



## **NATURAL SUBSTANCES WHICH CAN ASSIST BODY CONDITIONING**

A number of natural substances have been shown to have an effect on the chemistry of the body to produce an increase in muscle growth or conditioning (this is called an anabolic effect). Some examples are: Gamma oryzanol, Chromium and Creatine. These substances are natural chemicals which are found in feed. It has been found that supplementing these chemicals at a higher level can stimulate muscle growth. Because they are natural substances there are no adverse side effects and no prohibition on their use during competition or racing.

### **1. GAMMA ORYZANOL**

Gamma oryzanol is a rice bran oil derivative with two major active molecules, Sterol and Ferulic acid. Trials in the U.S., Japan and Australia have shown that gamma oryzanol has effects on weight gain and performance comparable to some anabolic steroids. Gamma oryzanol has effects on the body's endocrine system resulting in increased metabolism of fat and increased synthesis of protein. Human studies with weight lifters and athletes have shown increased muscle mass and definition, reduced fatigue and reduced post-exercise muscle soreness, which contributes to better training sessions. One trial of weight lifters in the U.S. compared a group taking gamma oryzanol with a group taking an anabolic steroid. The gamma oryzanol group showed greater weight gains, with better muscle definition and a leaner appearance. In a trial in Australia of 40 thoroughbred horses in full training a group supplemented daily with gamma oryzanol was compared with a control group. The gamma oryzanol group showed improved muscle to fat ratio, with better muscle definition in the rump, neck and over the withers. The horses supplemented with gamma oryzanol also maintained appetite better than the control group.

In addition, studies have shown that gamma oryzanol is a natural antioxidant and can lower cholesterol levels in the blood, it has been used in humans to lower the risk of heart disease (Scavariello and Arellano, 1998). Gamma oryzanol has also been shown to reduce the risk of gastric ulcers and increased gastrointestinal motility caused by stress (Ichimaru et. al., 1984).

### **2. CHROMIUM**

Chromium enhances the activity of insulin, which is vital to many body functions, most importantly in dealing with dietary sugar and in facilitating muscle growth (Colgan, M., 1993). Chromium is a component of glucose tolerance factor, which potentiates the action of insulin. Insulin has tissue building effect as it promotes glucose uptake by cells, stimulates amino acid synthesis and inhibits tissue lipase. Chromium excretion is greater in athletic animals and the chromium requirement is increased by physical activity. In addition, many diets are deficient in Chromium, and supplementation is vital for optimal muscular development.

Supplementation with chromium has been shown, in scientific trials in both humans and pigs, to increase muscle weight gain and decrease body fat (Press, R. I. et. al., 1990; Page, T. G. et. al., 1991). In feed-lot calves chromium excretion is increased by stress and supplementing with chromium has been shown to stimulate the immune system resulting in decreased incidence of disease (Jackson, 1997). In a trial of performance horses, supplementation with 5 mg/day of chromium resulted in an improvement in performance of an exercise stress test (Pagan et. al., 1995). Horses receiving chromium showed lower peak lactic acid levels and more efficient utilisation of fat during exercise. Chromium may be beneficial for horses which 'tie-up' due to more efficient utilisation of glucose (Jackson, 1997).

Chromium picolinate is a unique form of chromium which is very well absorbed and completely safe.

## CREATINE

Creatine is an amino acid which is involved in energy supply to muscles. During exercise the initial energy supply to muscles is adenosine triphosphate (ATP), which releases energy as it is converted to adenosine diphosphate (ADP). Creatine, as creatine phosphate, converts ADP back to ATP, so it can be reused. A contributing factor in the development of muscle fatigue is a deficiency of creatine. Supplementing with creatine results in an increase in muscle creatine stores (Greenhaff et. al., 1994). This means that more creatine phosphate is available to form ATP. Increased ATP supply prevents the muscle using glycolysis for energy and thus lactic acid production, associated with glycolysis, is reduced and the onset of muscle fatigue is delayed.

Delaying the onset of fatigue means that exercise can continue for longer, at a higher level, which results in increased muscle size, strength and power (Sahelian and Tuttle, 1997). Creatine supplementation also increases muscle size by bloating the muscle cells with creatine rich fluid. This swelling of the muscle cells results in stretching which stimulates muscle cells to grow. One of the stimulating factors of anabolic steroid use is water retention which causes muscles to swell and grow. Creatine also promotes greater nitrogen retention and protein synthesis by increasing intracellular water levels. Studies have shown that creatine supplementation increases power output and total work output (Birch, R. et. al., 1994), increases sprint performance (Dawson, B. et. al., 1995) and increases body mass (Balsom, P. D. et. al., 1993).

Creatine is in high concentrations in meat and vegetarian athletes benefit particularly from creatine supplementation. The cereal and herbage diet of horses is low in creatine and supplementation would similarly benefit equine athletes.

The most effective way to achieve high creatine levels in muscles is by a consistent elevation in the amount of creatine in the blood over a prolonged period of time (Sahelian and Tuttle, 1997). It is best to supplement creatine in the feed so that the insulin response that occurs with feeding facilitates the uptake of creatine into the muscle cells.

The absorption of creatine varies with the type of creatine molecule. Creatine citrate is an innovative molecule where creatine is bonded to citric acid, which is an intermediate in the Krebs cycle. The Krebs cycle, or citric acid cycle is the final common pathway into which the major fuel molecules, carbohydrates, fatty acids and amino acids are broken down to ATP. Increasing cellular concentrations of citric acid potentiates the rate of ATP formation. Creatine citrate has been shown to be up to five times better absorbed than creatine monohydrate.

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