

Dietary supplements containing dinitrophenol (DNP) can lead to severe intoxication and even to death

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In response to current events, the BfR is advising against the consumption of products containing the substance 2,4-dinitrophenol (DNP) which are being offered as dietary supplements. After an objection by the authorities in the United Kingdom about a product containing dinitrophenol which was marketed as a dietary supplement, a warning was issued in the European Rapid Alert System for Food and Feed (RASFF). The current example indicates that products containing DNP could also be illegally available in Germany at present, e.g. via internet trading platforms or through distance marketing from third countries.

The substance 2,4-dinitrophenol (DNP) is an industrial chemical which is illegally added to dietary supplements and slimming aids (so-called fat burners). In particular, people from the bodybuilding scene constitute an important target group for products of this kind. Cases have been documented where the addition of DNP had not been declared, meaning that such addition could not be identified by the consumer. This was also the case with the product which triggered the rapid alert mentioned above.

DNP is a lipophilic substance which belongs chemically to the group of nitrophenols. This group of substances is toxic to humans and can lead to intoxication via oral ingestion, inhalation or dermal exposure. Inside the body, DNP acts as an uncoupler of oxidative phosphorylation in the mitochondria of the cell, thus inhibiting the physiological respiratory chain and consequently the energy metabolism of the cell. DNP is not suitable for human consumption and can lead to severe, life-threatening intoxications. Possible symptoms of acute poisoning can be nausea, vomiting, sweating attacks, yellow colouring of the skin, overheating of the body, respiratory distress, a drop in blood pressure and cardiac arrhythmias. The symptoms can result in coma and death. Consumption of the substance over a longer period of time can lead to a yellowish opacity of the lens of the eye (cataract), skin lesions and effects on the liver, kidneys and blood, cardiovascular and nervous system.

In the medical literature, the lethal oral dose is given as 1-3 g of dinitrophenol. The substance appears to accumulate in the body, so that the repeated intake of smaller doses may also have severe and life-threatening effects.

In various countries, there have been several deaths in recent years which were attributable to the consumption of products to which DNP had been unlawfully added. In the German federal state of North Rhine-Westphalia, for example, a warning was issued in 2013 about a slimming aid containing 300 mg of DNP per tablet which was being marketed through the internet as a dietary supplement. Swissmedic, the agency responsible for the authorisation and supervision of therapeutic products in Switzerland, issued the same warning. In its opinion of May 2015, the Swiss Federal Food Safety and Veterinary Office (FSVO) urgently advised against the consumption of any amounts of DNP. Interpol, the International Criminal Police Organisation, also warned against products containing DNP in May 2015 due to two cases of severe health impairments, one of which had a fatal outcome.

The BfR provided information already in 2006 and 2008 on severe health impairments, some with a fatal outcome, that can occur through the consumption of products containing DNP. Within the scope of notification of poisoning on the basis of the Chemicals Act, the BfR has become aware of five cases of poisoning with 2,4-dinitrophenol to date, three of which were fatal.

In the first case of poisoning with a fatal outcome, a young woman had taken DNP as a “fat burner”. Severe sweating resulted, with an extremely rapid rise in temperature, increased heart frequency and pulmonary edema. She died a short time later of multiple organ failure. In the second case, a bodybuilder had taken too high a dosage of DNP. Here too, the outcome was an extreme increase in body temperature, kidney failure and cardiac arrest resulting in death. Also in the third fatal case, symptoms that are typical of DNP poisoning occurred, resulting in the death of the patient.

Due to the acute and chronic health risk caused by DNP, the BfR urgently advises against the consumption of this substance. If it is suspected that products containing DNP have been ingested, medical advice should be sought or a poison control centre contacted.

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