Sodium Nitrite in Food, Water Tied to Type 2 Diabetes Risk

— Observational study serves up "a new piece of evidence" for debate over additives

by Kristen Monaco, Staff Writer, MedPage

Greater daily exposure to nitrites in food and water may increase the risk for type 2 diabetes, French researchers reported.

Compared with those in the lowest tertile of total nitrite exposure (mean 3.3 mg/day), those exposed to the most nitrites -- a mean 8.6 mg/day -- had a 27% greater risk for type 2 diabetes (HR 1.27, 95% CI 1.04-1.54, *P*=0.009 for trend), according to Bernard Srour, PhD, PharmD, MPH, of Sorbonne Paris Nord University, and colleagues.

Meanwhile, those in the middle tertile for total nitrite exposure -- a mean 5.1 mg/day -- did not have a significantly higher type 2 diabetes risk, they wrote in *PLOS Medicine*.

Essentially the same level of risk was seen when looking at people who fell into the highest tertile for food- and water-originated nitrite exposure compared with the lowest exposure group over a median 7.3-year follow-up (HR 1.26, 95% CI 1.03-1.54, *P*=0.02).

When looking just at nitrite originating from additives -- mostly sodium nitrite e250, which is often used as a color fixer -- there was an even stronger relationship between the highest levels of exposure versus the lowest levels (0.56 mg/day vs 0.14 mg/day) with type 2 diabetes risk (HR 1.53, 95% CI 1.24-1.88).

The greatest risk for type 2 diabetes was seen when the researchers restricted the data to just sodium nitrite exposure. People falling into the highest daily exposure to sodium nitrite specifically saw a 54% higher risk for type 2 diabetes than the lowest exposure group (0.47 mg/day vs 0.14 mg/day).

On the other hand, there wasn't a significant link between any amount of nitrate exposure with type 2 diabetes risk. This included exposure to total nitrates, food and water-originated nitrates, additive-originated nitrates, and potassium nitrate.

"These results provide a new piece of evidence in the context of current discussions regarding the need for a reduction of nitrite additives' use in processed meats by the food industry and could support the need for better regulation of soil contamination by fertilizers, as highlighted by the latest report of the French Agency for Food, Environmental and Occupational Health and Safety," Srour's group pointed out.

They added that "in the meantime, several public health authorities worldwide already recommend citizens to limit their consumption of foods containing controversial additives, among which sodium nitrite, in the name of the precautionary principle."

Nitrites are quite pervasive across prepackaged foods. For reference, Srour's group noted that over 15,000 packaged items currently on the French market contain added nitrites or nitrates.

"Dietary exposure to nitrites and nitrates also includes food additives, as they can be used as preservatives to improve shelf life, also providing a pink coloration to ham and several processed meats," the authors explained. As for food-originated nitrites, they noted that the most common sources are green leafy vegetables and beetroots, as they're naturally occurring in water and soil, and also often added for fertilizer.

They acknowledged that fruit and vegetables, and leafy greens in particular, are an important source of nitrites, but that several meta-analyses have shown "low to very low quality of evidence for the association of cruciferous green leafy vegetables with [type 2 diabetes] risk."
The current analysis drew upon data on 104,168 adults in the French NutriNet-Santé cohort study. The cohort was about 80% female, and the average age was 43. Nitrite and nitrate exposure was deduced from 24-hour dietary recalls linked with a food composition database. Throughout the follow-up period, a total of 969 new cases of type 2 diabetes were identified.

The authors cautioned that no "causal link can be established from this observational study." Other study limitations included potential selection bias tied to the healthier behaviors of the cohort participants versus the general population.

Disclosures
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Srour disclosed no relationships with the industry. A co-author disclosed relationships with the French Pork Institute.

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