

Sport drinks: Sodium - How Sodium Helps Sport Drinks

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Hydration is an important part of our health and wellbeing. Even small losses of body fluid can cause headaches, lack of concentration, decreased reaction time, and lethargy, and can hinder sporting performance. Beverages, including those with sodium can help in restoring and maintaining our water balance.

Fluid loss and its consequences

The human body routinely excretes various amounts of water through urine, stool, sweat, and the air we breathe out. In very hot climates and during exercise, sweating can contribute substantially to this fluid loss.

Sweat is a mixture of fluids and electrolytes, including sodium, that is emitted when the body needs to cool itself down. Ideally, fluid intake should match the sweat rate to minimise detrimental effects to health and sporting performance. Athletes performing high intensity activity commonly have sweat rates of 1.0 – 2.5 L per hour, although when the ambient temperature is higher, sweat rates of more than 2.5 L per hour are not unusual.¹

Most individuals can tolerate a 2% decrease in body fluid without any significant risk provided they are in a cool or temperate environment, however if this occurs in a hot environment (> 30°C) there can be significant risk to health.²

When fluid loss occurs - as in sweating - a reduction in blood volume is seen, which thickens the blood, making it harder for the heart to pump the blood around the body. To offset this effect the heart rate increases, but oxygen delivery to exercising muscles and removal of carbon dioxide and waste products from them is hindered. Fluid loss can also lead to an increased core body temperature, which impairs the activity of enzymes in the body.

Research shows that the natural thirst mechanism makes individuals consume only approximately half the amount of fluid they have lost.² It is thought that the thirst mechanism does not initiate the drive to drink until the body is 2% dehydrated, which is at the point where performance can be compromised.¹

The role of sodium in rehydration

Water, diluted fruit juices and sports drinks are commonly used for rehydration. As sodium is the major salt in sweat, some drinks contain added sodium along with carbohydrates. This is in line with the recommendations by the Scientific Committee on Food to include sodium (460-1150 mg/L) and carbohydrates (0-350 kcal/L) for optimal rehydration during prolonged exercise. It is thought that the loss of sodium could play a role in the development of muscle cramps, or weakness. The loss of sodium also

affects the fluid make up of the body.

Sodium is known to stimulate the thirst mechanism and it also improves the rate at which the small intestine can absorb water and carbohydrate – this effectively helps rehydration and the delay of muscle fatigue, respectively. Once the water has been absorbed, sodium also helps the body to keep it by retaining greater levels of fluid, and urine output is decreased.^{4,5} Research shows that adding sodium to a beverage poses very little, or no risk at all to health.²

It is recommended that drinks contain sodium for use in exercise longer than 2 hours in duration, or in any event where heavy sweating occurs. Research suggests that consuming about 450 mg or more of sodium per hour of exercise is needed to maintain plasma volume and plasma sodium levels.⁶ This amount is easily provided by a well balanced carbohydrate-electrolyte beverage.

In conclusion

For optimal sports performance, especially in hot environments, it is important to drink regularly. Beverages that contain sodium may help to rehydrate faster than those without, and added carbohydrates may ward off muscle fatigue. However, sodium intakes should generally be reduced in most European diets to avoid adverse health effects.

References

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