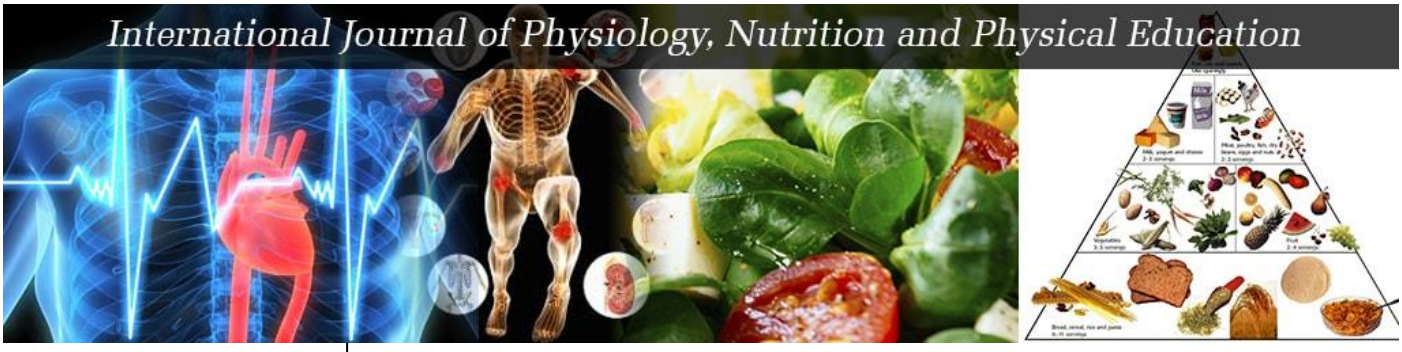


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# Supplements in sports

## Dr. Sanjeev Kumar

**Abstract**
Supplements included in the broad nutritional category include fluid supplements, carbohydrates, fats, proteins / amino acids and their metabolites, vitamins and minerals, plant extracts, phytochemicals, and engineered industry supplements. Nutritional supplements are not a complete substitute for a well-balanced nutrient dense diet. The availability and use of nutritional supplements as ergogenic aids have been raisin dramatically in the past few years. Many reports indicated that 50% of normal population, 75% of teenage athletes, and 100% body builders and elite athletes use supplements.

**Keywords:** Nutritional category, fluid supplements, sports

### Introduction
The first documented use of "natural preparations" to enhance athletic prowess were the ancient. Greeks (300 B.C.). It is probable that ever since that time, athletes have been combining and consuming various nutritional compounds in an effort to increase the ergogenic potential of the supplement and enhance performance Supplements included in the broad nutritional category include fluid supplements, carbohydrates, fats, proteins / amino acids and their metabolites, vitamins and minerals, plant extracts, phytochemicals, and engineered industry supplements. Nutritional supplements are not a complete substitute for a well-balanced nutrient dense diet. However, nutritional strategies in addition to a nutrient dense diet are vital in assisting the athlete in replenishing the necessary caloric requirements lost through high intensity energy expenditure. The availability and use of nutritional supplements as ergogenic aids have been raisin dramatically in the past few years. Many reports indicated that 50% of normal population, 75% of teenage athletes, and 100% body builders and elite athletes use supplements.

### Reality of the supplements
1. Manufacturers are not required to display the entire ingredient list on bottles.
2. Over 20% of the supplements that are not labeled correctly contain a prohibited substance.
3. Most manufacturers claim that their products are backed by valid scientific research-really the majority are not.
4. Very few advise consumers about the adverse side effects.

### Supplement concerns
Most of the athletes have been using Nutritional supplements to boost their performance without properly understanding the health consequences / risks of being caught in the dope test, if the supplement contains banned substance or contaminated. The main reasons for this include, Ignorance of the athlete, Unreliable sources of information, Lack of knowledge about the supplements for coaches, Purity and safety of supplements.

### Types and forms of nutritional Supplements
Broadly the nutritional supplements can be divided into Macro nutrient supplements (Carbohydrate, Protein and Fat supplements), Micronutrient Supplements (vitamin and Mineral supplements), Fluid supplements (sports drinks, and other liquid supplements).
Major forms of Nutritional supplements include, Tablets, capsules, pills, soft gels, creams, liquids, powders, extracts, bars.

**Major categories of Nutritional supplements based on evidence, benefits, legality**

For better understanding of nutritional supplements that are effective, safe and legal to use they can be divided into three major groups.

**Category-A Supplements**

This group of supplements may be recommended for athletes. These supplements are having substantial scientific evidence with promise of benefits. Examples include Sports drinks, liquid meal supplements, sports bars, sports gels, multi vitamin and mineral, iron and calcium supplements. For above 18 years of age, following are effective. Creatine, Bicarbonate, Glycerol, antioxidant, Stick packs of Zinc and Vit. C, Glucosamine.

**Category-B Supplements**

The supplements that are placed in this category are mostly safe to use. But they may be or may not be effective. No substantial scientific evidence is available about ergogenic benefits of these supplements. They are legal to use. Examples include HMB, Glutamine, Carnitine, Chromium, Ginseng / herbals, coenzyme Q10, amino acids, Medium chain triglycerides.

**Category-C Supplements**

All banned nutritional supplements are placed in this group. They are illegal to use. Examples include Anabolic steroids, Stimulants. etc. Athletes who use these category-C supplements will be tested positive in the doping.

An estimated one to three million athletes currently use androgens, often combined with stimulants, hormones, and diuretics, to facilitate the training response.

**Table 1:** Some of the most popular supplemental Ergogenic aids

| | Supplement | Claimed action | Research on action | Side effects | Legality |
|---|---|---|---|---|---|
| 1. | Creatine monohydrate | Increases muscle energy, Short term endurance, strength and lean muscle mass | Supports Insufficient data on long term effects | Mild | Legal |
| 2. | Energy gels | Quickly supply carbohydrate during endurance exercise | Supports | None, if taken with water | Legal |
| 3. | Sports drinks | Increases endurance performance, supply fluid, carbohydrate and electrolytes | Supports | None | Legal |
| 4. | Fluids | Increases endurance | Support | Mild | Legal |
| 5. | Branched chain amino acids (BCAA) | Optimize muscular growth and Repair | Supports, increased need for protein with activity | None unless underlying medical condition | Legal |
| 6. | Beta-hydroxybeta-Methyl butyrate (HMB | Enhance endurance performance, anti-catabolic (slows down muscle break down) | Mixed, some support for anti-catabolic function | Appears safe | Legal |
| 7. | Leucine | Prevents break down and enhances synthesis of protein, increases strength, improves body composition | Supports | Long term effects un known | Legal |
| 8. | Leucine | Decreases muscle break down, spares muscle glycogen stores | Limited, No ergogenic effect | None | Legal |
| 9. | Caffeine | Increases muscle contractility and aerobic endurance, enhances fat metabolism | Supports | Mild | Legal to certain urine levels |
| 10. | Carnitine | Increases fat metabolism | Refutes. No benefits | None | Legal |
| 11. | Chromium | Increases lean mass | Refutes. No benefits unless prior deficiency | Safe to 400 mg daily. Potentially dangerous above this level. | Legal |
| 12. | Coenzyme Q 10 | Enhances function of electron transport chain, improves endurance performance | Does not support use for athletes. | Appears safe | Legal |
| 13. | Medium chain triglycerides (MCT) | Increases energy and muscle cell mass, decrease fat mass, delay fatigue | Limited | Intestinal cramping and diarrhoea | Legal |
| 14. | Conjugated linoleic acid (CLA) | Increases response to tissue growth factors, hormones and cell messengers, increases muscle mass, weight loss and fat loss. | Limited. Animal studies | GI distress | Legal |
| 15. | Multivitamins | Increase energy, endurance and aerobic capacity, enhance recovery | No benefit unless pre Existing deficiency | None at RDA, some toxicities at high doses | Legal |
| 16. | Phosphates | Increase ATP production, energy and muscle endurance | Limited support | Mild at high Doses | Legal |
| 17. | Zinc | Increases physical endurance, mental alertness, concentration, free testosterone | Limited | None if taken in recommended dosages | Legal |
| 18. | Anabolic steroids | Increases strength, lean muscle mass and motivation | Supports | Significant. Dangerous | Illegal |
| 19. | Androstenediol | Same as steroids | Limited. Refutes | Unknown | Banned by Olympics |
| 20. | Androstenedione | Same as steroids | Refutes. No benefits | Significant. | Banned by Olympics and CAA |

| | | | | | |
|---|---|---|---|---|---|
| 21. | Amphetamines | Improve concentration, decreases fatigue and appetite | Mixed. Some support | Significant. Dangerous | Banned for shooting events |
| 22. | Dehydroepiandrosterone (DHEA) | Increases endogenous steroid Production | No benefits in healthy Athlete | Potentially dangerous | Banned by Olympics |
| 23. | Ephedrine | Stimulates CNS, increases energy, delays fatigue, stimulates weight loss | No benefit | Potentially dangerous | Banned by Olympics, FDA and other organizations |
| 24. | Blood doping | Increases aerobic capacity | Supports | Significant. Dangerous | Illegal |
| 25. | Human growth hormone | Increases muscle mass, strength and power, decrease fat mass | Supports | Causes enlargement of organs and increases risk of chronic disease | Banned by world antidoping agency |

## Conclusion

- Nutrition plays an important role in an endurance athlete's ability to perform.
- Nutritional supplements are not a complete substitute for a well-balanced nutrient dense diet. However, nutritional strategies in addition to a nutrient dense diet are vital in assisting the athlete in replenishing the necessary caloric requirements lost through high intensity energy expenditure.
- Certain nutritional supplements have not demonstrated any performance benefit in studies.
- Certain nutritional supplements can have potentially dangerous side effects
- Further legislation is needed to address the dangers of some nutritional supplements
- Professionals in the community need to be resources of good information for athletes, parents and coaches, Physicians, Athletic trainers and Dieticians.

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