

# Module 1: Hydrothermal processing to promote micronutrient bioavailability in processed food products

Biofortification of Whole Grains -  
Strategies to combat Hidden Hunger



Kerstin Fredlund – Founder Hidden in Grains  
Primary Care Specialist  
Doctor of Medicine in Food Science

# Strategies to Combat Hidden Hunger

Many people in developing countries are changing from traditional diets to a Western style diet with greater energy-dense, processed, micronutrient-poor foods, which contributes to unhealthy and poor diets.

Most **common strategy used for combating micronutrient deficiencies** caused by poor or insufficient diets are:

- Food fortification
- Food supplements
- Food diversification
- Biofortification



Photo source: Unsplash

# Food Fortification

**Food fortification** is the practice of adding one or more essential nutrients to a widely consumed food. Food is fortified by adding Multi Nutrient Powder (MNP) containing 10 different vitamins and 5 minerals, among others vitamin A, folic acid, iron, zinc and iodine.

The Food and Agriculture Organization (FAO) and the World Health Organization (WHO) identify food fortification as one of the main strategies for addressing micronutrient malnutrition.

# Food Fortification

In many countries, fortification practices are mandatory for food companies. *For example*, dairy products or plant-based “dairy” products are fortified with D-vitamin and other vitamins. Salt is fortified with iodine, and baby food like formulas, gruels and porridges are fortified with several vitamins and minerals.

However, **a healthy and diverse diet**, with reduced consumption of highly processed food, **could reduce the need of fortification**.

# Supplementation

**Food supplements** are concentrated forms of vitamins, minerals or other substances like amino acids, fatty acids or fibres, that are intended to supplement the normal diet. The form of supplements can vary as they can be taken as pills, capsules or liquid form.

The effectiveness of supplementation strategies to combat hidden hunger can be questionable since it can be difficult to reach the most needed target recipients living in rural and/or poor communities.



# Food Diversification

To **consume diverse food** or to increase the number of different foods consumed is another strategy to raise the nutrients in the food and to prevent and avoid deficiencies.

WHO 5 keys to a healthy diet:


1. Breastfeed babies and young children exclusively to 6 months of age
2. **Eat a variety of foods, a combination of different foods**
3. **Eat plenty of vegetables and fruits from a wide variety**
4. Eat moderate amounts of fats and oil, preferable from vegetable oils, white meat and limited processed foods
5. Eat less salts and sugars, avoiding foods, snacks and drinks high in salts and sugars

# Biofortification

**Biofortification** is focusing on making plant foods more nutritious as the plants are growing, rather than having nutrients added to the foods afterwards. Biofortification is seen as an upcoming strategy for dealing with deficiencies of micronutrients in low and middle-income countries. This can be done in two ways:

- **Selective breeding**, plant breeders search seed banks for existing varieties of crops which are naturally high in nutrients. They then crossbreed these high-nutrient varieties with high-yielding varieties of crops, to provide a seed with high yields and increased nutritional value.
- **Genetic modification**, plant's genes are engineered to increase its nutritional value considering. *For example*, Golden rice was developed to contain high content of iron and beta-carotene which can be converted in the body to vitamin A, as a potential new way to address the huge problem vitamin A deficiency.



A wide-angle photograph of a vast field of golden wheat. Scattered throughout the field are numerous red poppies, some in full bloom and others as buds. The background shows a distant treeline under a pale, hazy sky. The overall lighting is soft and warm, suggesting a sunrise or sunset.

Read more about **biofortification** and innovative ways of **bioprocessing wholegrains** in the next training block.