

Sodium Bicarbonate

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What is it?

Sodium Bicarbonate (SB) is an antacid, which is an alkalinizing agent. This means that SB counteracts or neutralizes acid (pH levels). Sodium bicarbonate is naturally found in the body, and as most people know, it is also found in baking soda.

How Does it Work?

During exercise, the body produces an abundant amount of hydrogen ions (H^+) with essentially builds up in the working muscles. Excess hydrogen ions are what cause fatigue while exercising under high-intensity workouts. Lactic acid is just an indirect measure of H^+ when measuring fatigue. When SB is supplemented, it increases the pH levels in the bloodstream, which indirectly affects the amount of hydrogen ions in and around the muscle. This increase in pH helps the H^+ move out of the muscle and into the bloodstream. By doing this, the time to fatigue is consequently delayed due to the decreased build up of H^+ in the muscles. Once pH levels are increased in the muscles, it allows athletes and active people to exercise at high-intensity workouts for longer periods of time before the onset of fatigue.

The Evidence: Pro or Con?

Many researches have been conducted investigating the effects of sodium bicarbonate on strength and power performances. A research administered by McNaughton and colleagues (1999) conducted a five-day study that investigated the effects of SB intake before short-term, high intensity cycling exercises. The male participants ingested 500 mg/kg body weight before each exercise session. The results showed that ingesting SB before exercising significantly increased total work capacity and power by approximately 12%. Recent research performed by Edge et al., examined the effect of chronic intake of sodium bicarbonate over an 8 week period while performing high-intensity interval training on cycle ergometers. This study assessed 16 recreationally active women and placed them into a control group ($n=8$) and a placebo group ($n=8$). The control group ingested 0.2 mg/kg body weight twice daily. SB was taken at 90 and 30 minutes before performing each high-intensity, interval training sessions. Group 2, the placebo group, were given sodium chloride. The findings from both of these studies concluded that sodium bicarbonate supplementation over a chronic period not only delays time to fatigue, but it also increases athletic performance and increases strength and power endurance.

Guidelines for Use

It is recommended that sodium bicarbonate be taken according to body weight. This obviously differs among every individual. Approximately 100 to 200 mg/kg body mass should be ingested 90 minutes prior to high-intensity strength and power exercise sessions.

Precautions

Side effects vary among each individual. However, doses greater than 300 mg/kg body weight may cause problems such as diarrhea, cramping, nausea, vomiting, etc. These side effects can be reduced by drinking increased amounts of water or with lower dosage. It is always best to experiment with this supplementation during training sessions before using it as a pre-competition aid. The gastrointestinal tolerance differs for everyone. Researching dose intake online or asking a sports nutrition specialist is highly recommended before supplementing.

Reference:

1. Antonio, J., Stout, J.R. Sodium Bicarbonate. In: *Supplements for Strength-Power Athletes*. Champaign, IL: Human Kinetics Publishing, 2002, pp.89-92.
2. Edge, J., Bishop, D., and Goodman, C. Effects of chronic NaHCO₃ ingestion during interval training on changes to muscle buffer capacity, metabolism, and short-term endurance performance. *Journal of Applied Physiology*. 101: 918-925, 2006.