

Creatine Powder



Science-Based Nutrition™



the dose regimen of creatine. Creatine does not seem to improve performance in aerobic exercises or increase endurance.^{11,12,13,14} Creatine also does not seem to improve isometric strength or body composition in adults over the age of 60 years old.^{15,16,17}

Dietary supplementation has become a significant part of athletic training. Because of this, a double-blind, placebo controlled trial researched the effects of 28 days of oral creatine ingestion (days 1-5: 5g four times daily; days 6-28: 5g twice daily) alone and with resistance training on resting metabolic rate, body composition, muscular strength, and limb blood flow.¹⁸ Following the 28-day interventions, body mass increased in the participants who ingested oral creatine. Creatine plus training improved the leg press one-repetition maximum significantly more than creatine and resistance training alone. Calf and forearm lean body mass increased significantly in the creatine plus training group but remained unchanged in the creatine or training-only groups. Resting metabolic rate expressed on an absolute basis increased in the creatine group and creatine plus training group, but remained unchanged from baseline in the training-only group. These findings suggest that the combination of creatine supplementation and resistance training significantly increases total and fat-free body mass, muscular strength, peripheral blood flow, and resting energy expenditure.

To study the effect of creatine supplementation for a longer time period, a randomized controlled trial investigated the effect of creatine supplementation during a strength-training program for approximately three months.¹⁹ During the entire experiment period, a change in body mass in the control and placebo groups was lacking. The body mass of the creatine group, however, increased significantly, by 2kg. It was suggested that since the relative volumes of body water compartments remained constant, the gain in body mass was not due to water retention, but most likely to dry matter growth accompanied with a normal water volume. Another

INGREDIENTS

Creatine Powder contains creatine monohydrate. Creatine is normally found in meat and fish. It is also naturally synthesized by the human body, primarily in the kidneys and liver, and then transported in the blood for use by muscles, where it is mainly stored.¹ Oral consumption of creatine increases the muscle content of creatine, which serves to regenerate adenosine triphosphate (ATP), an energy source for metabolic processes and cells in the body.²

BENEFITS

- Generates ATP for energy*
- Improves exercise performance and increases muscle mass*

ATP Generation for Energy*

Creatine may be synthesized in the human body from dietary amino acids.^{3,4} Synthesis originates in the kidneys where precursors, arginine and glycine, form guanidoacetic acid. This product is then methylated in the liver, forming creatine. In a reversible reaction, an enzyme known as creatine kinase transfers the phosphate group from ATP to creatine and as a result, forms phosphocreatine plus adenosine diphosphate (ADP). The hydrolysis of ATP into ADP and inorganic phosphate provides energy to the body. Because of the reversible reaction, the rapid resynthesis of ATP from ADP occurs via creatine kinase with the use of phosphocreatine. Of the 95% of creatine stored within skeletal muscle, approximately 40% is free creatine and about 60% is phosphocreatine.⁵ Creatine supplementation has been shown to increase skeletal muscle stores of creatine and phosphocreatine, which can therefore increase skeletal muscle's ability to resynthesize ATP from ADP.⁶

Athletic Performance Review*

Creatine has shown to be more effective for increasing muscular power in healthy young adults during short periods of repeated maximal energy bursts than for single event performances.^{7,8,9,10} Many variables seem to determine the effect of creatine on performance, including an individual's training status, the type of sport being tested, diet, age of the subject, and

Supplement Facts

Serving Size 1 scoop (≈5 grams)
Servings Per Container Approximately 60

	Amount Per Serving	% Daily Value
Creatine Monohydrate	5 g	†

† Daily Value not established.

Other Ingredients: None.

Suggested Adult Use: Dissolve 1 scoop in 8 ounces of juice or your favorite beverage. Consume 20-25 grams for 4-5 days to help promote muscle saturation. Maintain creatine levels with 5-7 grams per day thereafter. Try adding creatine to your favorite protein supplement, meal replacement, or high-glycemic carbohydrate supplement. Combine with a sensible diet, regular physical activity, and drink plenty of fluids.

NOTE: Some settling of contents may occur, affecting number of servings.

Non-GMO / Gluten Free / Soy Free / Vegan

Store in a cool dry place.

* These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

randomized controlled trial, which involved heavy resistance training and a similar experiment period of 12 weeks, also found that body mass and fat-free mass were significantly greater in creatine subjects than placebo.²⁰

Additionally, it has been shown that creatine supplementation not only increases muscle mass, but also force, power, and total work during short-duration, high-intensity activities. A randomized controlled study on the effect of 21 days of creatine supplementation and resistance training found that subjects in the creatine group performed more total work until fatigue, experienced significantly greater improvements in peak force and peak power, and maintained elevated mean peak power for a longer period of time.²¹

The studies showing a significant difference in strength and muscle mass are mixed with studies of lesser methodological quality, some demonstrating an improvement and some a lack of improvement. Overall, the available evidence indicates that creatine does increase lean body mass, strength, and total work. As mentioned, the variable results are likely due to the differing baseline levels in individuals prior to supplementation that may or may not be correlated with athletic status, gender, and age.

SCIENTIFIC REFERENCES



1. Wyss M. and Kaddurah-Daouk R. Creatine and creatinine metabolism. *Physiol Rev* 2000;80(3):1107-213.
2. Harris RC, Söderlund K, Hultman E. Elevation of creatine in resting and exercised muscle of normal subjects by creatine supplementation. *Clin Sci (Lond)* 1992;83(3):367-74.
3. Stricker PR. Other ergogenic agents. *Clin Sports Med* 1998;17(2):283-97.
4. Balsom PD, Söderlund K, Ekblom B. Creatine in humans with special reference to creatine supplementation. *Sports Med* 1994;18(4):268-80.
5. Demant TW and Rhodes EC. Effects of creatine supplementation on exercise performance. *Sports Med* 1999;28(1):49-60.
6. Spillane M, Schoch R, Cooke M, others. The effects of creatine ethyl ester supplementation combined with heavy resistance training on body composition, muscle performance, and serum and muscle creatine levels. *J Int Soc Sports Nutr* 2009;6:6.
7. Dawson B, Cutler M, Moody A, others. Effects of oral creatine loading on single and repeated maximal short sprints. *Aust J Sci Med Sport* 1995;27(3):56-61.
8. Terjung RL, Clarkson P, Eichner ER, others. American College of Sports Medicine roundtable. The physiological and health effects of oral creatine supplementation. *Med Sci Sports Exerc* 2000;32(3):706-17.
9. Preen D, Dawson B, Goodman C, others. Effect of creatine loading on long-term sprint exercise performance and metabolism. *Med Sci Sports Exerc* 2001;33(5):814-21.
10. Bosco C, Tihanyi J, Pucspk J, others. Effect of oral creatine supplementation on jumping and running performance. *Int J Sports Med* 1997;18(5):369-72.
11. Coco M and Percivalle V. Creatine ingestion effects on oxidative stress in a steady-state test at 75% VO₂max. *J Sports Med Phys Fitness* 2012;52(2):165-9.
12. Mujika I, Padilla S, Ibañez J, others. Creatine supplementation and sprint performance in soccer players. *Med Sci Sports Exerc* 2000;32(2):518-25.
13. Izquierdo M, Ibañez J, González-Badillo JJ, others. Effects of creatine supplementation on muscle power, endurance, and sprint performance. *Med Sci Sports Exerc* 2002;34(2):332-43.
14. Vandebuerie F, Vanden Eynde B, Vandenberghe K, others. Effect of creatine loading on endurance capacity and sprint power in cyclists. *Int J Sports Med* 1998;19(7):490-5.
15. Rawson ES and Clarkson PM. Acute creatine supplementation in older men. *Int J Sports Med* 2000;21(1):71-5.
16. Berman S, Venembre P, Sachet C, others. Effects of creatine monohydrate ingestion in sedentary and weight-trained older adults. *Acta Physiol Scand* 1998;164(2):147-55.
17. Rawson ES, Wehnert ML, Clarkson PM. Effects of 30 days of creatine ingestion in older men. *Eur J Appl Physiol Occup Physiol* 1999;80(2):139-44.
18. Arciero PJ, Hannibal NS 3rd, Nindl BC, others. Comparison of creatine ingestion and resistance training on energy expenditure and limb blood flow. *Metabolism* 2001;50(12):1429-34.
19. Francauz M. and Poortmans JR. Effects of training and creatine supplementation on muscle strength and body mass. *Eur J Appl Physiol Occup Physiol* 1999;80(2):165-8.
20. Volek JS, Duncan ND, Mazzetti SA, others. No effect of heavy resistance training and creatine supplementation on blood lipids. *Int J Sport Nutr Exerc Metab* 2000;10(2):144-156.
21. Burke DG, Silver S, Holt LE, others. The effect of continuous low dose creatine supplementation on force, power, and total work. *Int J Sport Nutr Exerc Metab* 2000;10(3):235-44.

* These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.