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Salt Skip News

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Use the **editorial address** when writing about the newsletter—see the panel on page 4.

Is the Drought Causing a Rise in the Sodium Levels Found in Water?

As the drought in Australia drags on, small communities in eastern Australia are turning to emergency water supplies. Often, this means bore water, which has prompted health fears over its high salt content.

Key Points:

- **Drinking water right around Australia may have surprisingly high levels of salt?**
- **All capital cities have water salinity levels that are within the Australian Drinking Water Guidelines of 500 milligrams per litre (mg/L) – however the guidelines do not regard salinity as a health consideration, but rather as an "aesthetic" guideline, based on taste.**

Australians consume too much salt, and many need to reduce salt in their diet, so the sodium component of salt has key health implications. For people following low-sodium diets for health reasons, the salt in their drinking water may also be important. It is generally recommended that people on low-sodium diets drink water with less than 20mg of sodium per litre, but Brisbane, Adelaide and most of Perth have been found to have saltier water than this.

What water salinity means

Water salinity is commonly reported as "total dissolved solids," which includes all organic and inorganic substances. "Salts" are soluble compounds of sodium, calcium, potassium, magnesium, chloride, sulfate and bicarbonate. Salts enter our waters from everywhere: the ground, the ocean, the air and living creatures.

Source: *theconversation.com*
Authored by: Western Sydney University, Ian Wright, Senior Lecturer in Environmental Science, Jason Reynolds, Research Lecturer in Geochemistry and Michelle Ryan, Lecturer, Environmental Health and Management.

Researchers from the Western Sydney University investigated drinking water in Australian capital cities, and some regional locations to compare salt content. When data was not publicly available for capitals, water authorities were approached for data on water salinity.

Four major groupings were found for the capital cities:

1. The **highest salinity** water was in some Perth districts.
2. The **second and third highest** were in Adelaide and Brisbane.
3. Sydney and some supply districts within Perth (such as Tamworth Hill) have the **joint second lowest salinity**.
4. Melbourne, Hobart, Darwin and Canb erra all share the **lowest salinity**.

Water can start tasting noticeably salty at 180 mg/L. The figure below shows which districts have less than or more than 180 mg/L.

Is the Drought Causing a Rise in the Sodium Levels Found in Water? ~ Continued:

Salinity varies a lot

Researchers obtained sodium data that showed water from Darwin, Canberra, Sydney, Melbourne and Hobart had less than 20 mg/L. However, Perth (most areas), Adelaide and Brisbane had more than 20mg/L of sodium in their water supplies.

Water supplies can be complex

One district in Perth, Tamworth Hill, had 20mg of sodium per litre, which conforms with the requirements for a low-sodium diet. Another Perth district around 50km away, Mt Yokine, had sodium levels more than six times higher, at 125mg/L.

Regional and remote regions of Australia often had water with elevated salinity. Tennant Creek and Alice Springs in Northern Territory and Geraldton in WA are three regional Australian cities with sodium content higher than generally found in Australian capitals.

Horrocks, a very small coastal settlement 500km north of Perth, in WA had the highest, based on the researchers' review of available public data. At 408 mg/L it was more than 130 times higher than Darwin's average sodium concentration.

What can you do about it?

Where medical health professionals recommend a low-sodium diet - consumption of sodium through drinking water should be considered. If unsure of the sodium content of your water, and if you are on a low-sodium diet, then contact your local water supplier. Also ask your treating doctor or other health care providers about consumption of sodium through drinking water.

Australia's Recommended Daily Water Intake

In Australia, the recommended Adequate Intake (AI) for total water (both fluids and food moisture) and total fluids (excluding food moisture) are set by the National Health and Medical Research Council (NHMRC) and are derived from the median intake estimates from the National Nutrition Survey. The **AIs for total water intake** (including food moisture) for adults is **3.4 L for males**, **2.8 L for females** and **1.4–2.2 L for children/adolescents depending on age and gender**. The **AIs for total fluids** are set at **2.6 L for adult males**, **2.1 L for adult females**, and **1.0–1.9 L for children/adolescents**.

New evidence found in mice ~ females might benefit most from a low-salt diet

A low-salt diet may be more beneficial in lowering blood pressure in females than males, report scientists who found that while actual salt retention isn't higher in females, there is still an effect that drives pressure up.

Females also might benefit most from drugs that directly block aldosterone, a hormone and blood vessel constrictor that is naturally higher in females and is further elevated by a high-salt diet, they report in the journal *Hypertension*.

"After just seven days on a high-salt diet, the ability of female mice to relax blood vessels decreased while their blood pressure increased", says Dr Eric Belin de Chantemele, Physiologist in the Vascular Biology Centre at the Medical College of Georgia (MCG) at Augusta University.

"When we gave mice a high-salt diet for a week, we saw an increase in blood pressure of about 10 mmHg - which is significant clinically - only in the females," says Dr Jessica L Faulkner, MCG Postdoctoral Fellow and the study's first author.

New evidence found in mice ~ females might benefit most from a low-salt diet ~ Continued:

“Treatment with the aldosterone antagonist eplerenone restored a healthier blood pressure and the ability of the lining of the blood vessels to relax”, says Belin de Chantemele, the study's corresponding author.

Blood pressures in males and females were similar at the start of the studies and aldosterone levels were higher in the females, a typical difference between the sexes, which Faulkner and Belin de Chantemele had previously found.

"We thought that if the female mice have more aldosterone than the males, they should be more salt-sensitive," says Belin de Chantemele. "That is what really pushed us to do this study."

Eating too much salt is a daily occurrence for most of us and one of aldosterone's functions is increasing sodium and fluid retention by the kidneys, the scientists say. There is supposed to be sort of seesaw effect so that when we eat too much salt, aldosterone levels go down so we don't retain too much salt, which drives up fluid retention and blood pressure.

The MCG scientists found that in male mice, the aldosterone-salt interaction action works: increased salt intake suppresses aldosterone, which helps protect males from this path to hypertension.

“However, female mice taking in a lot of salt don't suppress aldosterone as much, so aldosterone levels and blood pressure both are higher”, Faulkner says.

In this scenario, rather than holding onto more fluid and salt, aldosterone appears to cause problems by impairing the ability of blood vessels to relax. In fact, the scientists found no evidence that the kidneys, which should eliminate excessive sodium, were the problem. Both sexes excreted more sodium when they consumed more, and the females actually excreted the most.

Please send us your Salt Skip news, tips and salt-free or low sodium recipes… email to Malcolm.Riley@csiro.au. Thanks!

"In the salt-sensitivity field there are two main concepts," says Belin de Chantemele. "One is it's mediated by the kidney retaining more salt. Another one suggests that it's an improper relaxation of the blood vessels in people who are salt-sensitive. Our data supports that second concept."

When they used the drug, eplerenone -- a diuretic that blocks the receptor for aldosterone and is already used to treat high blood pressure and more commonly heart failure -- it restored blood pressure and endothelial function in the females.

It decreased both day and night time measures of the systolic blood pressure (top number which indicates pressure when the heart is contracting), diastolic pressure (bottom number, which indicates pressure when the heart is relaxed) and mean arterial pressure (an average between the two which gives an overall idea of blood flow).

In males, the drug didn't affect any of those pressures or alter the function of the endothelial cells that line blood vessels and aid their contraction and relaxation.

The findings provide more evidence that the aldosterone system is a particularly good target for females in the face of pathological problems like obesity and salt-sensitive hypertension, they write.

The females actually experienced lower activity than males of the renin-angiotensin system, a kidney-based system for regulating blood pressure and fluid levels often targeted by common hypertension medications like ACE inhibitors.

Clinical studies have indicated that female mice are generally more salt-sensitive, but those findings have not held up in animal studies.

The MCG investigators' previous work has indicated that female mice are particularly susceptible to mineralocorticoid receptor activation and aldosterone-mediated hypertension mechanisms. **Source: Medical College of Georgia at Augusta University**

SSN Commentary: A high salt intake may affect males and females to a different extent, so it is important to do research on both men and women (and animal studies on both males and females). **However, high salt intake raises blood pressure for both men and women** ~ Ed.

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Trainsmash

Here's an old favourite that goes with fish, chicken, steak, pasta or you could use it as a base for chutney – just add an apple and chopped raisons and your favourite herbs.

Ingredients:

Waver of olive oil
2 medium white onions, chopped
4-6 tomatoes or tomatoes from the garden, chopped
Heaped teaspoon minced garlic, optional
¾ cup of water (a little more if making a big batch)
Generous grind of black pepper
Cornflower and water mixed, runny consistency (if you need a thickener)

Method:

In a medium saucepan, add olive oil and heat. Add chopped onions and lightly fry.

Add garlic (if using) and tomatoes. Reduce down over medium heat and add water. Reduce heat to a simmer. Add more water if needed and thicken as necessary.

Stores in the freezer (6 months) or in the fridge for a few days.

To make a chutney: add herbs, raisins and a chopped apple, store in sterilised jars in the fridge. Enjoy!

At Salt Skip News, we are always interested to hear from readers. Please send us your Salt Skip news, tips and salt-free or low sodium recipes… please email to Malcolm.Riley@csiro.au

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