

## What is sodium nitrite?

Sodium nitrite is a salt and an anti-oxidant that is used to cure meats like ham, bacon and hot dogs.

Nitrite serves a vital public health function: it blocks the growth of botulism-causing bacteria and prevents spoilage. Nitrite also gives cured meats their characteristic color and flavor. In addition, USDA-sponsored research indicates that nitrite can help prevent the growth of *Listeria monocytogenes*, an environmental bacterium that can cause illness in some at-risk populations.

## Isn't botulism one of those old diseases that aren't really a problem anymore?

Botulism is rare today because processing methods and preservatives like sodium nitrite are used to protect consumers. In fact, since sodium nitrite was approved for use in cured meats in 1925, no cases of botulism have been associated with commercially prepared cured meats. Sodium nitrite provides a food safety benefit to consumers.

## Are 'nitrates' used in curing meats?

Decades ago, sodium nitrate - a "chemical cousin" of nitrite — was also used as a curing ingredient. Sodium nitrate, even though still permitted as an ingredient, is rarely used to cure meat and only in some certain specialty meat products.

## Are cured meats the major source of nitrite?

Actually, less than five percent of daily nitrite intake comes from cured meats. Nearly 93 percent of nitrite comes from leafy vegetables & tubers and our own saliva. Vegetables contain nitrate, which is converted to nitrite when it comes into contact with saliva in the mouth.

In fact, the amount of nitrate in some vegetables can be very high. Spinach, for example, may contain 500 to 1900 parts per million of nitrate; radishes may contain 1500 to 1800 parts per million and lettuce may contain 600 to 1700 parts per million. The nitrate to nitrite conversion process from eating vegetables makes up 85 percent of the average human dietary nitrite intake.

By contrast, the amount of nitrite allowed by USDA to be added to cured meats is miniscule at no more than 156 parts per million. In most cases, the amount added is 120 parts per million or less and after processing the amount remaining in the final product is typically 10 parts per million or less. This amount is approximately one-fifth the level of 25 years ago.

There is another source of nitrite in the body. Called the "Molecule of the Year" by Science Magazine in 1992, nitric oxide is an amazing chemical that the body uses to control blood pressure, kill tumor cells and heal wounds. When nitrite oxide is done with its work, its byproduct is nitrite. So clearly, nitrite is something that is made by the body as part of its normal, healthy processes.

## Can cured meats be produced without sodium nitrite?

Cured meats by their definition must include sodium nitrite. Sodium nitrite is the very ingredient that gives a product like ham its color and taste. Its shelf life also would be shortened substantially.

Some uncured products are available today that use ingredients like beet or celery juice or natural sea salt to deliver a color and flavor similar to traditional cured meats. Beets, celery and sea salt may all contain nitrate naturally. When the nitrate in celery, beets and sea salt, and other nitrate-containing vegetables, is exposed to certain types of bacteria in the product, nitrate is converted to nitrite, which results in product characteristics similar to traditionally cured meat products. The amount of nitrite consumed from these types of products versus traditionally cured meat products is virtually the same.

## Years ago, I heard some people say that nitrite causes cancer. Is sodium nitrite safe?

Numerous scientific panels have evaluated sodium nitrite safety and the conclusions have essentially been the same: nitrite is not only safe, it is an essential public health tool because it has a proven track record of preventing botulism.

Specifically, the National Toxicology Program, an agency within the U.S. Department of Health & Human Services and the world's leading authority on the toxicological safety of chemicals, conducted a multi-year study to evaluate its safety. The study, approved by a panel of experts May 18, 2000, found that nitrite was safe at the levels used.

A panel convened by the California Office of Environmental Health Hazard Assessment in June 2000 also determined that nitrite at the levels used did not pose any risk to developing fetuses.

## Is it true that nitrite actually may have health benefits?

Evidence is mounting that nitrite actually does have numerous health benefits. Studies have shown that nitrite is part of the body's healthy nitrogen cycle. The body converts nitrate to nitrite to regulate blood pressure, promote wound healing, destroy pathogens in the gut and even to prevent preeclampsia during pregnancy.

Scientists at the National Institutes of Health over the last several years have announced a number of studies that document the health benefits of nitrite. These scientists have concluded that nitrite is a potential new treatment for organ transplantation, heart attacks, sickle cell disease, and leg vascular problems.

Dr. Mark Gladwin of NIH's National Heart, Lung and Blood Institute, whose lab uncovered nitrite's value as a medical treatment, told reporters in September 2005, "The idea it's bad for you has not played out... We think we stumbled into an innate protection mechanism." Gladwin said NIH believes so strongly in its promise that it is seeking a pharmaceutical company to help develop it as a therapy.

## Conclusions

In a review by University of Minnesota scientists, nitrite as used in meat and meat products is considered safe because "known benefits outweigh potential risks."

Nitrite experts like Dr. Nathan Bryan at the University of Texas Health Science Center in Houston say there are many myths about nitrite sources and safety.

"Nitrite can prevent injury from a heart attack, control blood pressure, promote wound healing, help treat sickle cell anemia and many other health conditions and may even prevent disease progression," Bryan said. "Old myths about an alleged link to cancer are very weak at best."

Consumers should consume – and enjoy – nitrite-containing cured meats with confidence.

---

## Helpful Links

### American Meat Institute

<http://www.meatami.com>

<http://www.meatsafety.org>

<http://www.meatsafety.org/meat-and-cancer-myths>

### University of Minnesota

<http://www.extension.mn.edu>

### Medem

<http://www.medem.com>

### Council for Agricultural Science and Technology

<http://www.cast-science.org>

## Third-Party Experts

### Doug Archer, Ph.D.

Associate Dean for Research  
Institute of Food and Agricultural Sciences  
University of Florida  
(352) 372-1784  
[dlarcher@ufl.edu](mailto:dlarcher@ufl.edu)

### Andy Milkowski, Ph.D.

Adjunct Professor, Muscle Biology Laboratory  
Department of Animal Sciences  
University of Wisconsin  
(608) 262-1606  
[amilkowski@ansci.wisc.edu](mailto:amilkowski@ansci.wisc.edu)

### James R. Coughlin, Ph.D.

President/Principal Toxicologist  
Coughlin & Associates  
(949) 916-6217  
[jrcoughlin@cox.net](mailto:jrcoughlin@cox.net)

### Nathan Bryan, Ph.D.

Professor  
University of Texas  
(713) 500-2439  
[nathan.bryan@uth.tmc.edu](mailto:nathan.bryan@uth.tmc.edu)