

ERAFRICA PROJECT

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ERAFRICA PROJECT was launched on 6th October 2014 at University of Nairobi. The project title is to "Development of grain drying facilities that use super absorbent polymers (SAPs) and adjusting the properties of SAPs to optimize drying of grain and control of aflatoxin contamination (SAPDRY)."



Dr. D. Mbuge (Right), with the projects participants

Aflatoxin contamination in maize is documented to cause loss of life and post harvest losses in tropical climates. Aflatoxin contamination results when farmers who depend on direct sunlight to dry their grain are instead faced with rains during the harvest. This project addresses this problem by using super absorbent polymers to dry maize in places where it not possible to apply electricity or fossil fuel. Previous results clearly indicated that SAPs are effective for drying and aflatoxin control in maize. The proposed project seeks to apply the results to fabricate drying and storage structures and test the SAP for drying and control of aflatoxin contamination in maize using field scale experiments.

The main collaborators are

Collaborators

Dr. Eng. Duncan Onyango Mbuge, University of Nairobi, Kenya (Project Coordinator)

Prof. Dr. Raffaele Mezzenga, ETH-Zurich, Switzerland

Prof. Dr. Oliver Hensel, Universität Kassel, Germany

Dr. Moses Marenja, University of Venda, South Africa

Project Objectives

1. To fabricate and test grain drying and storage structures incorporating SAPs as drying agents and develop a prototype ready for manufacture and for use by farmers
2. To improve the formulation of SAPs so as to optimize their properties for use in grain drying
3. To investigate the electrochemical properties of maize contaminated with aflatoxin to help in the development of simple and portable equipment for the detection and measurement of aflatoxin levels
4. To improve the capacity of the participating institutions for research involving aflatoxin control and enhance opportunities for collaboration in future joint activities
5. To disseminate findings of the project, patenting and effect socio-economic analysis of the granary and aflatoxin sensors

Main results achieved by June 2015

- Project agreement was endorsed and signed by legal representatives of all the collaborating universities
- Project initiation workshop held in Nairobi and attended by all collaborators
- PhD student (Paul Mboya) and Masters student (Francis Muga) identified and are in the process of registration at the University of Nairobi and University of KwaZulu Natal
- PhD student visited both ETH Zurich and University of Kassel and carried out substantial work with the assistance of the two joint supervisors.
- Sorption and desorption isotherms have been determined at ETH Zurich for two types of hydrogels
- Appropriate programs have been identified and purchased for the Computational Fluid Dynamics (CFD) modelling. The CFD has been done at the University of Kassel and the model validation process has begun.