SCOPE AND PURPOSE

Background

Fortification is the purposeful addition of vitamins and minerals to foods during their industrial processing, as a way to improve the nutrition and health of populations who consume these foods. Rice is a globally produced, milled and traded staple food with an annual production and consumption worldwide of about 450 million metric tons. It is the dominant staple food crop of around 3 billion people worldwide, providing up to 50-60% of their daily energy and protein intake. It is estimated that 95% of the world's rice is produced in developing countries of which 92% takes place in Asia. With its popularity, reach and quantum of consumption, rice far exceeds the requirements for adoption as a vehicle for food fortification for the purposes of a population-level intervention.

The main rice processing method is milling. In some countries, the milled white rice is coated with talc and glucose to improve its appearance. Milled white rice is low in vitamins and minerals as these vitamins (B vitamins) and minerals (iron) are found predominately in the germ and bran layers. Parboiling is one of the ways by which nutrients in the rice grain can be partially preserved. The parboiling process of soaking of the rough rice, applying heat, drying and milling results in the transfer of nutrients to the inner endosperm layer from the bran before milling. Attempts of fortifying rice by simply adding a micronutrient powder to the rice that adheres to the grains by electrostatic forces (dusting) have proven unsuccessful due to the typical washing and cooking methods employed in most developing countries which results in the rinsing away of the enrichment. Three more sophisticated methods have been developed to overcome this limitation. Coating involves spraying of the surface of ordinary rice grains in several layers with a vitamin/mineral mix to form a protective coating that will not easily rinse off the surface when washed. The grains (fortified premix) contain high concentrations of vitamin and mineral fortificants and must be blended with natural rice to produce fortified rice. The extrusion technology is a totally different concept in rice fortification. In hot extrusion, a dough made of rice flour, vitamin/mineral mix, and water is passed through a single or twin screw extruder and shaped into partially pre-cooked grain-like structures resembling rice grains, that is then blended with natural polished rice at about 1:200 ratio to produce fortified rice. The cold extrusion follows a similar process a low temperature that does not utilize any additional heat primarily, and produces an uncooked, opaque fortified premix grains with a slightly softer consistency that is then blended with natural polished rice at about 1:200 ratio to produce fortified rice.
Rice is a highly culturally-sensitive commodity. Growing, selecting and cooking of rice grains are subject to regional, national and even local preferences. There are also many different ways of cooking rice: i) soaking, and boiling with excess water; ii) boiling in excess water; iii) boiling without excess water; iv) rinsing and boiling without excess water; and v) frying and boiling without excess water. The use of these cooking preparations could have different retention of micronutrients in fortified rice kernels as some vitamins are sensible to heat and others are water-soluble. Cultural preferences for specific types of rice represent another key barrier to mass fortification. A technical challenge is to produce fortified rice that resembles natural rice and resists normal meal preparation and cooking processes.

The World Health Organization (WHO) is updating several evidence-informed guidelines for the fortification of staple foods as a public health intervention, including the fortification of rice with iron and other micronutrients. WHO in collaboration with the Global Alliance for Improved Nutrition are convening a consultation on Technical Considerations for Rice Fortification in Public Health in Geneva, Switzerland from 9-10 September 2012 to provide inputs to the guideline development process and discuss technical considerations of the fortification processes for rice.

The objective of this consultation is to review the industrial and regulatory technical considerations in rice fortification.

Background documents will be commissioned to experts in food technology and nutrition science on the following topics:

The main outcomes of this consultation are to review:
1. Different technologies used industrially for the production fortified rice
2. Worldwide rice consumption patterns
3. Stability of micronutrients in fortified rice and rice products
4. Bioavailability of potential iron and zinc compounds used in the fortification of rice.
5. Methodological approach to estimate appropriate fortification levels in different types of rice, according to technology and consumption practices.
6. International experiences with legal frameworks and definitions of rice fortification.