Food & Business Knowledge Platform

Factsheet midterm findings Global Challenges Programme Call 1

Zambian traditional fermented foods

Summary

Fermented food products have significant added value compared to unfermented food products, such as: enhanced digestibility and associated higher nutritional value; enhanced food safety by protection from proliferation of pathogenic microbes; and a prolonged shelf life. Fermented products have been produced and consumed around the world for centuries as a means of preserving food and increasing the nutritional value of raw material. In many African countries, local fermented products exist with interesting properties, which offers a great potential to enhance nutritional status and livelihood of local people.

The project aims to improve the food chains between consumption and production of Zambian traditional fermented products (the milk-based Mabisi and cereal-based Munkoyo) by aligning needs and preferences of rural and urban consumers with practices of local producers, mainly women in rural areas. Consumer preferences and current practices of local producers are being assessed and complemented by nutritional and microbiological analyses of products, which allows a formulation of the best practices that meet consumer sensory, nutritional and safety requirements. Furthermore, current barriers for urban consumers to access products are being identified and aimed at tackling them.

To date, needs and preferences of rural and urban consumers and production processes have never been systematically analyzed and aligned. Moreover, the nutritional and food safety aspects of products in relation to the currently used processing practices – including mixtures of microorganisms used for product fermentation – have not been determined and optimized. The project consortium will define best practices to improve the food production chains themselves and better address the demands of urban and rural consumers. Tailor-made starter mixtures for fermentation will also be formulated. The final goal is to generate SME level processing protocols to produce traditional foods for members of farmer cooperatives in Zambia. The project work can serve as a model in how to promote production and consumption of traditional foods in Africa.

Interim Research Findings

The research consortium started by characterizing the current variations in production processes among producers. It was found that for both products, variations exist that give rise to regional variations of the product. The products are almost exclusively produced at the household level. In fermentations, a first characterization of the present types of microbes has been made, and the nutritional content of the products has been quantified. The current diet of people in rural areas was additionally surveyed. It was found that especially Mabisi can contribute to optimizing the local diet. Local farmer cooperatives have been formed in the last few years that have also started to process primary produce such as raw milk. The project's next steps are to optimize current processing practices to SME level. The research group aims at making them suitable for cooperatives by using combinations of microbes that yield the best products with the best taste and nutritional value, and by doing an assessment of consumer preference in urban areas.

The recent Zambian implementation of the Nagoya protocol towards benefit sharing from local biodiversity is delaying the project progress. The project fulfils all requirements of the protocol and is in the process of obtaining full clearance by the Zambian authorities. From this, the research consortium has learned that in the planning of projects – both before the actual start as well as during the execution – time and effort needed for bureaucracy needs to be taken into account.

Messages to

A) Actors from private sector:
Local cooperatives can develop into organizations that can be equal partners to larger companies.

B) Civil society and practitioners organizations:
NGOs who work on local rural capacity building are instrumental to the success of improving traditionally fermented food chains by bringing together local farmers and producers.

C) Policy makers:
There is a need for legislation to allow specific products on the market. Currently, Mabisi is based on raw milk and Munkoyo is produced using plant roots and these are not allowed on the market. The project group is working with the Zambian Bureau of Standards to perform a formal hazard analysis HACCP) of the production process.

Knowledge products

- This video gives an impression of a project focus group discussion in a rural village where the project team is discussing their research questions with local producers of Mabisi and Munkoyo.
- Here you can find a sketch for a research & training facility, starter culture production, and market research at the University of Zambia that the project team has composed based on their midterm findings.

Knowledge networks

Knowledge sharing with the Food & Business Knowledge Platform and AgriProFocus will mutually benefit this and other related projects.

Co-creation

The research project originated from fundamental science and the study of fermentation with a focus on the ecology and evolution of microbes. In this research, there are more questions than this project group has time and resources for. The contribution of various local stakeholders and their organizations has greatly helped to prioritize the research by rooting it into the local context. By asking local rural producers about their practices, needs and queries regarding the products they produce, as well as engaging consumers by asking them about their preferences; this is a very rewarding way to narrow down what questions to ask. Stakeholder engagement is also key to generate logistical support for project activities.

Interestingly, the questions that are viewed as most pressing by rural communities are the same questions that are most exciting from a fundamental science perspective. These questions focus on what factors stabilize (microbial) eco-systems. For local practices, answering this question should point to best practices on how to get a safe, tasty and reproducible product and how to adjust product properties to the needs of consumers. From a fundamental science perspective, this will show what selection pressures stabilize a biological system over evolutionary time scales.

Future research and activities

In order to implement production of traditional fermented products, the research findings need to be translated as to work together with stakeholders in their marketing plans by using a business model canvas. To allow members of farmer cooperatives to process Mabisi and Munkoyo, the traditional production needs to be scaled up from the household level to a SME scale that suits local cooperatives. This upscaling needs to be designed and tested in a facility that mimics the facilities of production that cooperatives would have at their disposal. Using the network and experience of the research consortium, members of cooperatives can be sensitized and will receive training on how to process the mixtures of microbes for fermentation (starter cultures) that needs to be produced.

For this, research into upscaling of production and training of members of farmer cooperatives is needed. The project is developing plans for a facility at the University of Zambia. The research team has made a first sketch of how such a facility would look like. There are also plans to establish the facility by the end of the project.

Consortium Partners

- Wageningen UR – Laboratory of Genetics (NL)
- Wageningen UR – Food Quality and Design (NL)
- Wageningen UR – Food Microbiology (NL)
- University of Zambia
- Tropical Diseases Centre (Zambia)
- Heifer International - Zambia office
- CSK Food Enrichment (NL)
- Yoba-for-Life Foundation (NL)

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Project website

F&BKP Research Project page