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### WHAT IS FOLATE?

Folate is the broad term for a group of over 100 compounds that have common vitamin activity and are important for healthy growth and development of blood cells and nerve tissue. Folic acid refers to pteroylmonoglutamic acid and is the synthetic form of folate. Folic acid is used in dietary supplements and fortified foods and beverages. It is more readily absorbed and used in the body, and is more stable than naturally occurring food folate. Good food sources of folate are green vegetables, especially broccoli, spinach and salad greens; legumes; fruits and fruit juices; nuts and seeds; and fortified cereals. Folate is destroyed by heat and oxidation during cooking and storage, so raw rather than cooked fruit and vegetables are a better source of folate. It is difficult to get enough folate from natural sources as natural folate is not as easily absorbed as a folic acid supplement.

### HOW MUCH FOLATE IS RECOMMENDED?

It is recommended that New Zealand adults consume around 400 micrograms ( $\mu\text{g}$ ) of folate each day. Most people get about 250 micrograms of folate from food each day, well below the recommended intake. Daily folate requirements increase substantially for pregnant and breastfeeding women and therefore they are recommended to consume around 600 and 500  $\mu\text{g}$  of folate each day, respectively. Folate deficiency can result in a type of anaemia called 'megaloblastic anaemia', which is a blood disorder characterised by the presence of enlarged immature red blood cells (megaloblasts).

### FOLIC ACID AND PREGNANCY

Folic acid is important for the healthy development of babies in early pregnancy. A baby's growth is most rapid in the first weeks of pregnancy – often before a woman is even aware she is pregnant. Folic acid is needed to help close the neural tube and form the spinal cord. If the neural tube doesn't close, the result is a neural tube defect (NTD), a major group of birth defects where the brain, spinal cord, or the covering of these organs has not developed properly.

Spina bifida is the most likely outcome of an NTD. Studies from the 1980s and 1990s showed that folic acid can help ensure healthy development of babies in early pregnancy. In 1999 Berry et al. found that a daily dose of 400  $\mu\text{g}$  of folic acid alone resulted in a reduction in neural tube defect risk when taken at least one month before conception and for 12 weeks after conceiving. Therefore, the New Zealand Ministry of Health currently recommends an 800  $\mu\text{g}$  folic acid vitamin supplement be taken daily for at least four weeks before conception and for the first three months of pregnancy to prevent the occurrence of most NTDs. There are no known negative side effects of high doses of folic acid when taken by healthy people. Although, research in this field continues with some negative health consequences suggested. For example, high levels of folic acid may mask vitamin B12 deficiency in certain groups such as the elderly and the young, thus delaying diagnosis. FSANZ notes that masking of vitamin B12 deficiency is unlikely to occur if intakes of folic acid are less than 1 mg a day.

### FOLATE FORTIFICATION

Fortification is when extra nutrients (such as folic acid) are added to food and drinks during the manufacturing process. Fortification can be voluntary and since 1995 in Australia and 1996 in New Zealand certain foods have been fortified with folic acid as the FSANZ Code has permitted voluntary addition to a maximum claim of 100  $\mu\text{g}$  for foods, such as breakfast cereals, and fruit and vegetable juices. However, mandatory fortification is when manufacturers are legally required to add extra nutrients to a particular food to meet a significant health need in the population. The mandatory folic acid fortification standard in Australia requires that all wheat flour used for making bread, with the exception of flour represented as organic, must be fortified with folic acid. This will mean most bread in Australia will contain folic acid. Bread will contain an average of 120  $\mu\text{g}$  of folic acid per 100 g (approximately three slices).

Bread was chosen as the appropriate food vehicle for fortification as it is consumed regularly by a large proportion of women of childbearing age across different socio-economic sub-groups. However, women of child bearing age will still need to take a folic acid supplement to ensure that they achieve the recommended amount of folic acid. Wheat flour was selected as the preferred route to add folic acid to bread. Bread will be labelled to identify that it has been fortified. This information will be included in the ingredients list and sometimes in the Nutrition Information Panel (NIP). The total amount of folate in the NIP includes the natural folate as well as the amount of folic acid that has been added.

For more than ten years, Australia and New Zealand have introduced a number of initiatives to increase the folic acid intake of women planning to or who may become pregnant to reduce the risk of their babies developing NTDs. These initiatives have included health claims on food labels, education programs, voluntary folic acid fortification of foods – such as breakfast cereals and bread – and encouraging women to take folic acid supplements. Despite these initiatives, most women of child-bearing age are still not consuming enough folic acid. Mandatory fortification is being introduced to provide additional protection against NTDs. Mandatory folic acid fortification is expected to reduce the number of NTD affected pregnancies by 14–49 (or up to 14%) each year in Australia.

### CONSIDERATIONS OF FORTIFICATION

The objective of FSANZ was to determine the most effective way to increase total folate intake in women to decrease the current incidence of NTD in New Zealand and Australia. The risks and benefits to the general population were considered in the final decision, so that improving the health of pregnant women does not impact on other groups within society. The risks of increasing folate

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toxicity in the general population are low as folate has a low absorption rate and the amounts present in foods are low so. There is some concern that high folate in the elderly can mask the signs of vitamin B12 deficiency, but this is only if vitamin B12 deficiency is determined from blood samples. There are also some recent studies linking high folate with decreased risk of cardiovascular disease, so fortification could benefit the wider community, not just pregnant women.

Some consumers believe that their food should not be fortified so their views were taken into consideration. The bread industry has opposed mandatory fortification of all breads as their research shows many consumers opposed not being able to choose whether the bread they are consuming is fortified. Instead, the industry proposed fortifying a number of breads targeted at those at risk of the consequences of a low folate diet.

### WHAT HAPPENS IN OTHER COUNTRIES?

#### MANDATORY FORTIFICATION WITH FOLIC ACID:

- USA – has had mandatory fortification of all cereal/grain flours with folic acid since 1998.
- Canada – white flour and pasta have been mandatorily fortified since 1998.
- Chile – introduced mandatory fortification of flour in 2000.
- Australia – introduced mandatory fortification of bread making flour in late 2009.

#### VOLUNTARY FORTIFICATION WITH FOLIC ACID:

- European countries – to date, none have introduced mandatory fortification with folic acid.
- UK and Ireland – continue to permit voluntary fortification of certain foods with folic acid.
- New Zealand – has deferred the mandatory fortification of bread with folic acid until May 2012.

Recommendations for women planning a pregnancy:

USA, Canada, Australia, UK and Ireland recommend women planning a pregnancy take a folic acid tablet in the range of 400–500 µg per day, for women at low risk of an NTD-affected pregnancy.

### FORTIFICATION DEFERRED IN NEW ZEALAND – FUTURE

Food Standards Australia and New Zealand had put a plan in place that by September 2009, all bread should be fortified with folic acid. This met with much criticism and the New Zealand Minister for Food Safety, Kate Wilkinson, deferred the commencement date requiring the mandatory fortification of bread with folic acid in New Zealand until 31 May 2012. In the meantime, bread manufacturers have indicated that they will voluntarily increase the range of breads that have added folic acid. In Australia the fortification of bread with folic acid has gone ahead and its impact will be closely monitored.

### REFERENCES

Food Standards Australia New Zealand 2009. Australian user guide – mandatory folic acid fortification.

New Zealand Food Safety Authority. Folate, folic acid and fortification.

Ministry of Health 2009. Nutrition – folate/folic acid. [www.moh.govt.nz](http://www.moh.govt.nz) [Accessed 2010].