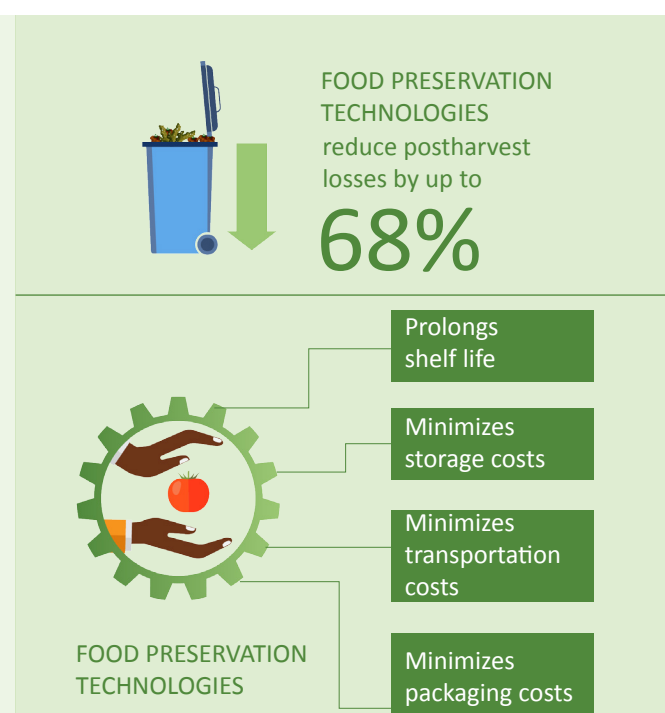
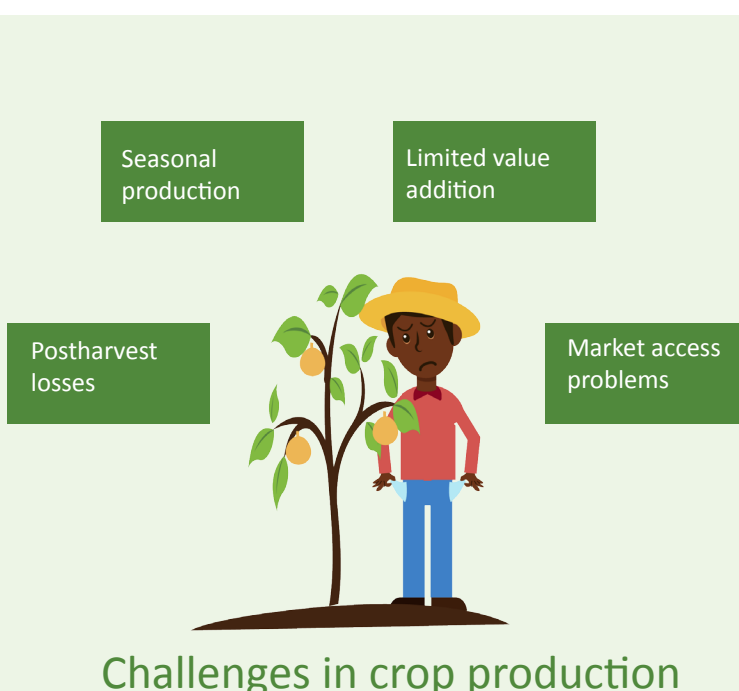


Adapting refractance window drying technology to produce high quality fruit and vegetable bioproducts.

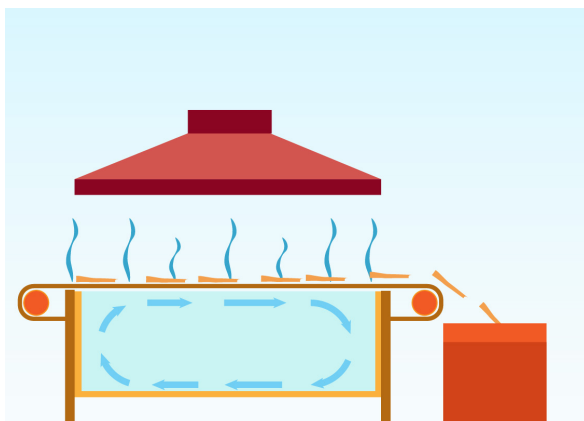
Preamble

Smallholder farmers in Uganda and Kenya produce a variety of fruits, traditional and exotic vegetables, spices, and herbs that have unique nutritional, nutraceutical and functional properties. However, the value derived from these crops is limited due to postharvest losses, seasonal production, limited value addition and market access problems. Developing and applying affordable food preservation technologies could reduce postharvest losses by up to 68%. Additionally, food preservation by drying not only prolongs shelf life, but it also

minimizes storage, transportation and packaging costs. While a variety of drying techniques exist, each differ in drying speed, energy efficiency, product quality, costs, and technological simplicity. Technologies that apply high temperatures in their processes lead to food discolouration, loss of flavour, and decreased nutrients and bioactive compounds. This project is developing a heat drying technology that is affordable yet yields high quality products, even from heat sensitive materials.



The technology



Refractance window drying technology (RWDT) uses heat to dry fruits and vegetables, while maintaining the nutritive qualities. With RWDT, liquid foods, purees or slices are dried on one side of a thin plastic film, whose other side is in close contact with hot water at temperatures below boiling point. The plastic film, usually in the form of a conveyor, is susceptible to infrared radiation, therefore allowing thermal energy

to be transferred from the water to the food. Transmission of infrared radiation stops when the food is dry, and the product scraped off the conveyor. The temperature of the product remains relatively low during drying, resulting in better quality retention due to reduced moisture content and inhibited microbial growth. The heated water is recycled, further improving thermal efficiency of the system.

Local and regional benefits

The project will fabricate an affordable RWDT, that local agro-processing companies can use to produce and market high value dried food products and ingredients from locally abundant fruits and herbs such as mangoes, pineapple, passion fruit, jackfruit, avocado and moringa leaves. The expected benefits include:



An affordable locally manufactured RWDT for fruit and vegetable processing in eastern Africa;



Higher quality dried fruits and vegetables used in salads, soups, sauces and thickeners, as well as value added products such as flavouring or colouring agents, fruit powders used for instant juice, baked products, teas, and other snacks.



New market opportunities for smallholder farmers who will supply the raw materials (fruits and vegetables)

Project leader

Prof. John Muyonga - *Makerere University (MAK), Uganda*

Project partners

Prof. Arnold Onyango - *Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya*

Mr. Andrew Koskei - *Kenya Industrial Research and Development Institute (KIRDI), Kenya*

Mr. Joseph Kavuma - *TONNET Agro-engineering company Limited, Uganda*

Mr. Joseph Wanyeki - *East Africa Nutraceuticals Ltd (EAN), Kenya*

Dr. Faith Namayengo - *Food and Nutrition Solutions Ltd (FONUS), Uganda*

Dr. Joshua Mutambi - *Ministry of Trade, Industry and Cooperatives, Uganda*

For more information about this project, please contact:

BioInnovate Africa Programme
icipe — International Centre of Insect Physiology and Ecology
Duduville Campus, Kasarani
P.O. Box 30772-00100
Nairobi, Kenya.

Telephone: +254-20-8632433
Email: bioinnovate@icipe.org

www.bioinnovate-africa.org

