

GM crops to fight spina bifida

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Credit: Earth100/Wikipeidia

Genetically modified crops are usually designed to have herbicide tolerance and insect resistance, but there are other applications of such engineered plants, such as the incorporation of genes for specific nutrients. Research published in the *International Journal of Biotechnology* suggests that the bio-fortification of rice with a gene to produce more folate (vitamin B9) could significantly reduce the risk of

birth defects, such as spina bifida and other neural tube defect conditions, caused by deficiency of this nutrient.

The first commercially available GM crop was the FLAVR SAVR tomato in 1994 but by 2012 some 170 million hectares of GM crops were being grown worldwide in 28 countries by 17 million farmers. There are various crop plants being developed that are enriched in iron and zinc, vitamin A and other [nutrients](#). Two well-known GM rice crops that were designed to improve nutrition levels in the food are in development. The first, so-called Golden rice, is an entirely safe, pro-vitamin A enriched rice and will be introduced soon with the potential to save the lives of hundreds of thousands of children who might otherwise die of malnutrition. By contrast, folate biofortified rice (FBR) is still at the laboratory phase of development, although proof-of-concept has been well established.

Hans De Steur and colleagues at Ghent University, Belgium and Liaoning Academy of Agricultural Sciences, China, suggest that in regions of high folate-deficiency risk, such as Balrampur (India) and Shanxi (China) there are many years lost of healthy life because of a lack of this vitamin. About 50% to 70% and up to 85% of all [neural tube defects](#) arise because of maternal folate deficiency.

The standard metric used in research, as described by the World Health Organization (WHO) is the DALY Disability-Adjusted Life Year. This equates to the sum of Years of Life Lost (YLL) due to premature mortality and the Years Lost due to Disability (YLD) for people living with a given health condition and so combines morbidity and mortality. The team's work shows that folate biofortification could help avoid 29 to 111 DALYs each year in Balrampur per 1000 births and between 47 and 104 DALYs in Shanxi. In absolute figures, China and India have 16000 and 18000 NTDs births per annum, and account for about 12% of the global estimated number of NTDs, i.e., nearly 300 000 NTDs per year.

More information: "Evaluating GM biofortified rice in areas with a high prevalence of folate deficiency." (2014) *International Journal of Biotechnology*. 13(4). p.257-279. [biblio.ugent.be/publication/59 ... 359/file/5933399.pdf](https://biblio.ugent.be/publication/5933399/file/5933399.pdf)

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