

WORKSHOP REPORT

The 8th international seminar on “**Valued-Added Processing of African Fermented Food for improved Quality and Food Safety**” held from the 16th to the 19th February in Ouagadougou Burina Faso. The seminar was hosted in AZALAI Hotel independence in the lecture room SEMBENE Ousmane.



The 16th, arrival of participant was followed by two meetings: the meetings were held at 6 hours and 7 hours in the afternoon. The first gather the reporter group including Dr Bréhima Diawara from Burkina Faso and Dr Wisdom kofi Amoa-Awua from Ghana. The second assembled the national project leaders from Burkina Faso (Dr Brehima Diawara), Ghana (Dr Mary Halm) and Benin (Prof Joseph Hounouingan).

Day 1

The 17th after a breakfast hosted by DANIDA and the registration of participants, work in room was divided in four sessions: Opening session, and three other sessions.

Opening session

The first statement by Dr Alhadi Wereme director of IRSAT (Institut de Recherche en Sciences Appliquées et Technologie/Research Institute on applied sciences and technology) welcomed the participant and emphasized the need to enhance African fermented food with an economical interest related to exportation. A presentation was made by prof Mogens

Jakobsen on “support of the agribusiness by value added food processing”. He explained the importance of the value addition in the food chain from agricultural production to the consumers, its requirements and, achievements that have already be done and those that are in hand for, within DANIDA projects, especially about capacity building issue. The opening statement was made by prof Basile Guissou general delegate of CNRST (Centre National de Recherche Scientifique et technologique / National research centre for science and technology) on the behalf of the general director of the National Research Centre. He gave in brief the context of DANIDA project within research based-development involving Africa fermented food; specify the importance of enhancing African fermented food quality to face new challenges, which are for research institutes to meet local industrial requirements as well as developed countries requirements in order to develop national and international trade. The result expected was noticed as a benefits implication of research on African fermented food in the economy of African countries. He ended by thanks Prof Mogens Jakobsen for his contribution during his long experience of collaboration, working as the project leader from Denmark, and wish him to have a well rest since he his now getting retired. He declared then opened the 8th seminar on value-added processing of African traditional fermented foods for improved quality and food safety

Session 1

During this session, nine presentations was made and followed by the lunch. Items generally treated by the presentations can be stated in two questions:

- ✓ Are research works done in research institution playing a beneficial role in poverty alleviation and economical development of the west African countries?
- ✓ What is done to help in solving problem met for the research results to be effectively used?

Concerning the first question, the overall outcomes of the presentation is that, in spite of efforts maid to undertake research works in agricultural area, results obtained especially in West Africa countries is currently facing a crucial problem to play an important role in poverty alleviation and development of the economy. Failures in implementation of research results are incriminated. Identified weaknesses include difficulties of research findings to fit a social and economical demand, absence of validation of findings, difficulties to make results

accessible. Creation of an interface between research institution and the users of research results appear to be necessary to get research involved in social and economical development.

As a response to the second question, some presentations dealt with the importance of collaborations between European institutions and West African research institutions, as well as the need to create and implement an interface between research institutions and the users of research results. Objectives of the EU support for agricultural and food research in Africa were stated as: strengthen cooperation between European and African higher educational and research institutions; build capability for application of the research results in developing countries. Framework project completed within cooperation with African countries under EU framework program were presented. A special attention was given to role play by the PathogenCombat institution and ENRECA-DANIDA projects. The objective of PathogenCombat was then presented and can be in general state as: providing new essential information and methods to the food industry and public authorities on how to reduce the prevalence of new and emerging food borne pathogens in the entire food chain. Information give by pathogenCombat will also help third countries to meet EU regulation required for exportation. Requirements of European microbiological criteria needed to be met by some African foods (i.e Baobab, mangoes and shea) for their exportation were exposed. Requirements of European microbiological criteria needed to be met by three African country food (Baobab, mangoes and shea) for their exportation were exposed. Achievements of DANIDA project especially in Ghana were presented and concerned capability buildings (educations, establishment and management of laboratories with ISO and GLP standards fully implemented and accredited, availability of several scientific informations on indigenous fermented foods), as well as establishment of collaboration between research institute and industries trough appropriate services. It comes that Ghana is the first West African country where ENRECA and DANIDA project lead to those achievements. A part the important role play by collaborations with EU institutions, the most significant point raised by the responsible of West African research institutions was the interface cervices. An example of strategy to implement services development in research institute was presented: The action to be carried out was to create an incubator centre in research institutes by research and private sector to promote the results of research through services development. The purpose is to make food technology research institute an effective tool for the private sector accompaniment and economical and industrial development. Many things steel to be done within this issue.

Session 2

The second session consisted in six presentations followed by a coffee break hosted by DANIDA.

The presentations dealt with traditional fermented food safety and the possible use of those foods as therapeutic foods.

In most of the presentations, researchers agreed on the fact that traditional fermented products, according to the mechanism that occur during the fermentation (inhibition of pathogens, reduction of toxins and elimination of antinutritional factors) may lead to safe foods. However, the final product can be risky resulting from the poor hygienic conditions during processing. For example, Sudan traditional fermented milk has shown to contain *Streptococcus infantarius* subsp. *Infantarius*, a potential pathogen that has been isolated from septicemic patients. Optimization of the fermentation process including the development of better equipments, improvement of their use, implementation of quality system assurance, development of standard for commercialization can make traditional alkaline fermented food being much safer. An example of the optimization during the production of a fermented food presented was the one of sumbala (an alkaline fermented product from an African locust bean from *Parkia biglobosa* tree) applied by the CNRST in Burkina Faso.

The presentations also showed that some of the microorganisms involved in traditional fermentations present beneficial effects in human health. Some examples given are the reduction of toxin in food, with the binding of aflatoxins, by yeasts of the genus *Saccharomyces* (especially *boulardii* species that is *S. cerevisiae* var. *boulardii*). Yeast appears to be an other probiotic group of microorganism as the one of *Lactobacillus* is known to be. New probiotic effect of Yeast include: binding and degradation of aflatoxin and other toxin; increasing of the bioavailability of nutrients; increase pharmaceutical uses (inflammatory diseases, modulation of the microbial gut ecosystem). Further studies are needed to understand interaction between yeast and others gut microorganisms (microbial community of the gastro-intestinal tract).

Session 3

In the third session, six presentations was maid and the day was ended by a cocktail hosted by DANIDA at new Monopole.

After the reminding by some presentations of problems that makes traditional fermented food risky and actions carried out to solve them, many works done on some African alkaline fermented foods was presented. Outcome can be stated as follows.

Process based on traditional knowledge is laborious, energy and time consuming, involved spontaneous fermentation and leads then to the variation in stability and quality of the final product. The long cooking time (around 40h) before processing of alkaline fermentation destroy potential harmful microorganisms and contribute to the safety of the end food product. However, production in home using rudimentary equipments under poor hygienic conditions explain the presence of some pathogens at harmful levels (*Bacillus cereus* at levels of 10^{6-8} CFU/g, producing an enterotoxin and an emetic toxin cereulide stable at heat and extreme pH (2-11); and not degraded by digestive enzymes). Other potential pathogens found are *Staphylococcus spp*, *Escherichia coli*, *Salmonella spp*, *Shigella spp* and *Clostridium spp*. Three needs have been identified to improve safety alkaline fermentation food product. They are: training of producers to ferment food under hygienic condition based upon guideline of GMP and HACCP; development of better equipments; development of starter culture for controlled fermentation.

It comes out that to develop starter culture, knowledge of the microbiology and biochemistry of the process is required. Within this issue, scientific works done on microbiology (growth, antimicrobial activity), biochemistry (proteolytic activity, lipolytic activity, degradation of polysaccharide and non-digestible oligosaccharide; also enterotoxin production and antibiotic resistance) and some probiotic activities of the dominants microorganisms involved in some African fermented food were presented. Those African fermented food are: fermented cassava leaf (*Manihot esculenta*) commonly named Ntoba mbodi; Baobab fermented seeds (*Adansonia digitata*) commonly named Maari; African locust fermented bean seeds (*Parkia biglobosa*) commonly named Soumbala or Dawadawa; Roselle fermented (*Hibiscus sabdariffa*) commonly named Bikalga.

Day 2

Session 4

In this session presentations was done in two times: there was first six presentations before a coffee break hosted by DANIDA. Five other presentations followed and after that there was a lunch hosted by DANIDA.

The presentations dealt with the use of starter cultures to improve the quality of “traditional” fermented foods. Works done on some African foods (castor bean seeds; cocoa; milk; soybean; sorghum and other cereals) were presented. It comes that starter cultures can significantly accelerate the process; enhance nutritional quality and the end product flavor. Improvement of the production of some African fermented food could be achieved without drastically change the original taste and flavor of the food. This makes the application of starter cultures in commercial production highly feasible. Associated with the implementation of Good Hygienic and Good Manufacturing Practices, scale-up of the production of some African fermented food can be experimented at a pilot plan.

Session 5

The few (three) presentations in this session concerned food quality management and socio-economical aspects of indigenous fermented foods.

As a reaction to the need of west African countries to export their indigenous foods, laboratories undergo accreditations in many analyses. That is the case of the DTA (Département de Technologie Alimentaire/Food technology department) laboratories in Burkina Faso. As most accreditation bodies worldwide have adopted the international standard ISO/IEC 17025 as the basis for accreditation, accreditation of Laboratory to ISO 17025 enable them to be in good agreement with other countries all over the word. This allows their data to be more readily accepted in international markets. Indigenous fermented food like soumbala will then be easily exported and will play an economical role apart its social role well known.

Closing session

In his closing note, as success achievements of DANIDA project, prof Mogens Jakobsen quoted: research and laboratory infrastructure; capacity building and high level of scientific impact. He explained that future challenges are:

- ✓ upscaling of research results to semi-commercial and commercial level production;
- ✓ development of new and improved products (new functional foods) for the local and international markets
- ✓ uptake and commercialization of research results by local enterprises
- ✓ getting support from local and international sources to sustain a critical mass of trained scientists and well-functioning laboratory facilities;
- ✓ development of south-south transfer of the available expertise and capability.

In his closing address, the general delegate of CNRST stated that there is the need to establish a good strategy to transfer the results to private sector. He also thanked the Danish corporation for its support in the organization of the seminar. He also thanked Prof Mogen Jakobsen for his continual support to the scientific research and wished a safe return to their countries. A gift was given to Prof Jakobsen at the end of the session.

Day 3

The third day was devoted to the visit of dolo producers (producers of fermented beverage made from sorghum). After that DTA laboratories were also visited. In the evening, a cocktail hosted by CNRST at the cafeteria of the Minister of foreign affairs ended the day.



Visit of Dolo producers



Visit of DTA laboratories : (three big balls of sumbala)

Report compiled by Claudine Valérie Passo Tsamo, whose participation in the workshop was financed by the Danish Development Research Network (DDRN) – www.ddrn.dk

Documentation from the workshop is available at:

http://www.pathogencombat.com/workshop_overview/Ouagadougou.aspx

All ppt presentations, including the one given by Claudine Valérie Passo Tsamo (Session 4), are available at:

<http://www.pathogencombat.com/INCO%20Portal/Workshop%20Burkina%20Faso.aspx>