The diversity of thick (*ugali*) and thin (*uji*) porridges consumed in Kenya

Wanjala, G.W. 
RS, FSPT.
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Background

• Porridges are important sources of nutrients.
• They are made when flours are heated in excess water.
• Starch-rich slurry transforms into porridge when starch is gelatinized.
• About 8-10% and 30-34% w/v flour is required to make thin porridge (*uji*) and thick porridge (*ugali*) respectively.
• *Uji* can be drank or eaten with a spoon whereas the *ugali* is a solid paste.
• *Ugali* is consumed as the main meal while *uji* as a drink at any time.
• *Uji* is an important food for invalids and complementary feeding.
• Rising incidence of lifestyle disease, low energy density and poor protein affects the nutritional value of *uji* and *ugali*.
Objective and justification

• The aim was to determine and document the diversity of *ugali* and *uji* consumed in Kenya.
• Documented indigenous technical knowledge of porridges
  1. Improve nutritional, sensory and functional properties,
  2. Develop candidate products for nutritional management of lifestyle diseases, and
  3. Open avenues for commercialization.
Methodology

Focused Group Interviews

Siaya, Migori, Kisumu, Homa Bay, Nyamira, Kisii, Bungoma, Busia, Kakamega and Vihiga

Purposive sampling groups of 8-10 women

Ethnic practices preparation and consumption of ugali and uji

1. Describe the preparation of flours from maize, finger millet, sorghum and cassava;
2. Identify the main unblended and composite flours used;
3. Describe the quality characteristics of the porridges;
4. Identify recipes for complementary feeding and for people suffering from lifestyle diseases.
Production and consumption trends

- Diverse formulations exist for *ugali* and *uji* preparation.
- White dent maize and finger millet flours are the most popular for *ugali* and *uji*.
- 28 and 29 composite flour blends were identified for *ugali* and *uji* respectively.
- Special formulations for type II diabetes and hypertension.
- The recipes used are variable and are dependent on:
  - Culture, predominant crop, availability and cost.
- Flour preparation is at home or at village mills (*posho mills*).
- Small-scale operations using rudimentary equipment & techniques.
- Lack defined processes, product specifications and variable quality.
Percentage composition of composite flours for thick porridge

- Millet: 20%
- Maize: 28%
- Cassava: 34%
- Sorghum: 18%
Frequency of staple crops in composite flours for thin porridge

- Maize: 5
- Millet: 11
- Cassava: 9
- Sorghum: 10

Percentage composition of composite flours for thin porridge

- Millet: 51%
- Maize: 14%
- Sorghum: 13%
- Cassava: 22%
Energy value of porridges

• Finger millet is popular for *uji* - unique taste and excellent viscosity.
• Sour *uji* that is acidified by citric acid, lemon or leaves of camel’s foot is liked.
• However, naturally fermented *uji* is more preferred.
• Malt is not used in porridge preparation.
• Despite importance of increasing energy value, malt or amylases were not used.
• Malt is associated with opaque beer – *busaa*, spirits like *chang’aa* and *kwete*.
• Among the Kuria community malt is used to make *togwa*.
• *Togwa* – uji plus millet malt and fermented overnight.
Cassava in composite flours

- Cassava is prepared in diverse ways.
  1. *Abeta* – tubers are preprocessed and sun dried directly.
  2. *Akuoga* – tubers are preprocessed, partially dried then heap fermented and finally dried completely.
  3. *Anyonga* – *akuoga* is mixed with fresh *abeta*, fermented - 3 days.
- Cassava gives a gummy product and is mainly used for blending.
- *Akuoga* and *anyonga* cassava are more preferred than *abeta*.

- Cynogenic glycosides in cassava reduced
  1. Genetic engineering.
  2. Preprocessing
Management of lifestyle diseases

- Type II diabetes and hypertension
- The choices are based on ethnic and advisory from health care providers in the respective area.
- Kakamega county, no cassava for diabetics
- Whole-milled millet, sorghum are preferred across the ethnic communities.
- Among the Luo, Suba and Kisii, currently some prefer yellow maize (nyamula).
- The foods should be of low glycemic load and high in resistant starch.
Complementary feeding

• The basic family formulations for thin porridge are used.
• Protein content is enhanced by adding silver cyprinid – off taste.
• Plant proteins from legumes and nuts – soya bean, common bean, green grams, amaranth, sim sim or ground nuts.
• Plant proteins also enhance the total fat and energy content.
• They are mainly added at about 5% of the mix. Due to beany flavour which are unacceptable to children.
• They are enhanced by precooking, roasting and sometimes germination. Though not practiced.
Feeding during lean times

• Thin porridge is consumed throughout the day.
• Sorghum becomes key raw material.
• Maize:sorghum blend – *otwaka, otwako, otama*
• Millet:sorghum:cassava – *saba lulala*
• Gives dense products
• A member eats one meal per day
• Causes constipation to some, hence need to blend some cassava
Specialty products – roasted flour paste

• Partially roasted and sun dried paste of maize or sorghum flour.
• The product is partially fermented.
• Popularly known as *makhalange* or *zimbare*.
• It is a “food bank”, in lean times as a convenient snack product.
• It can be eaten directly
• Reconstitute with water and sweetened with sugar
• It can be added to porridge.
• It’s a reserve food in boarding schools for students from poor households.
• It can dehydrate – plenty of water is needed after eating.
Specialty products – gluten free
African scone

• Locally known as *estata*

• A steamed product made from ripe or over-ripe bananas mixed with maize flour.

• Cooked banana leaves are used as foil cover.

• The product is very sweet as is eaten as a snack.
Specialty products – millets and sorghum

- Black millet – developed through heat moisture treatment.
- Finger millet stored in air-tight bags for several days causes colour change red to brown ‘emifuname’.
- Special ugali among the Luhya during weddings.
- Improved flavour and aroma of ugali
- Quick healing of wounds after circumcision
- Claims - high iron bioavailability and antioxidants

- Nyuka nang’a
Millet ugali made with fermented milk and eaten with ghee. It was used by elderly for energy provision.

- Non-caffeine sorghum beverage
Roasted and milled sorghum makes non-caffeine beverage. Taste and flavour of the beverage equivalent to drinking
African hot pot

- *Ekee a* traditional hot pot among the Kisii (a woven basket)
- It’s presented as a gift on the wedding day.
- It’s woven from finger millet straw,
- covered with leaves of an accacia tree (*omonyaboga*) to act as a foil paper.
- The basket is equipped with cattle hide at the bottom as padding to the head.
- This basket is claimed to retain acceptable quality characteristics of *ugali* for several days.
Conclusion and recommendation

- *Ugali* and *uji* are important foods in Kenya.
- They are processed from maize, millets, cassava and sorghum.
- White dent maize and finger millet are the most preferred straight flours for *ugali* and *uji* respectively.
- The preferred flour blends vary widely across the communities.
- Increased consumption is hampered by small-scale operations, limited shelf-life, labour-intensive home-based processing methods, lack of standardization and competition from ready-to-drink beverages and instant foods.
- This documentation and the understanding of the recipes and processing methods have on the quality of porridges can be used to formulate acceptable products that require minimal time to prepare at home and in large scale catering establishments such as schools, hotels and hospitals.
- The products can be improved further to make them functional foods for management of lifestyle diseases.
- Some of the health claims held should be further investigated for better utilization of these foods.