

## SUPPLEMENTS UPDATE

With the increasing demands in training camps and a turnover of athletes on the National squad, it's time to revisit a few old supplements you may consider using, and remind you a new one you will be introduced to over the next few months. If you have any questions regarding these or other supplements, please contact Liz Broad directly.

### **BICARBONATE LOADING** **WHAT IS BICARBONATE?**

Bicarbonate is a compound found mainly within our bloodstream, which serves in part to buffer excess hydrogen ions.

### **HOW MIGHT IT HELP SPRINT KAYAK PERFORMANCE?**

During racing, kayakers develop high levels of lactic acid within their muscle. The hydrogen ions associated with the lactate interferes with muscle contraction and produces the 'burning' sensation and limits performance. Pre-loading the bloodstream with additional bicarbonate enables greater 'mopping up' of this lactic acid build up in the blood, which enables more lactic acid to leave the muscle. The result is a delay in the onset of muscle fatigue during high intensity (anaerobic) exercise.

### **WHAT DO THE STUDIES SHOW?**

Research has shown that in high intensity events lasting 3-7 mins, a sodium bicarbonate dose of 0.3g/kg body mass can improve performance 1-3% compared with a placebo. There is variability in the response to supplementation between individuals.

### **WHAT IS THE PROTOCOL FOR BICARB LOADING?**

- The supplement of choice is Sodi-Bic capsules. It is recommended athletes take 0.3g sodium bicarbonate per kg body mass 1 hour before their event (approx. 20g). This dose is considered the optimal for performance effects without significant side-effects. Generally it is considered better to consume this over the period of an hour, in 3-4 smaller doses. When used in heats and finals on the same or subsequent days, lower doses may be possible to compensate for bicarbonate remaining in the system. This requires experimentation during training periods.
- The supplement must be consumed with 1-2 litres of water to reduce gastrointestinal problems.
- The protocol **MUST** be practiced in supervised training sessions prior to considering it for races in order to assess individual responses.
- More recently, studies have considered a more progressive loading over 1-3 days prior to the event. This requires a slightly higher dose of bicarbonate (0.3-0.5mg/kg) split into 3-4 doses over the day, or even over 3-5 days prior to the event. The results of these studies indicate the elevated bicarbonate levels remain for up to 24hr after the last dose, so this form of loading could be easier on the stomach and potentially more useful over a competition period.

### **WHAT ARE THE POSSIBLE SIDE EFFECTS?**

Some athletes experience varying degrees of gastrointestinal distress following bicarbonate loading.

This can be mild to severe (including diarrhoea, bloating, stomach cramps and vomiting), and is generally worse if dehydrated or the dose is not consumed with sufficient water. Those who experience severe side effects may reduce the dose to 0.2mg/kg instead and see how that goes.

This is why trialling the supplement during training is essential, and should never be done for the first few times in competitions.

### **IS SODIUM CITRATE BETTER?**

Sodium citrate works in a similar way to bicarbonate, and has been shown to have a similar effect on performance. Some individuals have used it in the belief that it produces less side effects, however the scientific evidence does not support this. Typical doses are 0.3-0.5mg/kg body mass and a similar protocol to above is recommended (take 1 hr before and with plenty of water).

If you are interested in trialling bicarbonate, we would recommend you do so in a controlled situation during training— you should definitely NOT try it for the first time at a competition! A good time to do so would be at the upcoming training camps in April. Please notify Liz Broad if you want to try bicarbonate loading so that we can set up a suitable time to do this.

### **CAFFEINE**

#### **WHAT IS CAFFEINE AND WHAT DOES IT DO?**

Caffeine is a member of the methyl xanthine family of naturally occurring stimulants found in leaves, nuts and seeds of a number of plants. Major dietary sources of caffeine include tea, coffee, cola beverages, chocolate, and 'energy' drinks (e.g. Red Bull, V).

As a stimulant, caffeine has a number of actions. It stimulates the central nervous system, cardiac muscle, excitability of muscle fibres, and the release and activity of adrenaline. It also stimulates diuresis, and has effects on working muscle which increases use of fat as a source of fuel.

Caffeine can also have an effect on mood. Low doses of caffeine (80-250mg/d) can increase energy, imagination, efficiency, self-confidence, alertness, motivation and concentration. However, too much can have a negative impact by reducing sleep quality, increased anxiety and impaired motor control.

#### **Caffeine Content of Common Drinks**

- 30-50mg for a cup of tea
- 70-100mg for a cup of instant coffee
- 50mg for a 375ml can cola soft drink
- 80mg for a can of Red Bull™
- as much as 500mg for a tall, strong espresso!

### **HOW MIGHT IT HELP SPRINT KAYAK PERFORMANCE?**

The potential for caffeine to influence performance is based on two aspects – the effects on central nervous system (by reducing perception of effort and increasing motor unit recruitment) and on changing the fuel supply to muscle. Studies have not been undertaken specifically on kayak performance, however other research indicates it is the central nervous system effects which benefit short term, high intensity performance.

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### **WHAT DO THE STUDIES SHOW?**

Research on performance of 3-5 mins has generally shown improved race times or tests of time to exhaustion (by up to 10%), along with reducing perception of effort (*i.e.* the same absolute effort feels easier).

### **WHAT ARE THE POSSIBLE SIDE EFFECTS?**

Due to its stimulatory effects, caffeine can have a number of side effects. These include gastrointestinal discomfort / irritation, 'the jitters' or over arousal, increased heart rate, headaches and difficulty sleeping. It may also impair fine motor control or technique.

It appears that some individuals do not respond to supplementation, but it is also important not to take too much.

Caffeine is a diuretic, however there is evidence to show that habitual caffeine consumers are generally at no greater risk of dehydration. In such cases it appears that the kidneys adjust well over the whole day to the point where the caffeinated drink is therefore an additional source of fluid.

The interaction between caffeine and other supplements (such as bicarbonate) requires investigating, and caution should be taken if both are used prior to racing.

### **WHAT IS THE PROTOCOL FOR USING CAFFEINE?**

- Recommended dose ranges from 1-3mg/kg body mass (70-200mg caffeine), taken 1 hr before the race. Higher doses do not provide any added advantage.
- Caffeine should be consumed with adequate fluid to counteract the diuretic effects and it is recommended you ensure good hydration pre-race.
- It is NOT recommended to use caffeinated beverages, as the caffeine dose is highly variable and they contain other chemicals which can have adverse side effects.
- The protocol MUST be practiced in supervised training sessions prior to considering it for races in order to assess individual responses.

When used in heats and finals on the same or subsequent days, it is **strongly recommended that the total caffeine dose for the day does not exceed 500mg.**

### **SHOULD I ABSTAIN FROM DRINKING COFFEE IF I'M USING IT AS A SUPPLEMENT?**

In theory, habitual use of caffeine may reduce the impact of performance-enhancing effects. However, the small amount of research which has been undertaken does not support this, nor is there any need to withdraw from caffeine in the days prior to caffeine supplementation to get an potential effect.

### **NOTE:**

Currently, the AIS is not permitted to provide caffeine to athletes. If you choose to use it, please discuss this with your coach first.

### **Antioxidants:**

In Paddling Nutrition No 19 we covered the topic of antioxidants (including Vitamin C and E). During heavy exercise and exposure to high altitude, our generation of damaging free radicals increases. Antioxidants are molecules or substances which buffer or balance these free radicals in our system. Therefore, we are going to trial the use of antioxidants during heavy phases of training (for example, during training camps) and in the initial stages of any altitude exposure, in order to optimise your training adaptations.

For further information, see the AIS Supplements Program, AIS Sports Nutrition website [www.ais.org.au/nutrition](http://www.ais.org.au/nutrition) and the AIS fact sheets.