

A contrary view to the one that only water should be taken during long flights

I would like to offer an alternative opinion to the recommendation that only water should be taken during the flight. I am a medical specialist (anaesthetist) and fluid physiology and fluid management is a central part of my practice every day.

On long hot flights the strict adherence to water only may in fact degrade performance to the point of being hazardous.

A few facts needed to be understood as to why this is so. If basic arithmetic and technical details turn you off, skip to the recommendations!

Our blood and body fluids normally contain 135-150 millimoles (mmols) of sodium and 100 mmols of chloride.

We probably sweat at around $\frac{1}{2}$ to 1 litre per hour on a hot day while gliding. Additionally we lose water at high altitude from breathing air with a low water content.

What we lose in sweat depends partly on our genetic makeup, but more importantly on whether we are acclimatized. The more acclimatized we are the less sodium and the more potassium we lose in our sweat. Sodium losses for a person that is well acclimatized is of the order of 5-30 mmols per litre. For someone who is not acclimatized (say an office worker who flies one or two days a week) sodium losses in sweat may be of the order of 40-100 mmols/litre.

(As a crude way of gaining an appreciation of these figures, one level teaspoon of table salt, which is just sodium chloride, dissolved in a litre of water equals approximately 100 millimoles per litre).

We do possess a very sophisticated sodium control system in our bodies that works well providing we are sufficiently hydrated to produce reasonable amounts of urine. Most of us readily excrete excess sodium in our urine. Conversely we also have a specific salt appetite. Glider pilots with low sodium levels often love salty foods at the end of the day!

Ingestion of water to replace sweat losses will decrease the sodium concentration in our blood, as we are not replacing the sodium that we are losing. Severe acute decreases in blood sodium (say 10%) may cause headaches, lethargy, apathy and confusion. Severe acute decreases (over 15%) may cause convulsions. While this is extremely unlikely to occur in our sport, cases of convulsions occurring in top athletes who only use water replacement are documented. Suffice to say even the mild symptoms are highly undesirable for a pilot!

Potassium losses may cause low blood pressure and weakness.

Small amounts of sodium and potassium in rehydration fluids increases the rate at which the gut can absorb the fluid. Drinking only water, apart from leaving you still dehydrated (because you haven't absorbed the fluid) can make you feel bloated and nauseous.

Pure water ingestion tends to shut off the thirst reflex, even when we are dehydrated.

Taste is a critical factor on whether athletes drink adequately during exercise. Some people love pure water, others loathe it.

High carbohydrate drinks such as energy drinks, fizzy drinks and fruit juice contain 10%-30% carbohydrate. Levels of carbohydrate over 8% inhibit intestinal absorption of the fluid. None of these are appropriate for rehydration during flight.

Sports drinks are not excessively high in sodium. At recommended strengths they contain 10-25 mmol/litre. They are also designed to replace potassium losses. They do contain carbohydrate but this is of the order of 6% which will not impede absorption or cause large fluctuations in blood sugar levels.

Recommendations

Guiding principles (on the basis that you are essentially fit and healthy) should therefore be as Martin Feeg wrote with regards to pre-flight dehydration, weighing etc and

- **On short flights whether we drink water or an electrolyte replacement is not critical.**
- **On longer flights (say over two hours) we should be aiming to replace what we are losing. Sports drinks are appropriate for this. As we are a “light physical activity in a hot environment”, some dilution from the recommended concentration can be used if this makes it more palatable. Which brand is not as critical as what tastes good to you.**
- **The carbohydrate (sugar) content is not harmful. Carbohydrate ingestion could only lead to a problem if a large carbohydrate load is taken at widely separated intervals, with the risk of insulin over secretion and low sugar levels occurring some hours later.**
- **Never take high sodium loads such as salt tablets.**
- **Heavy coffee and tea drinkers are prone to severe headaches on acute withdrawal. Recent studies have shown that caffeine is not deleterious to sport performance and a small amount on the long flying day before or after the flight is OK.**

There are excellent fact sheets at www.sportsdietitians.com

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Article courtesy of John Roake of Gliding International.