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CREALYTE POWDER: Supports Energy Production and to Maintain Lean Body Mass, Muscle Endurance and Power Output

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ABSTRACT

Creatine (Cr) is an amino acid derivative naturally found in human skeletal muscle, heart, brain, testes, retina and other organs. Over 90-95% of creatine in the body is in skeletal muscles, of which one third exists as free creatine, and two thirds as phosphocreatine (PCr). Creatine has a vital role in the provision and transfer of energy required for muscle contraction. Creatine acts as a performance enhancer offering athletes more power and strength for high intensity workouts. Depletion of creatine within the muscle can lead to reduced muscle power and build-up of lactic acid, resulting in rapid onset of fatigue. This article reviews the current available scientific literature regarding the effect of Crealyte Powder to Supports energy production and to maintain and promote lean body mass, muscle endurance, and power output.

Introduction

Creatine is found in considerable quantities in meat, fish and other animal products [1], with only trace amount found in some plants. Oral creatine supplementation not only increases the total creatine content of human skeletal muscle, but also seems to affect muscle hypertrophy (an increase in size of tissue). As a dietary supplement, creatine is available in the stable form, creatine monohydrate: a white, free flowing fine/crystalline powder, which has slightly characteristic odour and taste.

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Composition

One Level Scoop (5 g) Contains: Creatine Monohydrate (300 mg).

How CREALYTE POWDER is Metabolised?

Creatine in **CREALYTE POWDER** is primarily synthesized from arginine and glycine in the liver, pancreas, and kidneys at a rate of 1-2 g/day. An additional 1-2 g daily is obtained exogenously via dietary consumption of fish and meat. Creatine is eliminated by its irreversible conversion to creatinine at a rate of approximately 1-2 g daily [2].

The average creatine concentration of human muscle is 125mmol/kg [3]. Women may have higher concentrations than men [4] and vegetarians tend to have lower concentrations than non-vegetarians [5].

Adenosine triphosphate (ATP) is an energy-rich phosphate compound, which liberates energy when it is hydrolysed to adenosine diphosphate (ADP) and orthophosphate (Pi). ATP-ADP cycle is the fundamental mode of energy exchange in biological systems. ATP serves the principal immediate donor of free energy in

biological systems rather than as a storage form of energy [6]. The free energy liberated in the hydrolysis of an anhydride bond of ATP is used to drive reactions that require an input of free energy, such as muscle contraction.

Like ATP, creatine phosphate (PCr) has a high phosphate group transfer potential [6]. Creatine and phosphocreatine both play important roles in ATP production during maximal anaerobic burst-type exercise [7]. Creatine and phosphocreatine exist in reversible equilibrium. During intense muscle contraction, ATP is rapidly depleted [7]:

Adenosine Triphosphatase (ATPase)

ATP ---->ADP + Pi

Immediate generation of ATP is needed, if muscle contraction is to continue. This production of ATP is dependent on re-phosphorylation of ADP, which is accomplished under anaerobic conditions [7]:

Creatine Kinase (CK)

Phosphocreatine + ADP + H^+ ---------> ATP + Creatine

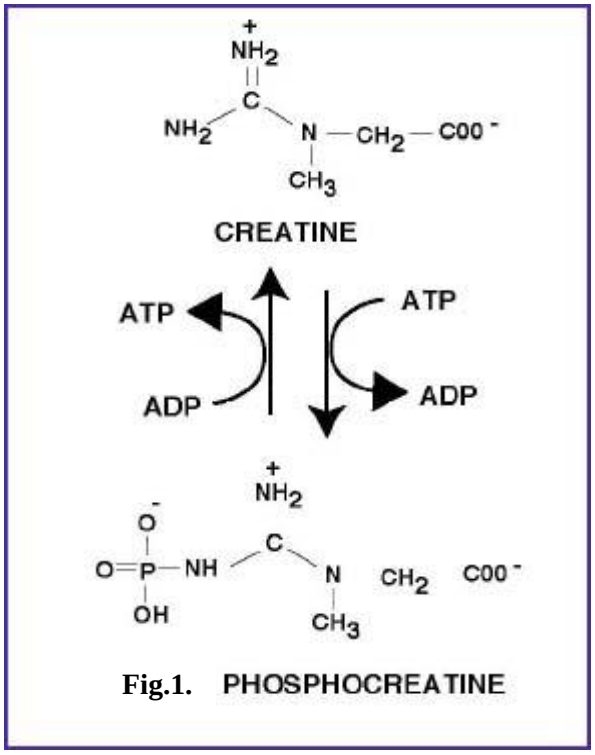

Fig.1. PHOSPHOCREATINE

Phosphocreatine is a limiting factor in maintaining ATP resynthesis during maximal exercise [8]. PCr contributes significantly to ATP resynthesis for about 10 to 20 seconds of maximal exercise [9]. This is followed by a proportionate increase in other pathways of ATP resynthesis, such as anaerobic glycolysis or aerobic oxidation of carbohydrates and fat. The resynthesis of PCr requires ATP, which is generated aerobically by oxidative phosphorylation in the mitochondria. Once generated, ATP is transported from mitochondria to the cytostol of the skeletal muscle myofibrils, where it transfers the Pi to creatine to form PCr. This reaction is catalysed by the mitochondrial creatine kinase (MiCK). PCr created in this process is then utilised to produce ATP from ADP in cytostol of skeletal muscle myofibrils [9].

It takes 30-60seconds to resynthesise half the PCr store after maximal bout of exercise. Most of the depleted PCr is restored within 5 minutes of recovery [10].

Why is CREALYTE POWDER Supplementation is Important in Sports Nutrition?

During rapid muscle contraction PCr stores get depleted resulting in the reduction of capacity of ATP resynthesis, and thereby energy production [8]. It is assumed that an increase in total muscle Cr concentration would limit the depletion of the PCr stores during intense muscular exercise and the decline in the ATP resynthesis rate by increasing the ADP phosphorylation rate. The potential benefits of this mechanism on exercise performance have been evoked to justify the administration of oral Cr to competitive athletes [11].

Creatine is slowly but continuously converted to creatinine, which itself is no use to the muscle for energy production and eventually excreted in the urine. As a result creatine must be continuously resupplied from indigenously or through the diet, if a metabolic demand of the muscles is to be maintained.

Currently, creatine does not appear on the International Olympic Committee (IOC) banned substances list because it is naturally occurring constituent of a normal diet.

Is CREALYTE POWDER Ergogenic?

The term "ergogenic" is derived from the Greek phrase and in relation to sports performance it implies "any means to enhance energy utilisation, including energy production, control and efficiency" [12]. Creatine phosphate has phosphate group transfer potential over 100% greater than glucose and over 40% greater than ATP itself and that is why it is so popular with athletes [8].

Oral creatine supplementation can increase muscular PCr concentration up to 20%. It acts as an ergogenic aid due to the following reasons [2]:

(a) Higher PCr concentration in skeletal muscle for enhanced anaerobic ATP production during maximal exercise [13], (b) Enhanced resynthesis of PCr during recovery periods between short bouts of maximal exercise, (c) Increase myofibrillar protein synthesis resulting in muscle accretion [14].

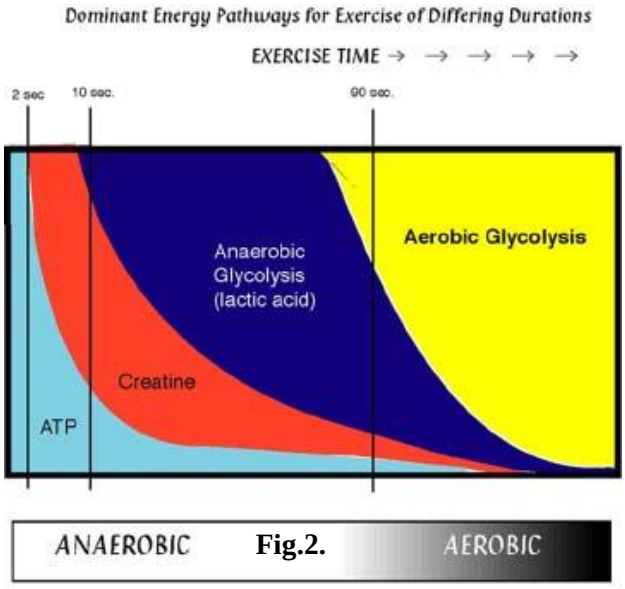

Fig.2.

Oral creatine supplementation is potentially ergogenic only for activities that have a high anaerobic component and for the endurance events that involve intermittent burst of anaerobic activity. In controlled laboratory studies, oral creatine supplementation has been shown to be ergogenic in repeated stationary cycling sprits [15], weightlifting [15],[16], repetitive sets of muscle contraction such as knee extensions [17], and kayak ergometry [18].

Is CREALYTE POWDER anabolic?

It has been reported that short-term oral creatine supplementation is accompanied by increase in body mass [19]. This weight gain is due to water retention [3] and/or an increased rate of contractile protein synthesis [1]. Creatine has been suggested to stimulate the biosynthesis of myofibril protein and uptake of amino acids into contractile proteins. Creatine supplementation has been shown to induce increase in the diameter of type II muscle fibre [14] and fat free mass [15].

What are the Benefits of CREALYTE POWDER Supplementation in Athletes?

Creatine in **CREALYTE POWDER** acts as an ergogenic and anabolic aid for sports performance in athletes. Its supplementation can be benefited as follows:

- Increased muscle creatine and phosphocreatine concentration for strength, power and an improved sports performance.
- Increased rate of ATP resynthesis leads to facilitated recovery during repeated bouts of high-intensity exercise required in weight lifting, sprinting and endurance events that involve intermittent burst of anaerobic activity.
- Reduced lactic acid concentration in the muscle leads to a delay in the onset of muscular fatigue [20].
- Increased protein synthesis and muscle accretion.
- Increased weight gain and lean body mass.

Creatine supplementation may be of benefit to athletes such as weight lifters, sprinters, body builders, wrestlers, boxers, kayakers, rugby players etc. Unfortunately, there is no published data available which supports the use of creatine supplementation in endurance athletes and marathon runners but it can be useful in endurance events that involve intermittent burst of anaerobic activity.

Safety data of CREALYTE POWDER

Its supplementation is safe [21] and does not pose any major side effects. In some people, high doses of creatine can cause minor side effects such as, gastrointestinal disturbances and /or muscle cramping [22]. Short-term creatine supplementation does not appear to impair the function in healthy kidneys [23]. There is no data available on its long-term side effects. Creatine supplementation should be avoided or limited in patients, with pre-existing renal disease and by those with a potential for renal dysfunction (e.g., diabetics). People with any medical condition should consult their doctor before using creatine. To achieve maximum effect, creatine should be taken in two phases followed by a resting phase. Creatine supplementation involves

a loading dose of 20-25g daily for 5-6 days, followed by a maintenance dose of 2.5-7.5g daily for 3 weeks and thereafter a resting phase of 1 week. The loading regimen can rise total creatine stores by 17-22%. Without a loading phase, a dose of 3 grams daily will achieve a similar increase after 28 days. Creatine storage capacity of human skeletal muscle is 150-160 mmol/kg [1]. Any excess creatine supplementation will not increase muscle creatine, but will be excreted in urine in the form both creatine and creatinine.

Suggested Use: Mix 1 level scoop with at least 8 ounces of water, juice, or preferred beverage once daily or as recommended by your health-care or performance professional. Can be used 30-90 minutes before or after exercise (Servings per container).

Summary & Conclusion

Creatine plays an important role in the production of cellular energy by making ATP, a molecule needed by all cells in the body. Creatine, an organic acid naturally produced in the body from other amino acids, is found in foods such as meats, eggs, and fish. With increases in exercise or as a result of muscle damage, the physiological need for creatine is increased. Creatine supplementation has been shown to support increased work capacity and power output of the muscle while promoting physical endurance and lean body mass gains. Outside of the athletic population, creatine has also been shown to lessen muscle breakdown and support cognitive function in aging populations. We use Crealyte, a micronized form of creatine monohydrate that's colourless and odourless. Our Creatine has enhanced solubility so it mixes well with juice or other Performance Nutrition products to meet your performance goals.

Declarations

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Competing Interests Statement

The authors declare no competing financial, professional and personal interests.

Consent for publication

Authors declare that they consented for the publication of this research work.

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