

Nitrite in spinach and other foodstuffs

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Analyses of frozen spinach by the competent German *Länder* authorities have revealed increased concentrations of nitrite in some samples. Nitrite (NO_2^-) is the anion of inorganic sodium nitrite. Nitrite is an intermediate product of nitrogen supply of plants. The nitrogen is stored as nitrate in plants. Under certain conditions after harvest, microbiological or enzymatic influences depending on temperature and time can cause the nitrate contained in plants to convert to nitrite.

Nitrite has relatively low acute toxicity which practically eliminates the acute health hazard of nitrite in spinach even at higher concentrations for adults. Infants, however, react sensitively to nitrite during the first months of life as it disrupts the oxygen transport by the red blood cells which can cause oxygen deficiency (cyanosis). Thus increased intake of foodstuffs containing nitrite or nitrate in the first months of life could constitute a health risk. Yet in actuality, infants consume hardly any foodstuffs containing nitrite or nitrate during this time.

However, the intake of larger concentrations of nitrite through foodstuffs over a longer period of time is problematic. There are reasonable grounds to suspect that nitrite is converted to N-nitroso compounds (e.g. nitrosamines) with naturally occurring amines in the body. Many of these compounds have proven carcinogenic in animal experiments. The Federal Institute for Risk Assessment thus advocates that the human intake of nitrite is reduced as much as possible. The same is true for nitrate, which can be converted to nitrite within the body. The concentrations of nitrite and nitrate in foodstuffs should therefore be reduced as much as possible.

BfR names a number of measures that can help reduce concentrations of nitrate and nitrite in vegetables. At the same time, the Institute emphasises that the issue nitrite and nitrate should not lead to reduced vegetable consumption. The benefits of a large dietary portion of vegetables greatly outweigh the potential risk of slightly increased nitrate and nitrite concentrations.

The full version of this BfR Opinion is available in German on
http://www.bfr.bund.de/cm/208/nitrit_in_spinat_und_anderen_lebensmitteln.pdf