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Original article

Methods of preparation of Swazi traditional fermented foods

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ABSTRACT

Background: Fermentation is an age old technique of preserving food in many communities. A wide range of fermented products are prepared by varying the types of raw materials, utensils, and fermentation times. Several fermented foods are consumed in Swaziland. A survey of the types of fermented foods, preparation methods, and utensils used was done in the Hhohho region of Swaziland. The current study aimed at documenting the preparation methods of *emahewu*, *emasi*, *umcombotsi*, and *buganu* at household levels.

Methods: Detailed fermentation steps were documented for *umcombotsi*, *emahewu*, *buganu*, and *emasi*. Five constituencies, called *tinkhundla*, were randomly selected from the 14 found in the Hhohho region of Swaziland. At each *inkhundla*, households that were known to regularly prepare the fermented foods were identified with the assistance of local community leaders and were interviewed. A semistructured questionnaire was used for the face-to-face interviews.

Results: With respect to preparation procedures and practices, all respondents indicated that they had prepared different fermented foods at one time or another. The most commonly prepared and readily available fermented foods were *umcombotsi* (alcoholic beverage), *emahewu* (nonalcoholic beverage), *buganu* (marula wine), and *emasi* (spontaneously fermented milk). Both men and women indicated that they prepared *umcombotsi*, and only women reported that they prepared *emahewu*, *buganu*, and *emasi*. *Umcombotsi* was mainly prepared for sale, while *buganu*, *emahewu*, and *emasi* were for sale as well as for household consumption. *Umcombotsi* was mostly prepared by mixing maize meal, unmilled sorghum malt (*magayiwe*), and brown sugar (3 kg) in water (20 L). The initial stage involved cooking the mixture to gelatinize the starch, followed by fermentation at ambient temperature (25–30°C) for about 72 hours. The whole preparation process takes about 4–5 days. *Emahewu* was prepared by mixing maize meal (1 kg) with water (5 L) and cooking to make a soft porridge. The cooled porridge was left to ferment at room temperature. Some reported adding sugar or a peeled potato to aid the fermentation process. *Emasi* was prepared by letting raw milk to naturally ferment at room temperature (25–30°C) in either metal or plastic containers (buckets) for 2–3 days. *Buganu* was prepared from marula fruit (*amaganu*) juice and pulp mixed with water (10 L) and sugar (2 kg). The mixture was allowed to ferment at ambient temperature for about 3 days, sieved, and then served.

Conclusion: *Umcombotsi*, *emahewu*, *buganu*, and *emasi* were the fermented foods commonly prepared at a household level in the Hhohho region, Swaziland. The main ingredient used for preparing *umcombotsi* and *emahewu* was maize meal. Unmilled sorghum malt was also added during preparation of *umcombotsi*. However, typically no malt was added during the preparation of *emahewu*. *Buganu* and *emasi* also play an important role in the diet and socioeconomic activities of the population in Swaziland.

1. Introduction

Several traditional spontaneously fermented foods are prepared in households in Africa [1,2]. Numerous investigations have revealed the important role of this technique including making the raw materials more palatable and extending the shelf life of the

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product. Various benefits of fermentation have been reported such as improved bioavailability of some nutrients, destruction of anti-nutritional compounds such as tannins, phytates, and polyphenols, as well as inhibition of spoilage and pathogenic microorganisms facilitated by the low pH [3,4]. Cereals, fruits, and milk are common raw ingredients used in these preparations. African traditional fermentation technologies are at best an art; hence, the fermentation products vary in quality depending on the type of raw materials, types of containers used, and environmental conditions [5–8]. However, the communities where a specific product is made normally have well-known and agreed steps for its preparation. For example, Simango [9] described *mahewu* prepared in Zimbabwe as a maize-based cereal gruel with added malt. The malt provides the inoculum and enzymes for spontaneous fermentation. In South Africa, traditional fermented milk (*amasi*) is prepared in several types of containers of varying sizes. Buekes et al [6] reported that the Xhosa and Zulu people mainly use calabashes to make *amasi*, while the South Sotho use clay pots to make a similar product called *mafi*. The use of clay pots reportedly gives a better flavor to the fermented milk than calabashes. The types of container used, as well as the environmental conditions, contribute to the gradual selection of specific microorganisms that are responsible for the perceived flavor [6].

Common traditional fermented foods consumed in Swaziland include nonalcoholic cereal beverage (*emahewu*), spontaneously fermented milk (*emasi*), fermented porridge (*incwancwa*), fermented maize meal (*sancoti*), fermented marula fruit juice and pulp (*buganu*), alcoholic cereal beverage (*umcombotsi*), and malt distilled spirits (*mankanjane*) [10]. The importance of these products to the diet and socio-cultural wellbeing of the Swazi community is well documented. However, details of the preparation steps have not been systematically studied and recorded. It is important to document the process, quantify the ingredients and identify the key conditions for a successful fermentation in order to replicate the process under standardized conditions and ultimately at industrial level. The current study's aim was to document the steps and equipment used in the preparation of four products, *emahewu*, *emasi*, *umcombotsi*, and *buganu* prepared at household level in Swaziland.

2. Materials and methods

2.1. Location of study and selection of households

The study was conducted in the Hhohho region of Swaziland. The region is divided into 14 local administrations called *tinkhundla*. The Hhohho region is in the Highveld of the country where the temperatures can range from the very cold in winter to hot in summer. Using a lottery system, five *tinkhundla* were selected for the study. At each *inkhundla*, members of the community who were known to prepare fermented foods were identified with the assistance of community leaders, such as the village head (*umphakatsi*) or schoolteachers.

2.2. Preparation methods

Using a semistructured questionnaire, preparation steps and the utensils or equipment used for the different fermented foods were

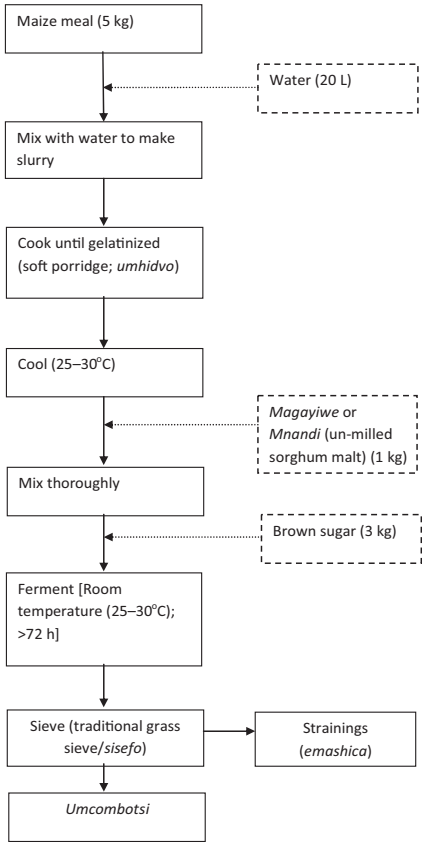

Fig. 1. Commonly practiced traditional preparation method for *umcombotsi*, Swazi maize meal and sorghum malt based alcoholic beverage.

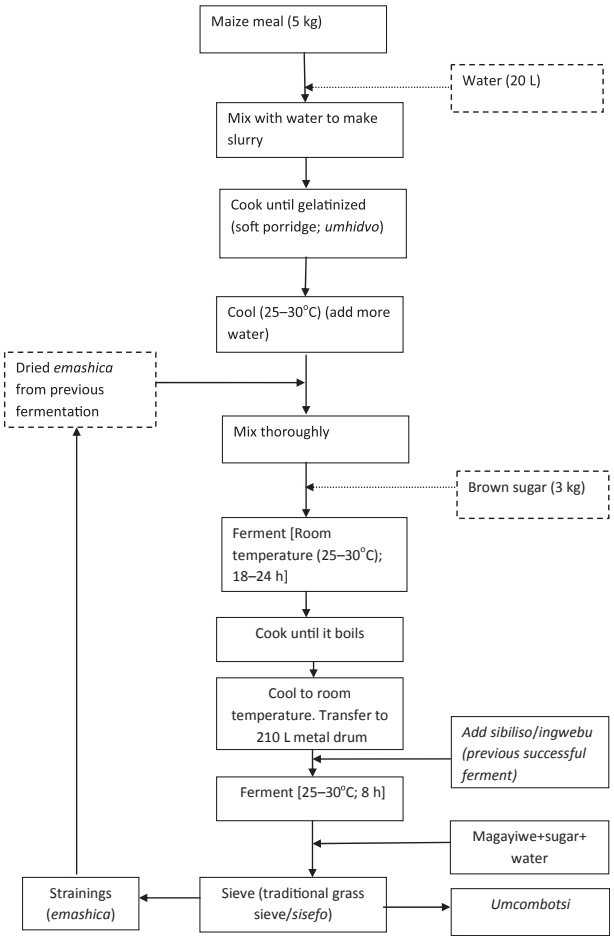

Fig. 2. A variation of traditional preparation of *umcombotsi*, Swazi maize meal, and sorghum malt based alcoholic beverage that uses back-slopping.