

# Assessing Ultra Rice®

## Research on an effective tool for micronutrient fortification

Micronutrient deficiencies threaten the health, development, and productivity of millions of people worldwide. PATH's Ultra Rice—a micronutrient-fortified manufactured food product—is an effective, appropriate means of improving nutritional status in populations where rice is a staple food.

The Ultra Rice technology has been researched far more than any other rice-fortification technology. The findings, summarized here, indicate that Ultra Rice is acceptable, effective, stable, and affordable.

### About Ultra Rice

Made from extruded rice flour, Ultra Rice grains resemble natural milled rice grains in size, shape, color, and density and taste and smell just like regular unfortified rice. The manufactured grain contains and protects any added micronutrients—which may range from vitamin A alone to a mix of iron, zinc, thiamin, niacin, and folic acid—limiting the extent to which the nutrients degrade during storage, rinsing, and cooking. Ultra Rice does not include any animal or genetically modified products.

Rice millers (and other users) typically blend the Ultra Rice grains with ordinary rice at a ratio of 1:100, which provides approximately one-third of the recommended daily intake of each nutrient per serving of rice. Even in cultures where rice is eaten at each meal, the levels of nutrients consumed will never be high enough to cause adverse effects.

### A proven technology

To date, more than 25 studies have assessed various aspects of Ultra Rice. A summary of these studies is available on the PATH website (<http://www.path.org/publications/details.php?i=1153>).

- **Consumer acceptance.** In sensory evaluations in Ecuador, Colombia, and India, the majority of consumers accepted the fortified rice. Trained food panelists agreed that rice blended with vitamin A-fortified Ultra Rice grains was similar in taste, texture, and smell to ordinary rice.



*Ultra Rice, which resembles ordinary rice both before and after cooking, was widely accepted in evaluations in rice-consuming countries.*

- **Willingness to pay.** In India and Ecuador, consumers said they were willing to pay more for the nutritional benefits of fortified rice. After a social marketing campaign in Indonesia, 13 retail outlets maintained or increased their volume of rice sales when they offered fortified rice, even when prices were 10 to 20 percent higher.
- **Nutrient retention.** Nutrient losses are low after fortified rice is rinsed and cooked, unless a large amount of water is used that is not consumed. Researchers at the National Institute of Nutrition in India found that fortified rice lost less than 2 percent of iron when they rinsed it four times and cooked it using the water-absorption method.

- **Stability.** Ultra Rice grains remained stable even under challenging testing conditions. When stored for six months at 45°C and both 60 and 100 percent relative humidity, the Ultra Rice retained 100 percent of its iron, zinc, and folic acid and nearly 80 percent of its thiamin and vitamin A. The effect on color and taste was slight, with minimal lipid oxidation (rancidity).

## The impact of Ultra Rice

### Combating vitamin A deficiency

- In Brazil, researchers provided 83 children aged one to six years with vitamin A–fortified Ultra Rice. The number of vitamin A–deficient children decreased from half to less than 10 percent in a single month. Other preschool children ate the fortified rice for a full year, during which time the number of vitamin A–deficient children decreased from almost half to none.
- In Canada and Brazil, researchers supplied non-pregnant women with Ultra Rice, intentionally providing excess levels of vitamin A. The women’s serum retinol levels increased by a maximum of 50 percent. The researchers concluded that it would be impossible to consume enough fortified rice to cause serum retinoic acid blood levels that could be dangerous to pregnant women.
- In Nepal, 69 women in their last trimester of pregnancy received Ultra Rice fortified with 850 µg of retinol equivalent per day, six days per week, over a six-week period. Their mean adjusted pupillary threshold—a measure of dark adaptation that reflects vitamin A status—showed a significant improvement, despite the fact that it otherwise would be expected to worsen late in pregnancy.

### Providing essential iron

A randomized, blinded-to-participants, placebo-controlled feeding trial demonstrated that Ultra Rice fortified with SunActive® iron was highly effective in improving the iron status of non-pregnant, non-lactating Mexican women. The experimental group ate fortified rice providing 20 mg of iron per daily portion. At six months, women eating Ultra Rice had a significant increase in plasma ferritin concentration, and the prevalence of anemia had decreased by 80 percent.



*Extensive study has shown that Ultra Rice is acceptable, effective, stable, and affordable.*

## Moving forward

Research on Ultra Rice is ongoing, both to continue refining formulations and to test its impact on additional populations in different countries. Meanwhile, commercial companies have learned how to make Ultra Rice in Colombia and Brazil, and India will join the list soon. Government agencies in those countries and in China are actively exploring opportunities for making Ultra Rice available to vulnerable populations with micronutrient deficiencies, including through public-sector feeding programs and by commercial means. The Ultra Rice technology will better equip these countries to achieve their public health nutrition goals. PATH will continue to document its impact as part of international efforts advocating for universal rice fortification.

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