive and emotional capacities, participate in the community, as well as fulfill the daily demands of life. The lack of a diagnosable mental illness does not guarantee good mental health. A person's ability to carry out daily tasks and achieve goals may be used to gauge their level of mental health. There are several indicators of mental health, including the ability to cope with typical levels of stress, maintain happy relationships, and conduct a self-sufficient existence; and the ability to rebound from adversity.

Physical fitness is a state of physical well-being achieved via a combination of regular exercise, a healthy diet, and enough rest to allow the body to recover. Fitness may be defined as both a condition of health and well-being (general fitness) and particular fitness (specific fitness) (a task-oriented definition based on the ability to perform specific aspects of sports or occupations). The ability of the heart, blood vessels, lungs, and muscles to perform at their best is considered physical fitness. A person's ability to carry out a day's work without feeling overworked was formerly considered to be a sign of fitness. Following the Industrial Revolution, this criteria was no longer adequate because of automation, greater free time, and lifestyle changes. Achieving maximum effectiveness is essential in the

current situation. Physical fitness is today described as the capacity of the body to perform efficiently and effectively in both work and leisure activities, to be healthy, to fight sickness, and to respond to emergencies. In addition to aerobic fitness, muscular strength, muscular endurance, flexibility, and body composition, fitness may be broken down into five categories: The ability to handle mental and emotional issues is enhanced by physical fitness. Those who are physically active feel more confident and energised. It's important to maintain a healthy level of fitness in order to be able to handle unexpected challenges, such as rushing to catch a bus.

### Nutrition & Health Are Closely Related

Many infectious illnesses have been eliminated during the previous century, and the vast majority of the American people may today expect a long and productive life. There has been an increase in non-communicable illnesses, such as chronic diet-related disorders, while infectious disease rates have decreased over the last several decades. Poor diet and exercise habits have a cumulative impact and have led to severe nutrition- and physical activity-related health problems that presently confront the American population. About 117 million persons in the United States suffer from one or more chronic illnesses that may be avoided if they made better food choices and exercised more often. Some of the most common include heart disease, high blood pressure, type 2 diabetes, certain malignancies, and weak bones, to name just a few of the more serious ones. As many as two-thirds of adults and almost a third of children and adolescents are overweight or obese.

### Sports Foods

Sports foods including sports drinks, bars, gels, ready-to-drink supplements, and meal replacement powders are practical and accessible solutions for athletes to satisfy their unique nutritional demands. Athletes may benefit from the usage of these products when they are utilized correctly. They vary in carbohydrate, protein, and fat content, and are often enriched with vitamins and minerals. Depending on whether they are fortified with various nutrients that are claimed to encourage weight growth, facilitate weight reduction, and/or boost performance, they may be different as well. These dietary aids are often used as a nutrient-dense snack or as a means of regulating calorie intake during weight gain or loss efforts. Athletes who don't have time to sit down for a full meal or who wish to decrease food volume might benefit from the use of these sorts of products, which can provide carbohydrates, protein, and other nutrients before and after exercise.

## 1. Health supplements

Regular, continuous intense activity may need a higher intake of particular supplements (e.g., multivitamins and minerals, fish oils, glucosamine). Supplementation with these items does not seem to improve performance in any way. Supplementation with various vitamin and mineral mixtures, on the other hand, may be justified if dietary intake of energy or nutrients is reduced in an unavoidable manner (e.g., a prolonged period of travel, particularly to countries with an inadequate or otherwise limited food supply

## 2. Protein and amino acid supplements

In order to guarantee that athletes get the protein they need, protein supplements are a practical option. It's been a major emphasis of recent years to see whether various forms of protein have varied impacts on training's physiological and hormonal responses (e.g. whey or casein or soy or milk proteins or even colostrums). Numerous studies have looked at whether certain amino acids and timing of protein consumption have a role in boosting lean mass (i.e., training adaptations) and/or the formation of new muscle fibers.

## 3. Ergogenic supplements

These are described as any substance that has a particular mechanism of action for enhancing athletic performance. Creatine supplementation during exercise has been shown to improve muscle mass. Increasing an athlete's capacity to execute high-intensity exercise seems to result in stronger training responses and muscular hypertrophy, resulting in larger muscle mass increases. Guarana, bissey nut, and kola are all sources of caffeine, which may be found in many dietary supplements. Other sources of caffeine include coffee and tea as well as soda, energy drinks, and chocolate. Caffeine may help you burn more calories, lose weight, and reduce fat in your body.

### Factors Influencing Diet Choices of Athletes

In addition to personal preference, cost, sustainability, cultural values and religious views are recognized to have a role in a person's dietary choices. Individuals' understanding of food and nutrition science also has a role in their decisions.



Athletes' performance in sports is closely linked to their dietary routine and composition; hence nutrition is a crucial consideration for them. Athletes' efforts to reach their objectives are linked to external data on physique, weight, and performance because of people's preoccupations with their own weight and shape. Athletes might have a wide variety of priorities when it comes to their diets, from recreational (leisure or recreational sports) to elite (competitive) (national or international competition)

## CONCLUSION

A total of two separate studies were used to conduct the current research, titled "Effect of selected dietary supplements (liquid/solid) on nutritional status and sports performance of the athletes." There will be two studies, one to see whether a liquid supplement (sugarcane juice and sports drinks) can boost athletic performance while the other will assess the effectiveness of spirulina and commercial antioxidant supplements. This study's findings demonstrate that college athletes of all genders and geographical locations had poor nutritional status. Because of the gaps in their data, it was determined that geographic location had no effect on participants' sports nutrition knowledge, attitude, or practice. In other words, locally available ingredients can be used to make a low-cost nutri-bar and water beverage. For athletes, making their own dietary supplements is a simple matter of practice. Supplements were supplied to the experimental groups in the second phase as part of a supplementation programme. Over the course of 60 days, the participants received the antioxidant supplement Icapsuld (Selace Forte, Universal Medicare Ltd) and 3g/day of EGI spirulina (Sunova, Dabur Pvt. Ltd). To find the optimal dosage, researchers compared the beta carotene content of spirulina to that of a commercial antioxidant, Sugarcane juice may be more effective in maintenance of blood glucose levels during exercise than plain water and sports drink

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