

**REVIEW ON BENEFITS OF PROTEIN SUPPLEMENTS FOR ATHLETES**Ishara M.D.P\*<sup>1</sup> and Wimalasiri Y.S.G<sup>2</sup><sup>1</sup>Lecturer(Probationary), Institute of Indigenous Medicine, University of Colombo.<sup>2</sup>Senior Lecturer, Institute of Indigenous Medicine, University of Colombo.**\*Corresponding Author: Dr.(Ms) M.D.P Ishara**

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Article Received on 04/11/2021

Article Revised on 24/11/2021

Article Accepted on 14/12/2021

**ABSTRACT**

As the competitiveness is increasing in the field of sports, the popularity of the protein Supplements has increased in the market. The role of Protein for Athletes are, helping to meet the threshold of their physical activity, increase muscle mass, reduce excessive fat level and improve performances. Thus the objective of this study was to review on benefits of protein supplements for athletes. The data were collected from review articles through Google scholar using dietary protein and protein supplements as key words and additional articles were retrieved from reference lists found in these papers. Dietary proteins which are natural and supply other minerals, water and fibers for athletes. In high protein diets, more undigested protein derived ends up in the large intestine and then more bacterial amino acid takes place in the colon. The colonic fermentation of these amino acids may result in end products having systemic negative and positive and metabolic effects. When athletes find it inconvenient to consume dietary protein sources then portable protein sources, particularly protein supplements, offer an alternative. Artificial sweeteners and sugar substances in these protein supplements may induce adverse effects during long term consumption and if protein supplements used without any appropriate guidance, would affect health. Considering the positive and negative effects of both dietary protein and protein supplements, acquiring protein requirements via dietary proteins would be more beneficial and using the protein supplements as an occasional resource under the supervision as an alternative when they are in an inconvenient moment to get dietary proteins, will be effective.

**KEYWORDS:** Athletes, Dietary protein, Protein supplements.**1. INTRODUCTION**

Proteins are large biomolecules or macronutrients consisting of one or more long chains of amino acids. Its role in the repair, maintenance, growth of body tissues as well as helping in energy production. Specially the benefits of the proteins for athletes are repair and rebuild muscles that are broken down during exercise and to help optimizes carbohydrate storage in the form of glycogen. Protein is not an ideal fuel to use in exercises, but can be used when the situations of lack of adequate carbohydrates. The American college of sports medicine (ACSM), International Society for Sports Nutrition (ISSN) and International Olympic Committee (IOC) provide consensus that the daily protein requirement of athletes range between 1.2 and 2.0 g/protein/kg/day <sup>[1]</sup>. With the popularity of the protein supplements in the market athletes are compelled to search for them in an effort to meet the threshold of their physical activity, increase muscle mass, reduce excessive fat level, improve performances and improve markers of recovery. It should be carefully reviewed which has the special role in athletes, protein supplements or dietary protein.

**2. MATERIALS AND METHODS**

Data were collected from review articles through Google scholar using dietary protein and protein supplements as key words. Additional articles were retrieved from reference lists found in these papers.

**3. RESULT AND DISCUSSION****3.1 Role of dietary protein in athletes****3.1. a) Advantages of dietary proteins**

Dietary protein can come as complete proteins or incomplete proteins. Complete proteins contain all amino acids needed for Muscle Protein Synthesis (MPS) which are derived from animal and dairy sources. Several vegetable based proteins are classified as incomplete proteins and therefore would need to be combined with second protein source.<sup>[2]</sup> Protein can found in fish, egg, dairy products, legumes, cereals and poultry. Luciene a branched chain amino acids, plays a critical role in switching on the MPS.<sup>[3]</sup> Some foods are naturally high in Luciene including red meat and milk. Researches suggests that 2-3g of Leucine maximally stimulate MPS.<sup>[4]</sup>

Athletes may have elevated physiological protein requirements, to maintain adequate protein synthesis and energy production, sufficient immune function and good gut integrity in the multi stress conditions of goal directed, prolonged exercises. When determining protein requirements for athletes, it is important to look at the athlete's overall eating pattern and training period.

The recommended dietary allowance for protein is 0.8g/protein/kg/day for public under age of 19 and may vary due to different nations.<sup>[5]</sup> Recommendations become more vivid on athletes and sports people. For endurance and strength- trained athletes, American Dietetic Association, Dieticians of Canada and the American College of Sports Medicine has recommended a protein intake of 1.2-1.7 g/kg/day.<sup>[1]</sup> Recommended protein intake of 1.5-2.0 g/kg/day for strength and power athletes.<sup>[1]</sup> and for endurance athletes an intake of 1.83 g protein/kg/day has been recommended. Studies have shown that diets high in protein and certain amino acids have been linked with successful weight loss and with reduced risk factors of obesity and metabolic diseases.<sup>[6]</sup>

Protein need increases along with increasing intensity and duration of performance.<sup>[7]</sup> According to those studies protein should be included in meals before and after the actual performance and regularly (every 3-5h) during the day to secure the efficient supply of essential amino acids.<sup>[7]</sup>

A study has shown immediate post exercise: 20-25g or 0.25g/kg weight along with CHO (no more than 30min. after) would be beneficial.<sup>[8]</sup>

Resistance exercises have been shown to stimulate both protein synthesis and protein degradation.<sup>[9]</sup> When protein is ingested following exercises, that increase in muscle protein synthesis (MPS)<sup>[10]</sup> and increases in strength and muscle mass.<sup>[11]</sup> Other study has reported that the combination of oral ingestion of amino acids and resistance exercise may produce an even greater increase (3.5 fold) in MPS and greater the peak bone mass achieved<sup>[12]</sup>. In addition, strength and muscle mass gains in patients who had just undergo knee surgery were promoted to greater degree by protein.<sup>[13]</sup>

So it has proven that more important is to adapt the intake according to the needs of different timing periods.<sup>[14]</sup>

Some studies also reported that in a group of young men and women that immediate post exercise consumption either skim milk, the equivalent amount of protein in soya and isoenergetic carbohydrates after resistance exercise, the greatest lean mass gains were seen in skim milk consumed group.<sup>[15]</sup>

Pre-exercise protein digest into amino acids and is ready to be taken up by muscles and digested nutrients would

help to repair muscles and decrease fatigue. Thus it secondary helps to perform well.

Dietary requirements can be covered by appropriate food. Extra benefits are supplying fiber and other minerals with those foods. When athletes find it inconvenient to consume such protein sources then portable protein sources, particularly protein supplements, offer an alternative.

### 3.1.b) Disadvantages of Dietary proteins

In high protein diets, more undigested protein derived ends up in the large intestine and then more bacterial amino acid takes place in the colon. The colonic fermentation of these amino acids may result in end products having systemic negative and positive and metabolic effects. There are also indications that some high protein low carbohydrate diets and high fat diets may induce detrimental effects on both gut microbiota.<sup>[16]</sup> and emerging as ammonia, p-cresol or indol have been associated with cancer development and physiatrist diseases.<sup>[17]</sup>

Proteins from vegetable sources are considered as incomplete proteins due to lacking of essential amino acids and someone who desires to get their protein from only vegetable sources (vegetarians) need to consume more variety of vegetables, legumes, fruits.

### 3.2 Role of protein supplements in athletes

#### 3.2. a) Advantages of protein supplements

Protein and amino acids have in optimizing the training response and enhancing recovery is depending on the timing of ingestion and exercise intensity. Thus, the most convenient and effective method for providing immediate protein need to enhance recovery may be through supplements. The availability and consumption of supplements along with physiotherapy and psychotherapy have been recognized as ergogenic advantage in sports performance and recovery.<sup>[18]</sup>

Supplements are concentrated sources with a nutritional or physiological effect. Marketed dose forms are capsules, pastilles, tablets, pills and other similar forms sachet of powder, ampoules of liquids, drop dispensing bottles or similar forms.<sup>[19]</sup> There are range of protein supplements as dairy derived; whey and casein, to vegetable based proteins such as soy and quinoa. Whey proteins are rich with Branch chain amino acid (BCAA) (valine, leucine, and isoleucine) supplementation is often utilized by athletes and proposed to reduce muscle soreness and to improve training performances.<sup>[20]</sup> Further those studies have proven that BCAA supplementation might have a role in regulating some brain neurotransmitters and thus decrease in fatigue development during exercise.<sup>[20]</sup> Due to fast digestion and absorption, whey protein supplements are a popular source for athletes,<sup>[21]</sup> Casein is a slower digester than Whey and some research studies have demonstrated that casein raises blood leucine concentration and

recommend to take before long periods of not eating.<sup>[22]</sup> That in resistance subjects younger than 49 years, protein supplementation has been suggested to maximize the anabolic reactions of skeletal muscles in resistance training.<sup>[22]</sup>

Some studies showed that untrained individuals consuming supplement protein have no impact on lean mass and muscle strength during initial weeks.<sup>[23]</sup> However as the duration, frequency and volume of resistance training increases, protein supplementation may promote muscle hypertrophy and strength in untrained and trained.<sup>[23]</sup>

### 3.2.b) Disadvantage of protein supplements

When it comes to protein and amino acid supplements, artificial sweeteners and sugar substances in these products may induce adverse effects during long term consumption. And if protein supplements used without any appropriate guidance would affect health. Most supplements are heterogeneous and expensive.

Nevertheless, high plasma levels of BCAA have been associated with development of type 2 diabetes and non-alcoholic fatty liver.<sup>[24]</sup>

## 4. CONCLUSION

Considering the above facts on dietary proteins and protein supplements, both have positive and some negative effects on athletes for their sports career. Dietary proteins which are natural and supply other minerals, water and fibers for athletes. According to the scientific evidence, dietary proteins also help to increase MPS, but athletes should be concerned about the quality, quantity with high biological value and time that they are ingesting. Moreover they should think about other components of their diet and maintain normal weight and physical activity to ensure the supply of essential amino acids while indulging their versatile microflora to avoid harmful fermentation products. If the diet of sports people lacks protein, several effects on organ system may take place. Moreover, some reviews have highlighted that athletes should try to consume their protein requirement by their meals.

The decision to use a protein supplement should base on their training load, goals, daily energy requirement, appetite, post exercise, budget available and general dietary. Talking with an accredited Sports Dietitian can help to re-evaluate the need for supplementation when changes to training, health condition occur as an athlete with anorexia or any other digestive or metabolic problem. If the athlete should travel far and cannot reach up to the dietary protein requirements, if the sports is prevailing for a long time, athletes can use the supplements based on the guidelines.

And yet, there is no scientific evidence found any protein supplement is superior to the dietary proteins. And dietary requirements and protein supplements can react

differently based on gender, ethnicity and medical conditions.

Considering scientific reviews it should be understood that athletes can use dietary protein and they can use protein supplements under the supervision as an alternative when they are in an inconvenient moment to get dietary proteins. So athletes need protein supplements as well as dietary proteins. Supplements should be an occasional resource to improve athletic performance and recovery.

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