

Project update

Project title (Acronym):	Quality improvement and more efficient utilization of products derived from the baobab tree (<i>Adansonia digitata</i> L.) to enhance food security and nutrition in Sub-Saharan Africa (BAOQUALITY)
Geographical focus:	Malawi, Kenya, Sudan
Call reference:	Innovative approaches to process local food in Sub-Saharan Africa and Southeast Asia, which contribute to improved nutrition, as well as qualitative and quantitative reduction of losses (Announcement No. 18/16/32)
Cooperating partners:	<p>Rhine-Waal University of Applied Sciences (HSRW) The Fraunhofer Institute for Process Engineering and Packaging (IVV) Humboldt University of Berlin (HU) Mzuzu University (MU) Lilongwe University of Agriculture & Natural Resources (LU-ANAR) University of Khartoum (UKHART) Jomo Kenyatta University of Agriculture and Technology (JKUAT) Wild Living Resources (WLR) Zankhalango Association (ZA)</p> <p>Associated partners: Justus-Liebig-Universität Gießen (JLU) Malawi Bureau of Standards (MBS) Naturals Limited (NL) Baobab Social Business gGmbH (BSB) africrops! (AC) DAL Food Industries (DAL) Welthungerhilfe (WHH) African Baobab Alliance (ABA)</p>
Duration:	01.09.2019 – 31.12.2022 (HU until 28.02.2023)
Budget:	834,358.53€ + 376,403.71€ (IVV) + 301,022.37€ (HU)

Aim of the project:

The rapid growth of the baobab processing sector, particularly in Malawi, has led to substantial challenges that significantly constrain the benefits derived from baobab utilization, such as poor and inconsistent raw material quality; safety, shelf-life, and quality issues of processed products; nutrient loss and waste streams during processing; or the predominance of largely informal processing enterprises of low economic performance. In cooperation with partners from science and practice, the BAOQUALITY project, therefore, aims to improve the quality and safety of baobab products, optimize local processing technologies and increase resource efficiency during processing. This intends to support baobab collectors and processors in improving their products and processing technologies and help diversify their sources of income. Ultimately, this will contribute to improving the supply of nutritious, safe and affordable baobab food products, and achieve nutrition and food security objectives.

Results:

A major challenge in the processing industry of baobab pulp is to provide high quality pulp. Traditional approaches for quality assessment are unreliable, destructive and time and labour intensive and lead to high post-harvest losses. With a portable NIR spectrometer we developed a non-invasive rapid method to determine the quality of baobab pulp. Analyses have shown that the microbial and aflatoxin contamination levels in baobab products differ in formally and informally produced baobab products with lower levels in yeast, molds and Enterobacteriaceae in formally produced products. Microbial contamination in processed baobab products indicates an unhygienic processing environment, while the fungal and aflatoxin contamination may indicate poor post-harvest handling, transport and storage conditions of baobab fruits along the value chain. Trainings on good hygiene and good manufacturing practices and the implementation of Hazard Analysis Critical Control Points (HACCP) plans are necessary. Trainings have shown to reduce the microbial contamination on hands, devices and storage devices.

Post-harvest losses were highest during grading and sorting at purchase sites in Malawi. For candies and ice rolls highest losses occurred at the processing stage. Majority of baobab products remain unknown to baobab retailers in Kenya, but this depends on distance to markets, income from other sources, group membership, age, gender and education level. Both in Malawi and Sudan baobab is mostly collected by women, while in Malawi male collectors usually collected large quantities and obtained high value per kilogram of whole fruit and pulp sold. In Sudan marketing of baobab is dominated by females and usually sold on spot markets.



Figure 1: Main target region, core research area outlined in red
Source: © OpenTopoMap (CC-BY-SA)

Seite 3 von 3

First results from surveys in Ghana and Malawi indicate that the majority of enterprises has informal structures. Innovation performance depends on factors such as, among others, owners/managers' characteristics, IP management strategy, institutional support, organisational culture and climate, innovative dedicated resources as well as customer and network integration.

Baobab briquettes have a high calorific value and can provide an alternative to fire wood and charcoal. Field trials on the production of baobab root tubers and leaves in Malawi showed that baobab seeds in hilly areas have highest rates for survival and growth. Dried leaves and root tubers contain highest amounts of proteins and carbohydrates. Return on investment is higher for tubers than for leaves, although this differs with location. Mechanical scarification of baobab seeds can have a strong influence on germination and development.

Key statements and policy advice:

- Baobab fruit pulp is characterized by a special nutrient profile and can therefore, contribute to combat micronutrient deficiencies and hidden hunger;
- However, in countries with high pressure on baobab resources, severe quality problems are currently limiting the benefits of its utilization;

- In particular the purchase of pre-processed baobab fruit pulp from middlemen in contrast to direct purchase of whole fruits from collectors prior further processing activities increases the risk of microbial contamination.



Figure 2: Baobab seedlings in field trials using leftover seeds from fruit processing activities (left), in order to investigate possible use as a vegetable (right)
Source: Lennart Jansen (HSRW)

Risk for contamination is higher in informal produc-

tion units, while trainings can reduce risks for contamination.

- Residues from baobab fruit processing offer various further possible uses and can possibly increase the efficiency of baobab processing enterprises; for example baobab briquettes have shown to be a sustainable alternative to fire wood and charcoal.
- Solutions developed within BAOQUALITY will be transferable to other regions with abundant baobab resources and a yet developing baobab processing industry.