Bryan: Q&A on nitrites

DR. Nathan Bryan of The University of Texas has answered the following questions on his work with nitrates and nitrites in foods and the health benefits he believes they provide.

Q. Are the nitrates/nitrites in vegetables/fruits the same chemically as the nitrates in cured meats?

A. They are exactly the same chemically. The only difference is that in fruits and vegetables, nitrites/nitrates are present naturally from incorporation through the nitrogen cycle. Of course, they are added as salts to cured meats, butthe residual nitrite or nitrate is just the same and sometimes higher in vegetables than what is added to meats.

Q. The nitrites/nitrates in cured meats are synthetic, so are they the same as coming from vegetables or fruit?

A. They are synthetic in that they are sodium or potassium salts added exogenously, but in solution (and in the body), they occur naturally as anions, just as in the vegetables. The high water content of meats allows complete dissociation to the anions, so what you are ingesting is the same as what you ingest in the form of vegetables.

Q. Nitrite-free bacon appears to have 3 mg/100 mg of nitrites. Is this native to bacon? Are there other meats that have nitrites on their own without being cured?

A. There are low levels of nitrites and nitrates in all tissues. Surprisingly, this bacon was labeled as nitrite-free bacon (or organically cured) but contained twice as much nitrite as the naturally cured bacon.

Q. From your perspective as a scientist, as to your knowledge in research, do you consume cured meat? What is your opinion about cured meat? Is it healthy or harmful?

A. I do not avoid cured or processed meats. I commonly eat bacon for breakfast one to two days per week and have a sandwich (with luncheon meats) or hot dog on occasion. I eat these without guilt or fear. An occasional hot dog or sandwich can be part of a balanced, healthy diet.

Q. Regarding vegetables like spinach, is there a difference between the nitrite content of cooked and raw vegetables?

A. What we have reported on is the content in raw vegetables. The manner in which you cook will affect the content of nitrites and nitrates. Raw or steamed vegetables contain the most. However, when you cook vegetables in water, nitrite and nitrate — being water soluble — come out in solution, so the content in the cooked vegetables is much less. In fact, that is how we extract the nitrite and nitrate from the raw vegetables.

Q. Niman Ranch has a bacon with nitrites derived from celery. Is this healthier than regular cured (synthetic nitrite) bacon?

A. The notion of "nitrite-free" or "organically cured" meats is a public deception. In this method of curing, instead of adding nitrite salts directly to the meats, celery salt is added, which is about 50% nitrate. Then, a starter culture of bacteria is added to the celery salt to reduce the endogenous nitrate to nitrite, "the curative molecule." So, they can label it nitrite free, but, in fact, they are generating more nitrite from the celery salt than what is allowed to be added as a salt.

That is the reason for the higher nitrite content in the nitrite-free bacon. It is the exact same molecule as the one added to regular cured meats; it just comes from a natural source: celery. I think it is probably less healthy than regular cured meats because of the bacteria load and the unknown efficacy of conversion by the bacteria. My hope is that we create awareness and educate scientists, physicians and food people of this concept.

Mean nitrate and nitrite contents of a convenience sample of fruits, vegetables, meats and processed meats*

Fruits	Nitrates, mg/100 g	Nitrites, mg/100 g
Apple sauce	0.3	0.008
Banana	4.5	0.009
Fruit mix	0.9	0.08
Orange	0.8	0.02
Vegetables		
Broccoli	39.5	0.07
Carrots	0.1	0.006
Cole slaw	55.9	0.07
French fries	2.0	0.17
Ketchup	0.10	0.13
Mustard greens	116.0	0.003
Salad mix	82.1	0.13
Spinach	741.0	0.02
Tomato	39.2	0.03
Vegetable soup	20.9	0.001
Meats/processed meats		
Bacon	5.5	0.38
Bacon, nitrite-free	3.0	0.68
Ham	0.90	0.89
Hot dog	9.0	0.05
Pork tenderloin	3.3	0.0

*Nitrate and nitrite concentrations were quantified by ion chromatography (ENO 20 Analyzer; Eicom, Kyoto, Japan). Analysis of foods reflects mean value from triplicate or quadruplicate analyses.
Source: *Food Sources of Nitrates & Nitrites: The Physiologic Context for Potential Health Benefits*, by Norman G. Hord, Yaoping Tang and Nathan S. Bryan.