

## Frequently Asked Questions about Folic Acid

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The vitamin, folic acid, is essential for human health. However, only about twenty percent of the German population have a high enough dietary intake. Besides its role in human metabolism, folic acid also has a second important role: at high doses (400 microgram per day) timely intake before and during the first months of pregnancy can prevent malformations of the spinal column and the central nervous system. Too much folic acid (1,000 microgram of synthetic folic acid) can mask the neurological changes caused by vitamin B12 deficiency. This primarily affects older people. BfR has compiled frequently asked questions on the subject of folic acid.

### **What is folic acid?**

Folic acid is a water soluble vitamin in the B group which occurs naturally in many foods and is also produced synthetically. Folic acid which occurs naturally in food is called "folate". Synthetically manufactured folic acid is used in food supplements, is contained in fortified foods or is used in medicinal products. Here the term "folic acid" refers to both forms of the vitamin.

### **In which foods does folic acid occur naturally?**

Folates occur naturally in foods of animal and plant origin. Liver, green vegetables like spinach or broccoli, pulses, wheat germ, wholegrain cereal products, yeast, egg yolk, citrus fruits and juices are particularly rich in folates.

### **What are folate equivalents?**

Folates in food and synthetically manufactured folic acid are ingested and converted in the body at differing rates. In order to take this different bioavailability into account, their levels are indicated internationally as folate equivalents: 1 microgram folate is equivalent to 1 microgram dietary folate or 0.5 microgram synthetic folic acid.

### **Why does the body need folic acid?**

Folic acid is involved in a large number of metabolic processes and is, therefore, important for all cell division and growth processes. If too little of this vitamin is present, then metabolic processes cannot take place normally. This may lead to disease symptoms like anaemia, dyspepsia and changes in the mucous membranes. The unborn child needs folic acid for the neural tube to close properly.

### **How much folic acid should people take?**

The recommended folic acid intake per day depends on age. Adolescents and adults should have a daily intake of 400 microgram folate equivalent from food. Pregnant and breastfeeding women need about 50% more, approximately 600 microgram.

### **Can the recommended amount of folic acid be ingested from food?**

The normal folic acid requirement can be covered by a balanced, rich diet with loads of vegetables, pulses and wholegrain products. Studies, however, show that only a small part of the population has a diet of this kind. This means that many people do not have a high enough folic acid intake.

### **Do people in Germany have a sufficient supply of folic acid?**

The recommended daily intake of 400 microgram folate equivalents is not reached by the majority of the population in Germany. Just under 20% of people in Germany achieve the recommended folic acid intake. In 2000 the intake of folate equivalents by men was between

195 and 376 microgram, by women between 194 and 350 microgram. In other European countries, too, folic acid intake is lower than recommended.

### **Can food fortification improve folic acid intake?**

Various foods like breakfast cereals, dairy products, salt and soft beverages are fortified with folic acid. Because eating habits and the reasons for choosing certain foods vary considerably, not all groups in the population benefit equally from this fortification.

In Germany and in other European countries there are also discussions about whether the targeted fortification of a staple food, which is consumed in predictable amounts by all echelons in the population, could be one way of improving the population's folic acid intake. The USA and Canada already carry out this kind of fortification. Ireland will be the first European country to introduce the mandatory fortification of flour with folic acid.

### **Why should women wishing to start a family and women in the first three months of pregnancy take folic acid tablets as well?**

The neural tube of the unborn baby closes in the first four weeks of pregnancy, a stage at which many women do not realise they are pregnant. In around one to two out of 1,000 pregnancies the spine does not close at all or not completely. This leads to a neural tube defect. The most well known is spina bifida, which is referred to popularly as "open back".

There are various causes for neural tube defects. Studies have shown that the incidence can be reduced by increasing folic acid intake during the critical phase of neural tube closure. For precautionary reasons intake should commence four weeks prior to conception and continue up to the end of the 12<sup>th</sup> week of pregnancy. Even now we still do not know how folic acid works. We simply know that it does.

### **How much additional folic acid should women wishing to start a family take to prevent neural tube defects?**

In addition to the 400 microgram folate equivalents which adolescents and adults should take in daily from their diet, it is recommended that women wishing to start a family and women in the first three months of pregnancy should take an additional 400 microgram folic acid per day as food supplements or medicinal products. Studies have shown that this amount can reduce the number of neural tube defects by between 20 and 60%.

Women who have already given birth to a child with a neural tube defect or who have terminated a pregnancy because of a defect of this nature should also take folic acid when trying to become pregnant again. Studies have shown that a dose of 4 milligram per day has the desired effect. These women should also begin taking folic acid four weeks prior to conceiving and continue up to the end of the first three months of pregnancy.

### **Can too much folic acid cause damage?**

Too much folic acid can mask the neurological changes caused by vitamin B12 deficiency. This mainly affects older people who are not able to ingest vitamin B12 effectively from their diet. However this effect only occurs at intakes of more than 1,000 micrograms synthetic folic acid.

It is still to be clarified whether the additional intake of folic acid increases the number of twins. Nor has it been fully clarified whether additional folic acid encourages the early stages of cancer, for instance in the colon.

### **What does BfR recommend?**

BfR primarily recommends that all consumers have a diet which is rich in folic acid. It further recommends that women wishing to start a family and women in the first three months of pregnancy should also take folic acid products. Here it should be borne in mind that the folic acid requirements are higher in the further course of pregnancy and when breastfeeding, too. Doctors, midwives and pharmacists should inform women of childbearing age about the specific action of folic acid and advise them correspondingly.

If Germany decides in favour of the mandatory fortification of certain staple foods (for instance flour) with folic acid in order to achieve an even supply of the population, the fortification of other foods should be restricted to maximum 100 microgram per portion in order to avoid the risks related to excessive folic acid intake by the population. Soft drinks should not be fortified at all.

The goal of mandatory fortification of staple foods with folic acid is to improve the folic acid supply of the entire population. The folic acid intake which is recommended to prevent neural tube defects cannot be achieved through this however. What would still be needed is the targeted uptake of folic acid from folic acid supplements.