

A breakthrough in rice fortification

Malnutrition, in the appearance of distinct underfeeding, regrettably is still common throughout Third World countries. Pictures of fully emaciated and starving children still circulate around the world and presumably represent the motor for private sponsoring of public social aids. But many are not aware of the type of malnutrition caused by deficiencies of vitamins and minerals.

This type of malnutrition is better known as “hidden hunger,” since most of the people affected do not show the physical symptoms usually associated with hunger and nutrient deficiency. The lack of key vitamins and minerals, the so called micronutrients, has been known for a long time to cause anemia, cretinism and blindness. Only in recent years has it been realized that these visible forms of deficiencies are but the tip of an enormous iceberg.

A large percentage of malnutrition is not directly related to extreme hunger but to a shortage of the nutritionally correct forms of food, particularly during early childhood. Levels of mineral and vitamin deficiencies that have no clinical symptoms can have major impacts, causing many people to live below their physical and mental potential.

The hidden form of malnutrition impairs the mental and physical development of infants and young children. It also exposes fetuses to the risk of aberration and pregnant women to death during or shortly after birth, and it undermines productivity of adults. Children easily fall victim to a vicious circle starting in poverty, causing malnutrition and sensitivity for diseases, which leads to mental and physical stunting and generates the base for restarting poverty.

The reason for hidden hunger is often simple. When daily meals are predominantly based on one starchy food such as rice, wheat flour or corn, the diet may provide enough calories but does not supply the vitamins and minerals needed for suitable nutrition to ensure good health. A balanced diet containing adequate amounts of all essential vitamins and minerals includes a variety of fruits, vegetables, pulses, dairy, eggs and possibly other foods from animal sources. People who do not consume such foods for any reason (cost, availability, traditions, ignorance, etc.) will sooner or later develop hidden hunger.

by Roland Kunz

NutriRice process addresses the problem of ‘hidden hunger’

The Global Alliance for Improved Nutrition (GAIN), the globally acting non-profit organization fighting malnutrition through food fortification projects in many countries, estimates that vitamin and mineral deficiencies affect one-third of the world’s population, involving all negative aspects as described above. Hidden hunger especially exists in many countries where rice is the major staple food and provides a high per-



The Buhler extruder used in the NutriRice process. Photos courtesy of Buhler.



Buhler's expertise in extrusion technology helped create the NutriRice process.

centage of the daily caloric intake. Rice has a low vitamin and mineral content, and a significant part of micronutrients in rice is lost during rice whitening and polishing processes. Making rice more

nutritious by fortifying it with essential vitamins and minerals will help to improve the health status of people.

STAPLE FOOD FORTIFICATION

Food fortification — the addition of small amounts of essential vitamins and minerals to the foods that people regularly eat — is a demonstrated and effective way to ensure that large numbers of those at risk for micronutrient deficiencies receive the nutrients they need. The fortification of commercially produced staple foods allows exposed populations to benefit without necessarily making major changes to their eating habits. This approach has been successfully used in many countries with flour fortification. Buhler is part of the interactive network known as the Flour Fortification Initiative. Peter Boehni, head of Buhler's Nutrition Solutions, is a member of FFI's Leaders Group. While flour fortification

is performed by simple blending of flour and micronutrients — both with comparable granulation which helps prevent segregation — the fortification of rice admittedly requires a special process.

The NutriRice process, jointly developed by Buhler and DSM and based on the low-cost raw material broken rice, not only addresses the problem of hidden hunger but also meets the challenge of implementing rice fortification. While embedding the vitamins and minerals into the reconstituted rice kernels, these valuable micronutrients do not segregate and are well protected during storage against negative factors like oxidation as well as against washing-off during rinsing prior to cooking.

NutriRice — reconstituted vitamin and mineral-enriched rice kernels — is formed by extrusion of rice flour, thereby simulating natural rice kernels in size, shape and color. The color, howev-

er, may be impacted by micronutrients like β -Carotene, and therefore may even increase the attractiveness of the rice for children. The rice reconstitution and fortification process offers the opportunity not only to compensate for vitamin and mineral losses during the whitening and polishing processes, but to add multiple micronutrients in an adequate complex designed to the local needs of populations and especially to the exposed groups such as children, pregnant women or geriatric people. The fortified reconstituted kernels are finally added to the natural whole rice kernels in a ratio of, for example, 1:100 or 2:100, guaranteeing a controlled intake of the right levels of vitamins and minerals.


With the combined knowledge of Buhler on extrusion processing and DSM on micronutrients and food fortification, a reliable process has been elaborated to overcome the challeng-

es of efficiently fortifying rice, being qualified for production-scale application. A careful selection of vitamins and minerals along with well-adjusted process parameters is key to ensure quality of the fortified rice kernels, which can be demonstrated at Wuxi NutriRice, the China-based joint venture of Buhler and DSM.

GAIN AWARD

The relevance of the NutriRice concept and the well-engineered and reliable technology behind it have been recognized by eminent protagonists of international aid programs such as GAIN. Together with IBLF (International Business Leaders Forum), GAIN nominated DSM, the micronutrient expert and moving spirit for public relations within the NutriRice partnership, as the winner of the 2008 GAIN Business Award for Innovation

in Nutrition. Out of more than 30 entries from all over the world, DSM won this prestigious award for the reason of “displaying outstanding innovation in the development of new products and services to fight malnutrition, improve public health and promote sustainable development.”

DSM and Buhler said the GAIN award was a great honor and hopefully will help pave the way for increased attention to the global problem of hidden hunger and the need to find solutions, which requires efforts from the private and public sectors in cooperation with NGOs (non-governmental organizations). 

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