Technical consultation: Staple crops biofortified with vitamins and minerals: considerations for a public health strategy

Date: 6 - 8 April 2016
Location: Sackler Institute for Nutrition Science in New York City, NY, United States of America

SCOPE AND PURPOSE

Member States of the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO), assembled at the Second International Conference on Nutrition in Rome from 19 to 21 November 2014 recognized that the progressive realization of the right to adequate food in the context of national food security is fostered through sustainable, equitable, accessible in all cases, and resilient and diverse food systems and that food and agriculture systems, including crops, livestock, forestry, fisheries and aquaculture, needed to be addressed comprehensively through coordinated public policies, taking into account the resources, investment, environment, people, institutions and processes with which food is produced, processed, stored, distributed, prepared and consumed. These and other commitments were agreed on the Rome Declaration on Nutrition. Additionally the Framework for Action included actions recommended for sustainable food systems and promoting healthy diets.

Biofortification refers to the indirect addition of essential nutrients or other substances to foods for the purpose of nutritional or health enhancement. “Biologic fortification” or “biofortification” when referring to agriculture, indicates crops that have been nutritionally enhanced using agronomic practices, conventional plant breeding practices, or modern biotechnology. As with industrial food fortification, the basis for biofortification as a strategy to improve nutrient intake is based on the regular daily consumption by all family members of a consistent and large amount of food staples which predominate in the diets of the poor, thus implicitly targeting low-income households. The intention is to provide nutrients that are essential for health and development, but for metabolic, physiological or economic reasons are not available to all population groups at all times.

There are three, non-mutually exclusive methods which are used to develop biofortified crops: application of fertilizer (agronomic biofortification), conventional plant breeding, and bioengineering or genetic modification (including trans-genetic manipulation). Since biofortified crops are usually more nutrient-dense than non-biofortified varieties and assuming similar nutrient bioavailability and nutrients retention after cooking or processing, persons will consume and absorb more of such nutrients from biofortified crops than from non-biofortified crops.

Biofortified crops offer the possibility of rural-based interventions that could reach remote populations, where micronutrient deficiencies are more prevalent, and also could potentially penetrate to urban populations as production surpluses are marketed. From an economic point of view, once the biofortified crops are developed, there are no costs of buying the fortificants and adding them to the food supply during processing, as is the case for industrial fortification of staple foods.

However, biofortified foods may be not accepted by consumers if they have different characteristics compared to non biofortified crops. Allergies or intolerance, particularly with bio-engineered crops or genetic modification (including trans-genetic manipulation) have been also raised as a concern. From the environmental perspective cross-contamination of crops and the reduction of biodiversity in crops have been cited as threats of this strategy by limiting diversification of foods.

WHO has commissioned a systematic review of evidence to determine the effects of staple crops biofortified with increased micronutrient content for improving vitamin and mineral status in populations, with particular emphasis on iron, vitamin A and zinc.

The review will help inform a WHO guideline on biofortification as a strategy to address micronutrient malnutrition. While the review is in progress, it is also important to have a dialogue between technical experts, researchers, producers, policy makers, programme implementers and the private sector to collate opinions on the technology, feasibility, economic impact and legislation of biofortification for the improvement of micronutrient status, and to explore the applicability in other countries where this technology is less often used or not applied.

WHO and FAO are convening a technical consultation: Staple crops biofortified with vitamins and minerals: considerations for a public health strategy at the Sackler Institute for Nutrition Science in New York City, NY, United States of America to be held on 6 - 8 April 2016 to discuss these issues in detail. The objectives of this consultation are to review:

1. Role of biofortified crops in improving micronutrient status as constituent of regular diets and patterns of production and consumption worldwide.
2. Technical considerations with regard to variety of biofortified crops, the number and amount of nutrients that can be included in a biofortified food, their stability and bioavailability as well as the acceptability of the foods.
3. Economic, acceptability, environmental and safety aspects of biofortified crops and equitable marketing to ensure access by vulnerable populations.
4. Legal and regulatory issues related to biofortification in agriculture and health.
5. Ethics of biofortification in public health.
7. Research priorities to better support evidence of improved nutrition and unintended adverse effects.