Nitrates and Nitrites in Food and Vegetables

Why not have a salad for breakfast, especially when it contains Mom and Dad's home-grown lettuce? It's low in nitrates because they either use no fertilizer or in the odd year composted manure. Fresh manure can contaminate it with both nitrates and bacteria, while most synthetic fertilizer will definitely increase the concentration of the ion. Here's more on why nitrates can be harmful and what foods contain them.

1. Why worry about nitrates (NO_3^-) and nitrites NO_2^-?

Here's the latest health effect summary(*italicized*) from the Environmental Protection Agency

A) Excessive levels of nitrate in drinking water have caused serious illness and sometimes death. The serious illness in infants is due to the conversion of nitrate to nitrite by the body, which can interfere with the oxygen-carrying capacity of the child's blood. This can be an acute condition in which health deteriorates rapidly over a period of days. Symptoms include shortness of breath and blueness of the skin.

One author (Martijn Katan) who is a nutritionist argued here (http://ajcn.nutrition.org/content/90/1/11.full#ref-3) that what's being described above (**methemoglobinemia**) is actually caused by bacterial contamination and subsequent production of nitrogen monoxide. But that was one conclusion from an experiment in the 1950s. Meanwhile, reputable medical sources (such as http://www.nlm.nih.gov/medlineplus/ency/article/000562.htm) point out that nitrites and nitrates can cause methemoglobinemia , and it can also be brought about by a host of other compounds according to several sources that show up in Google Scholar under "causes of methemoglobinemia".

B) Drinking water levels which are considered "safe" for short-term exposures: For a 10-kg (22 lb.) child consuming 1 liter of water per day, a ten-day exposure to 10 mg/L total nitrate/nitrite.

C) Chronic: Effects of chronic exposure to high levels of nitrate/nitrite include diuresis, increased starchy deposits and hemorrhaging of the spleen.

D) *Cancer: There is inadequate evidence to state whether or not nitrates or nitrites have the potential to cause cancer from lifetime exposures in drinking water.*

So it is still a possibility given that their presence and impact can combine with that of known carcinogens in the environment. Nitrates and nitrites are not themselves carcinogenic but they can form cancer-causing nitrosamines in the gut.

2. What foods are sources of nitrates and nitrites?

Bacon particularly along with cold cuts and hot dogs have nitrites added to them either in the form of sodium nitrite or celery salt. But erythorbic and ascorbic acids are also added to prevent nitrosamine formation. Meanwhile spinach, especially, and lettuce can also have concentrations of nitrate that can be as high as those of bacon. But it depends on how they're grown! If they are grown with composted manure, legume-enriched soil or with no fertilizer at all, these vegetables will have safe levels of nitrates. What elevates their concentration is liquid synthetic nitrates, some other nitrogen fertilizers and fresh manure, especially that of chickens. It should also be noted that outer leaves of lettuce have more nitrates than the inner leaves, since they have more time to concentrate them.

Sources:

http://www.agroecology.org/documents/Joji/leafnitrate.pdf

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http://ajcn.nutrition.org/content/90/1/11.full#ref-3

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