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Supplements in sports

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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 raised 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 raised 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.

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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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