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African Food Tradition rEvisited by Research

FP7 n°245025

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This document has been sent to:

The coordinator by WP Leader	Date: January 2015
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Executive summary

The re-engineered procedures and the type of final products have been defined for each product. The modified steps of the procedures on which the work has been focused are detailed in the milestone.

1. Case of Kenkey

Re-engineered white kenkey (optimized nsiho-kenkey) is a slightly salted, whitish coloured, cylindrically shaped fermented maize dumpling (Photo 1). Packaged in polyethylene under vacuum, its shelf life is of 6 months.

Photo 1:Cooked kenkey cylinder

Some key unit operations were improved/optimized (Figure 1):

- **Steeping:** it should be carried out at a temperature of about 30°C for 30 hours.
- **Fermentation**: The dough is naturally fermented at 25-30°C for 12 hours.
- **Mixing** of cooked dough with rough dough: two third of cooked dough is mixed with one third of uncooked dough
- **Shaping**: 50-100g of the mixed cooked dough is mouldinto small aluminium or suitable containers to a depth of about 3 centimeters
- **Steaming**: the containers are steamed for 1 hour.
- **Packaging**: After steaming the slices of white kenkeyarevacuum packed with a cling film.

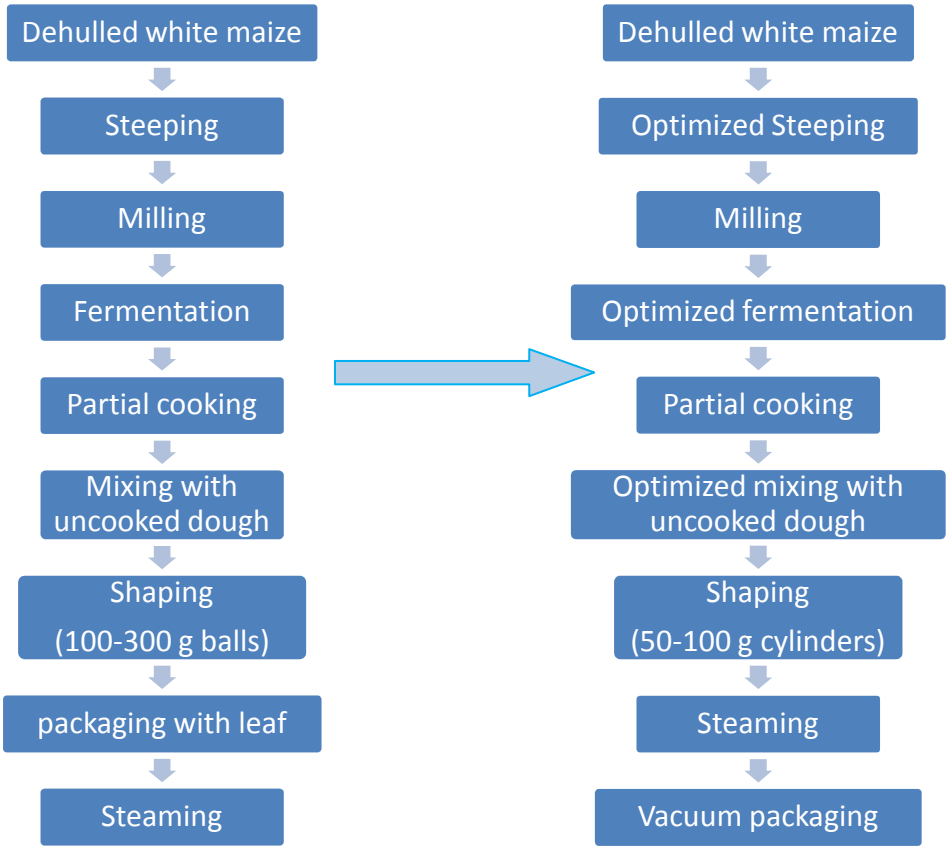

Figure 1: Outline of the traditional (left) and re-engineered (right) processes for preparing kenkey

2. Case of Gowé

Ready to cook Gowé flour (Photo 2) is the re-engineered product (the traditional one is sold as undiluted paste, packed in leaves and can only be stored for 2-3 days).

Photo 2: Ready to cook Gowé flour

Some key unit operations were improved/optimized(Figure 2):

- **Malting**: It has been improved in the view of limiting risks of mould development, of improving α-amylase activity and of shortening the malting process. A washing step of sorghum grains with sodium chloride solution has been added to limit mould hazard.
- **Saccharification**: The saccharification step is performed at intermediate temperature in order to both avoid the inactivation of enzymes and lower the natural microbial load. It is indeed a saccharification and pasteurization step.
- **Fermentation**: The use of *Lactobacillus casei* and *Kluyveromyces thermotolerans* decreases the fermentation duration and lead to a Gowe with reproductible safety and sensory qualities.
- **Drying of Gowe**: The drying of Gowe increased significantly its shelf-life (up to 6 months); this opens the market for urban areas and for export. The obtained Gowe flour can be cooked by the consumers.

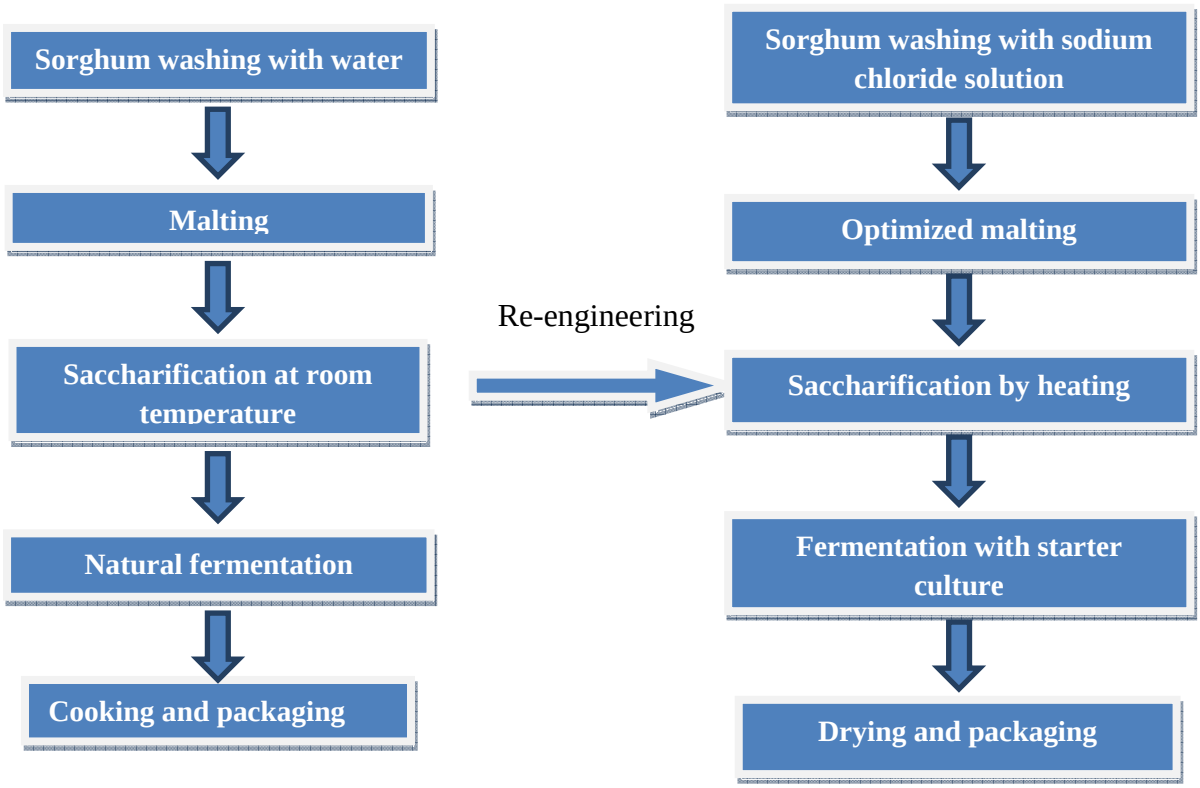

Figure 2: Outline of the traditional (left) and re-engineered (right) processes for preparing Gowé

3. Case of Akpan

The final product is bottled Akpan (photo 3) that can be stored for several weeks at 4°C (the traditional one is sold freshly diluted and is directly consumed; no storage).

Photo 3: Ready to drink Akpan

Some key unit operations were improved/optimized (Figure 3):

- **Grain Steeping:** Boiled water was added to the maize to minimize steeping duration, improve the yield and decrease microbial load.
- **Formulation:** The formulation (addition of milk and sugar) is performed before the pasteurization step for limiting the risks of cross contaminations when milk and sugar are added just before consuming the traditional Akpan
- **Pasteurization step1:** This step is introduced to reduce potential pathogens (risks of contamination during milling and sieving) and to favour the growth of the starter culture.
- **Fermentation:** The mash is inoculated with *Lactobacillus casei* to obtain a product with reliable and consistent quality.
- **Pasteurization step 2:** This step is introduced to reduce lactic acid bacteria in raw (no-cooked) ogi (risks of second fermentation after cooking) and to favour the long storage of Akpan at 4 °C.
- **Cooking:** Specific parameters (ratio cooked/non-cooked Ogi, temperature, duration) were optimized for improving sensorial quality.
- **Packaging:** Akpan is bottled in 33 cL plastic containers as for liquid yoghurt and stored at 4°C.

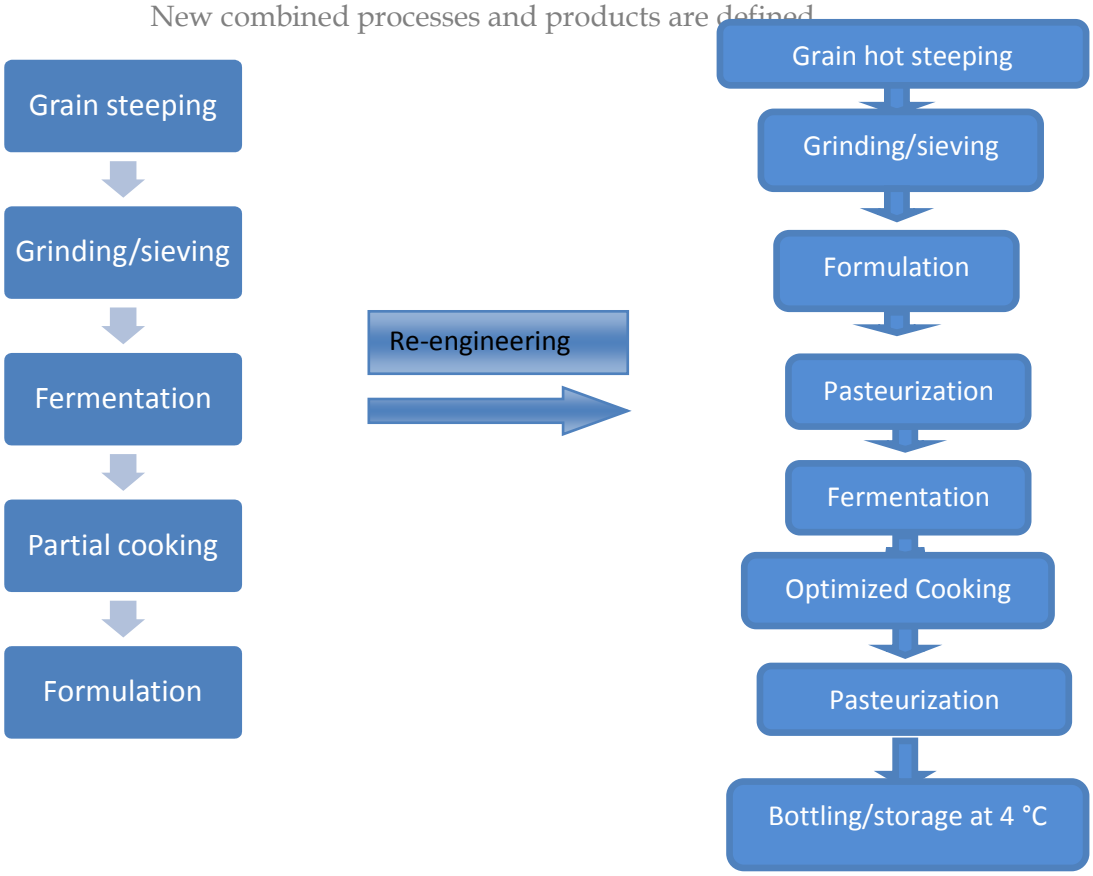

Figure 3. Outline of the traditional (left) and re-engineered (right) processes for preparing Akpan

4. Case of KS

KishkSa'eedi is indigenous cereal-based fermented food that has survived the test of time. It is made by first fermenting the required amount of buttermilk which is referred to as "Laban Zeer". The second fermentation takes place after mixing the fermented milk with freshly harvested whole grain wheat that had been parboiled, dried and coarsely crushed. The final product is then shaped into small rounded balls and dried.

Photo 4. KS packaging

Some key unit operations were improved/optimized (Figure 4):

- **Preparation of Laban Zeer**
  - **a- Pasteurization:** The butter milk is pasteurized before fermentation
  - **b- Fermentation:**after cooling, it is inoculated with selected starter culture, and fermented for 16-18 h.
  - **c- Concentration:**Fermented butter milk is filtered for concentration
- **Preparation of the cooked wheat semolina**
  - **a- Parboiling:**The grains are parboiled in a cooking pot in order to soften them and obtain light yellow grains with a transparent core.
  - **b- Oven drying:**The grains are driedat 40 °C for 18-20 h. When dry, the grains can be easily cracked by teeth.
  - **c- Grinding:**The grains are finally grinded and seived to obtain an homogenous semolina
- **Dough fermentation:** Laban Zeer is added to the dry coarse flour. The mixture is left to ferment for 4 hours.
- **Shaping and drying:** The improved KS is shaped into small balls and dried at 40°C for 18-20 h. The balls obtained are easily broken by teeth and the core is dried.
- **Storage:** Re-engineered Kishksa'eedi is parked in cotton bags and kept in dry area.

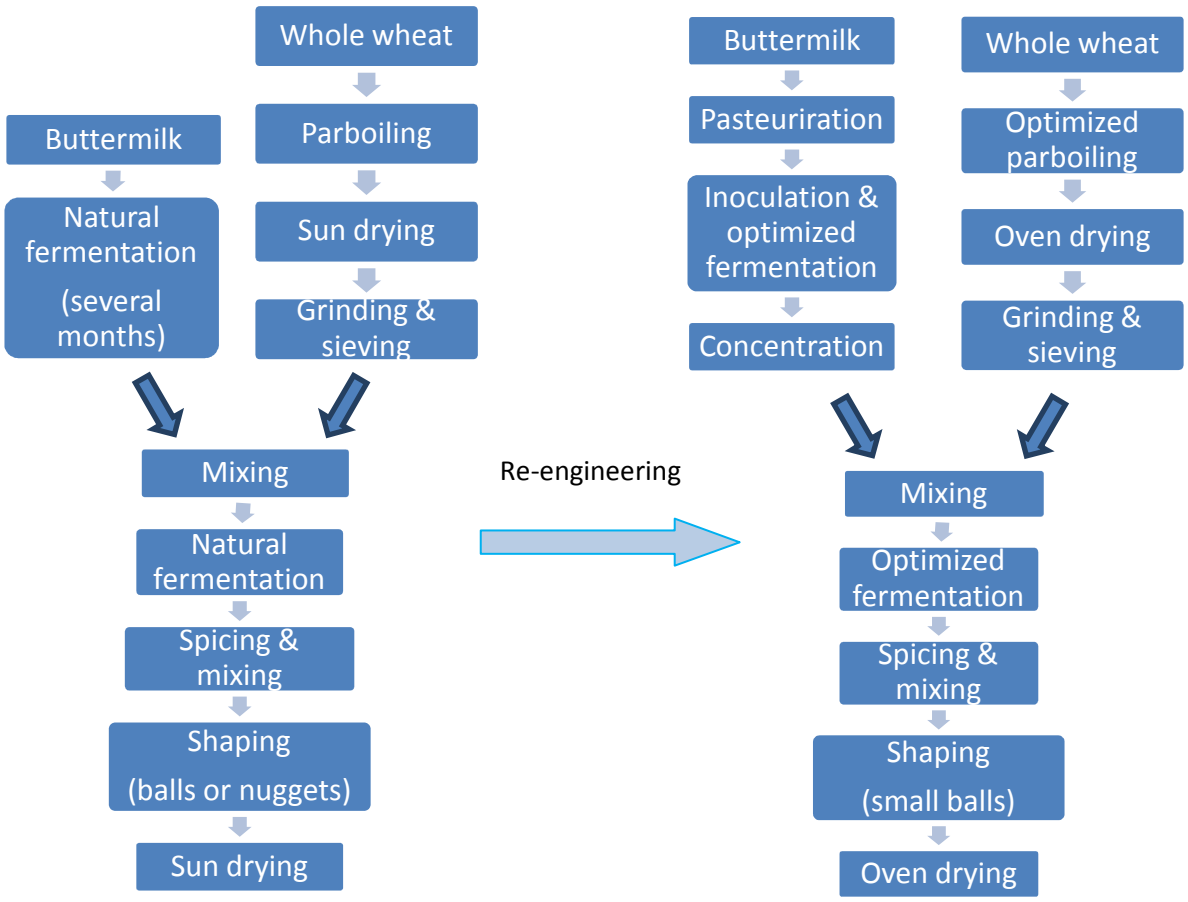

Figure 4. Outline of the traditional (left) and re-engineered (right) processes for preparing KS