

**Baseline Survey, Biochemical, Microbial, and Technological Studies on “*Mnazi*”**

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## ABSTRACT

This thesis focused on the traditional tapping and distillation methods of *mnazi* in addition to economic importance, isolation and identification of microorganisms, preservation and chemical wholesomeness of the beverage. Educational levels and major constraints facing tappers and farmers in the coconut sub-sector were also studied.

*Mnazi* is an alcoholic beverage from palm tree. It is referred to as Nigerian wine, palm wine, *toddy*, *tuba*, *tuak*, *nsafufuro*. For consistency, this thesis shall adopt the word *mnazi* instead of coconut toddy or Nigerian wine as has been referred to by other scientists.

The survey involved both stratified and area-sampling methods. Specific methods for isolation, characterization and identification of bacteria and yeasts were employed including the use of API kits.

Information was obtained on identification of the right spathe, tapping process, sap collection, *mnazi* storage and distillation. The farmers interviewed were either illiterate (32.5%) or had primary education (42.0%). For tappers, 40.3% were illiterate while 53.1% had primary level of education. The major constraints faced by farmers and tappers included: lack of market, low/fluctuation of prices, poor storage/preservation facilities, pests and diseases. The total number of coconut trees was estimated as 4.6 million trees. Tappers owned 35.5% of the trees tapped while farmers owned 64.5%. The annual production and income from *mnazi* was 4.6 million decalitres and KES710 million respectively. Other coconut-based products generated KES832 million.

The newly developed products: dry, medium dry and sweet brands were stable during the first 4 weeks after production. Assimilation of sucrose and fructose were faster than glucose, with fructose being the fastest. The absence of methanol and fusel oils in fresh *mnazi* makes it possible to recommend its removal from the category of illicit brews but not its distillate because of its high levels of fusel oils.

The study identified two genera: *Acetobacter* and *Gluconobacter* as the dominant spoilage microflora in *mnazi*. Apart from spoilage, the two genera may be used for production of vinegar. A total of 15 isolates out of 86 isolates of lactic acid bacteria were identified as follows: *Lactobacillus paracasei ssp paracasei*1, *Lactobacillus paracasei ssp paracasei* 2, *Lactobacillus paracasei ssp paracasei*3, *Lactobacillus plantarum* and *Lactococcus lactis ssp lactis* 1. The API C AUX system identified 24 species as: *S. cerevisiae* 1, *S. cerevisiae* 2, *Candida pelliculosa*, *Candida utilis*, *Stephanoascus ciferrii*, *Kloeckera spp*, *Trichosporon asahii* and *Rhodotorula mucilaginosa*.

The findings in this study are expected to act as a base for further research and technological improvement in the *mnazi* industry.

It is also envisage that the newly established Kenya Coconut Development Authority will put in place appropriate policy measures that shall address most of the constraints faced by farmers and tappers.

**Key Words:** *Mnazi*, educational level, constraints, tapping, distillation, economic importance, bacteria, yeasts, chemical wholesomeness.