

Nitrate: healthy heart or cancer risk? Meet nutrition's Jekyll and Hyde

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Despite our understanding of nutrition expanding remarkably in recent times, few aspects of our diet continue to confuse and divide the experts like nitrate.

For a long time nitrate has been viewed warily, with previous research showing it could potentially be linked to causing cancer.

However, subsequent research has revealed dietary nitrate also has various cardiovascular health benefits, which could help reduce the risk of related conditions such as heart disease, dementia and diabetes.

So, how can one dietary compound have such contrasting potential risks and benefits?

Edith Cowan University's (ECU) Nutrition and Health Innovation Research Institute hopes to find out how and why nitrate such contrasting potential risks and benefits.

All about the source

Dr. Catherine Bondonno led a review of nitrate research and says the key may lie in where it comes from.

"We get nitrate from three major dietary sources: meat, water and vegetables," she said.

"Nitrate's reputation as a health threat stems from 1970, when two studies showed it can form N-nitrosamines, which are highly carcinogenic in laboratory animals.

"However, no [human studies](#) have confirmed its potential dangers, and our clinical and observational studies support nitrate preventing cardiovascular disease, if it's sourced from vegetables.

"So the review looked to unpack all of that, identify new ways forward and ways that we can solve this puzzle, because it's really time to address it: it's been 50 years."

Urgency required

Despite recent research indicating the source of nitrate may affect its health benefits and risks, current dietary guidelines relating to nitrate have been in place since the 1970s and don't differentiate between nitrate from meat, vegetables and water.

Dr. Bondonno said while the 1970s animal studies reported a small incidence of malignant tumours, there was evidence not all nitrates deserve to be "tarred with the same brush".

"For instance, unlike meat and water-derived nitrate, nitrate-rich vegetables contain high levels of vitamin C and/or polyphenols that may inhibit formation of those harmful *N*-nitrosamines associated with cancer," she said.

Dr. Bondonno said it was vital more research was conducted so guidelines could be updated.

"The public are unlikely to listen to messages to increase intake of nitrate-rich vegetables, if they are concerned about a link between nitrate intake and cancer."

However, she stressed while official guidelines hadn't changed, the apparent benefits of nitrate had seen many people potentially put themselves at risk.

"We need to be sure nitrate-rich vegetables don't actually have an increased risk of cancer if we consume a higher amount," she said.

"High dosage nitrate supplements are already used to improve physical performance in sport, while [vegetable](#) nitrate extracts are being added to cured meat products with a "clean label" claim, purporting to be better

for you.

"So we really need to get this right."

What do we eat, then?

Given its divided experts in the field, Dr. Bondonno said it's understandable people may be confused as to whether nitrate is good or bad for them.

"They're probably thinking, 'If I can't have a salad, what CAN I have?'," she said.

Despite the debate, she said current evidence suggests people should aim to get their nitrate from vegetables—but there was no need to go overboard.

"Dark green, leafy vegetables and beetroot are good sources, our research shows one cup of raw, or half a cup cooked per day is enough to have the benefits on cardiovascular health," she said.

"We know processed meat isn't good for us and we should limit our intake, but whether it's the nitrate in them that is causing the problem or something else, we don't know.

"It just further emphasises the need to investigate dietary [nitrate](#) to clarify the message for people.

"The potential cancer link was raised 50 years ago; now it's time to conduct an in-depth analysis to distinguish fact from fiction."

'Nitrate: The Dr. Jekyll and Mr. Hyde of human health?' was published in [Trends in Food Science & Technology](#).

More information: Catherine P. Bondonno et al, Nitrate: The Dr. Jekyll and Mr. Hyde of human health?, *Trends in Food Science & Technology* (2023). [DOI: 10.1016/j.tifs.2023.03.014](https://doi.org/10.1016/j.tifs.2023.03.014)

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