Soy-enriched, traditional fermented foods of southern Africa with Mageu as focus

Johan de Wet

Researcher / consultant on mageu fortification

PART 1:
Theory on Mageu production

What is Mageu?

- A traditional brew
- Made originally from maize porridge, sugar, water
- Contains little / no alcohol (< 1%)
- Different flavours of the commercial product: plain, banana, cream, pineapple, strawberry, guava

From home to industry

- Started as a family craft (at home)
- Increased urbanization – production scale of fermented foods increased from small to large scale
- Tempe, soy sauce, sorghum beer = fermented foods successfully industrialized

Reasons for fermentation of cereal-based beverages

- In Africa most cereal based foods are:
  - In the form of a porridge
  - Naturally fermented
- Why fermentation?
  - Imparts diverse sensory & nutritional qualities
  - Improved digestibility
  - Improved shelf life of high moisture gruels

Fermentation cont.

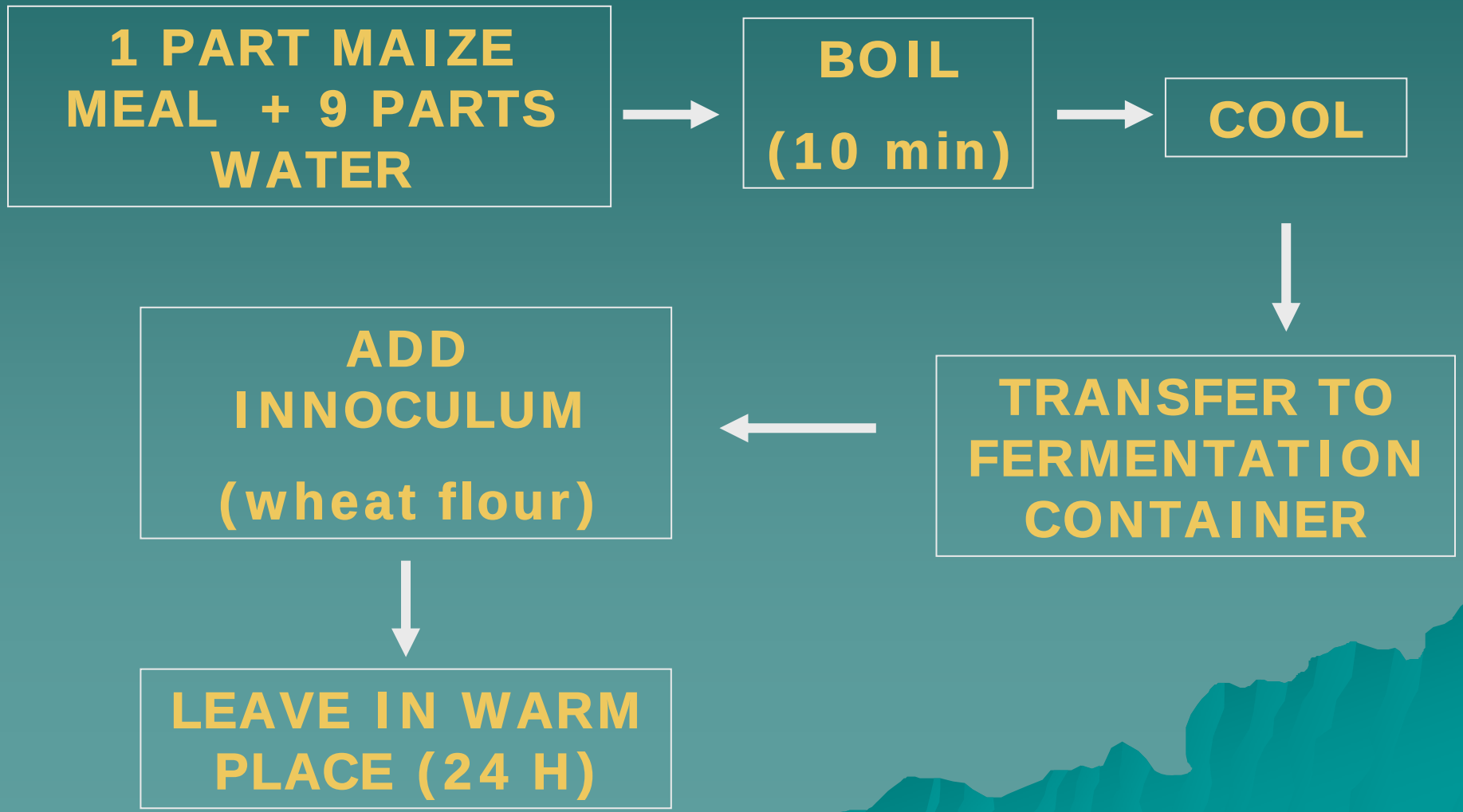
- Origin of microbes (rural level)
  - From clay pots used for cooking (LAB)
  - Maize meal
  - Back-slopping of previous batch
  - Opportunistic microbes from flies (yeasts) that live symbiotically with LAB

Substrates for the LAB

LAB grow require sugars / fermentable substrates like:

- Added sugar
- Maize, sorghum, millet, teff, casava broken down into sugars by
  - Added commercial amylases
  - Added malted cereals containing activated amylases

Mageu – traditional preparation in the home



Mageu – traditional small scale production

Different from home production:

- Cooked 20-30min
- Cooled to ambient T
- Add sugar
- Use back slopping OR starter culture inoculum
- Add sugar to taste

Mageu – Industrial production

- Maize meal + water = thin gruel
- Cooked (steam pots) 85-95°C for 20-30min
- Cooled to 50°C
- Fermentation in bioreactors
- Inoculant (bread flour, sugar, active MALT?, thermophylic *Lactobacillus* starter culture)
- Preservatives, vitamins, minerals

Mageu – Industrial production

- Static fermentation (18-30h)
- Buffering salts to maintain lactic acid production
- Result:
  - Temp drops to 30°C
  - pH drops to 3.5-3.8
  - Product consistency is yoghurt-like
- Pasteurization to increase shelf life
- Cooled to 10°C
- Packed & refrigerated

Nutritional value of Mageu

1 Litre Mageu (9% solids) contain:

78.5g carbohydrates

5.5g protein

4.2g fat

Energy value 375 kcal

% RDA of mine worker (1780kcal) = 20-25%

Instant mageu powder

- Jabula Foods (1984)
- Precooked maize and wheaten flour
- 2 types available:
  - Chemically acidified – ready to consume, just add water
  - Biologically acidified, add water, ferment prior to consumption

Sales volumes

- Peak sales in summer season (October – March)
- 1984 market size = 146 million litres
- Market shrunk to 76 million litres in 2001 with rand value of R388 million
- 2006 estimation for Mageu no.1 = 216 million litres in cartons & 36 million in bulk deliveries

Soy fortified mageu

- Need for fortification of popular, low protein staple and weaning foods with inexpensive plant proteins
- Alternative for milk and sour milk products
- MUST be
  - culturally convenient
  - have sensory appeal
  - affordable

Future prospects

- Decline in Mageu production in rural areas
- Traditional fermented foods may be displaced by globalisation
- Soy-enriched, fermented foods have potential to address energy-protein requirements of infants and children in Africa

Future prospects cont.

- Incorporation of probiotic bacteria into fermented cereals will improve the functional and therapeutic value for children
- Will reduce hygiene risks in a rural home environment

PART 2:
Discussion of published work and tasting session