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Opinion Article

Short Note on Biofortification

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DESCRIPTION

Biofortified" or "biofortified" refers to nutritionally fortified food crops with higher bioavailability for human consumption that are developed and grown using modern biotechnology techniques, common plant varieties and agronomic practices. The Food and Agriculture Organization of the United Nations estimates that around 792.5 million people worldwide are malnourished, 780 million of who live in developing countries. In addition, about two billion people around the world suffer from another type of hunger known as "hidden hunger", which is caused by not getting enough of the necessary micronutrients in the daily diet.

Biofortification is the idea of growing crops to increase their nutritional value. This can be done by conventional selective breeding or by genetic engineering. Biological fortification is different from conventional fortification because it aims to make plant foods more nutritious as the plant grows, rather than adding nutrients to the food during processing. This is a significant improvement over regular fortification when it comes to providing nutrients to the rural poor, who rarely have access to commercially fortified foods. Therefore, microfiltration is seen as an upcoming strategy to address micronutrient deficiencies in low- and middle-income countries. In the case of iron, WHO has estimated that biofiltration could help cure 2 billion people with iron-deficiency anemia.

Basically, biofortification is the process of growing crops to increase nutrition value from the seed on. It is different from food fortification which involves improving the nutritional content of food crops during the processing stage. In biofortification, the nutritional value of crops is improved during the plant growth stage, i.e., nutritional micronutrient content is embedded in the crop being grown. Crops can be biofortified through selective breeding or genetic engineering. In India, biofortification is done exclusively through selective breeding. Biofortification research focuses on iron, zinc, and vitamin A deficiencies. These are the micronutrients whose deficiency affects the largest amounts in the world. In India, the focus is on tapioca (iron), wheat (zinc), sorghum (iron), rice (zinc), cowpea (iron) and lentils (iron and zinc). Bio-fortified pearl millet, rice and wheat are now available to farmers in India.

Agronomic practices: This involves fertilizing to increase micronutrient intake to plants in soil conditions that are poor in these micronutrients/minerals.

Conventional plant breeding: This involves traditional breeding methods, which produce enough genetic variation for desirable traits in the plant, such as high levels of any micronutrients. any nutrition. It involves crossing varieties over several generations to eventually produce a plant rich in nutrients as well as other favorable traits. This is the only method used in India to produce biofortified crops.

Gene engineering/modification: This involves inserting DNA into an organism's genome to create new or different traits, such as resistance to any disease.

Sufficient and sustainable production and food safety is the ultimate goal of biofiltration. Biological fortification of essential micronutrients in crops can be achieved through three main approaches, namely transgenic, conventional and agronomic, involving the use of biotechnology, plant breeding and fertilization strategies. Most crops are targeted by transgenic, conventional breeding and agronomic approaches including staple crops such as rice, wheat, maize, sorghum, lupine, pine beans usually, potatoes, sweet potatoes and tomatoes. Cassava, cauliflower and bananas have been biofortified using transgenic and breeding approaches, while barley, soybeans, lettuce, carrots, canola and mustard have been biofortified with genetic engineering and agronomic methods. Many crops have been targeted by means of transgenics, while the practical application of biofiltration by means of propagation is higher.

The transgenic approach can be a valid alternative to the development of bio-enriched crops when the nutrient content of the cultivars is limited or no genetic modification. It relies on access to unlimited genetic resources to transfer and express desired genes from one plant species to another, regardless of their evolutionary and taxonomic status. Furthermore, when a particular micronutrient does not exist naturally in the crop,

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transgenic approaches remain the only viable option for enriching these crops with the specific nutrient. . The ability to identify and characterize the function of genes and then use those genes to alter plant metabolism is key to the development of transgenic crops. In addition, the pathways of bacteria and other organisms can also be cultured to exploit alternative pathways for metabolic engineering.