

EQUINUT: a high-energy weapon fighting malnutrition

Malnutrition in Malian children is being tackled by a combination of improving a familiar traditional food recipe and eliminating toxin contamination from its main ingredient.

This increases the chances of the bio-fortified food – Equinut – being acceptable and achieving its aim of reducing the high mortality rate in children under five years, while greater awareness of the contamination risks associated with aflatoxins (toxic and carcinogenic substances) could boost the use of toxin-resistant varieties. The improved recipe also offers women the potential to improve family livelihoods by selling Equinut.

Malnutrition is one of the main causes for 241 of every 1,000 children born in Mali failing to reach the age of five years. Food availability and lack of access to food underlie malnutrition in rural areas where the majority of households do not consume vegetables regularly and do not eat more than one meal a day during the lean season (May, June and July).

A survey on quality of life conducted by the Aga Khan Foundation (AKF) in 2008 revealed the following problems in rural households in Mopti region: a quantitative deficiency of the diet; low dietary diversification; ignorance of the nutritional value of food prepared; low use of food hygiene measures for disease prevention; and little knowledge of the process of weaning and ignorance of the practice of exclusive breastfeeding.

In response, through the Aga Khan Development Network, the AKF is running a research project – Action on Di-dégué – a food recipe based on existing local products in the food habits of people in rural areas of Mali. The project partnership includes ICRISAT, the University of Bamako's Faculty of Science and Technology and Faculty of Medicine Pharmacy and Dentistry, with the Institute of Rural Economy/ Laboratory of Food Technology (LTA) of Mali.

Di-dégué is a combination of peanut groundnut paste, honey and millet, sorghum or rice flour and already in the food habits of people in rural areas of Mali.



The basic concept of the Equinut project is the bio-fortification of di-dégué and its extension as a nutritional and therapeutic food against malnutrition among children from 6 to 59 months in disadvantaged rural communities in Mali and, later, in sub-Saharan Africa. The target is to reduce the rate of acute malnutrition from 39% to 19%.

A strong research component underpins the Equinut project, including the production and dissemination of groundnut free of aflatoxin; development, characterization, and production of Equinut; and a clinical trial to test the effectiveness of Equinut in the management and prevention of malnutrition in comparison with a reference product.

Significant progress has been made in the first two years of the project in two components: production and popularization of groundnut resistant to aflatoxin, and the development, characterization and production of Equinut, as well as capacity building of health centers' staff. With ICRISAT at the helm, the main breakthrough in the first component is that five varieties of groundnut resistant to contamination by aflatoxin fungi have been developed and the integrated management practices introduced in groundnut-growing areas in rural districts of Kita (Kayes region) and those of Mopti and Djenné (Mopti region). This is a major breakthrough because all the varieties hitherto grown in these zones were sensitive to aflatoxin and carried varying levels of contamination.



Di-dégué is biofortified to make Equinut

Extension techniques for producing groundnut resistant to aflatoxin contamination

Groundnut is an essential component of Equinut because the biofortification of the local dish di-dégué and extension of Equinut requires groundnut varieties resistant to aflatoxin.

ICRISAT contributes to the Equinut project by introducing integrated crop management practices, improved agronomic practices, biological control and biotechnological interventions to reduce risks of groundnut contamination.

The production of groundnut resistant to aflatoxin and its extension phase mainly comprised: (i) training women in the production methods and techniques of groundnut resistant to aflatoxin and the construction of granaries for crop storage in proper conditions after harvest, (ii) training women in Equinut production, and (iii) a study on the value chain for marketing the product in local markets. Twelve women's groups were selected to produce groundnuts resistant to aflatoxin contamination.



ICRISAT Scientific Officer Diallo Aoua Traoré training farmers in integrated aflatoxin management in Kouyou village of Kita region, Mali

The training course covered theoretical training, which focused on seven priority themes: farming practices, pest control, harvesting, seed packaging, shelling, bagging, storage and conservation of seeds. These courses in the local language were followed by practical work, including participants jointly monitoring a collective testing plot for aflatoxin-resistant groundnut, and exchange of experiences.

Research on characterization and laboratory testing of Equinut conducted by IER/LTA and FST/LaboREM-biotech registered significant progress, showing an increase in the protein content of di-dégué from 11.91% to 19.50%, and a similar increase of the energy content of simple di-dégué from between 406.62 Kcal and 432 Kcal/100g to 480 Kcal for bio-fortified di-dégué (Equinut) recipes.



What makes Equinut special?

There are seven principles underpinning the fortification of di-dégué to ensure Equinut respond to the needs of the communities. These are:

Quality

Equinut provides important energy and meets international standards for vitamin and micronutrient content;

Volume

daily consumption of 100 g is effective;

Administration

children of 6 to 59 months may eat it at any time of the day;

Location

local ingredients are used in product preparation;

Interaction

the product is sold in local markets and available to all families in the project area;

Time

Equinut can be kept throughout the year at room temperature in a closed container;

Economy

all the necessary ingredients are available at harvest, thereby avoiding any additional burden on households.

Researchers from the institutions involved ensure implementation, while the overall project management functions (monitoring of activities, resource mobilization, management of partner relationships) are carried out by the Aga Khan Foundation (Mali). A national steering committee is also involved in project implementation and monitoring.

Integrated management of aflatoxin in groundnuts

Many people in the developing world are exposed to aflatoxins, poisonous toxins produced by fungi infecting crops such as groundnuts that are unknowingly ingested by consuming contaminated foods.

Therefore, the importance of ensuring that farmers produce safe crops and food provides focus for ICRISAT involvement in the Equinut project in Mali.

ICRISAT, together with the Institut d'Economie Rurale (IER), is helping farmers produce quality groundnut, free of aflatoxin, to enhance household consumption as part of a project with the Aga Khan Foundation in Mali. ICRISAT's role involves supporting groups of women to produce improved aflatoxin-free groundnut varieties that will be used to make a biofortified version of the local dish di-dégué, which will be developed into a product known as Equinut.

As part of the project, 10 staff of the Health Referral Centers and Community Health Centers in Mopti, Djenne and Kita districts attended refresher courses for the diagnosis, recognition and management of malnutrition, along with communication for behavioral change. Similarly, 1000 women from various women's groups, some of which have already been introduced to growing aflatoxin-resistant groundnut in the said districts, were trained in the recognition of malnutrition and behavior change practices.

Nearly 14,420 children under five years in 20 villages benefit directly from this project, which indirectly affects nearly 16,583 Malian women of childbearing age.

The work reported above is continuing under the CGIAR Research Program on Agriculture for Nutrition and Health.