

**THE PRESERVATIVE POTENTIAL OF THE INDIGENOUS
PLANTS COMMONLY USED BY THE MAASAI COMMUNITY
IN MILK PROCESSING AND PRESERVATION**

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2009

ABSTRACT

The study was done because despite the continued use of the indigenous plants by the Maasai community in Kajiado district in milk processing and preservation, their actual preservative potential had not been studied. The study had two components: field study and laboratory analyses. The field study was carried out to obtain information about the indigenous plants used in association with milk by the Maasai community in Kajiado district. This was followed by collection and identification of the plants. Three plants used in milk processing and preservation (*Lippia javanica*, *Olkingiri* and *Olea europaea*) were collected and used in this study.

The chemical and phytochemical composition of the three plants was determined. The plant materials were sequentially extracted to obtain the plants extracts. The plants extracts were analyzed for their antioxidant and antimicrobial activity. The toxicity of the plants was tested to evaluate the safety of these plants for human use. The quality properties, chemical composition and sensory characteristics of fermented milk prepared with water extracts stored at ambient temperatures for 14 days were also determined.

The plants moisture content was 8.84 – 22.80%, pH ranged from 4.9 - 9.9 and ash 3.20 - 6.69%. All the plants analyzed had varied amounts of minerals; calcium 20.3 - 90.0 mg/100g, magnesium 1.8 - 4.3 mg/100g, zinc 10.3 µg/100g - BDL, copper 3.1 – 28.7 µg/100g and iron 0.1 – 0.8 µg/100g. Phytochemicals namely tannins, saponins, flavonoids, alkaloids, steroids, sterols, terpenoids, flavones aglycones and reducing compounds were present in most of the plants tested except saponins absent in *Olkingiri* and flavones aglycones in *Lippia javanica*.

The water extracts exhibited antioxidative activity; the scavenging effect and the reducing power activity of water extracts ranged from 8-84% and 1.2-1.7 respectively. The water extracts had the potential to inhibit the test microorganisms *Lippia javanica* on *E. coli* and *Olkingiri* on *S. aureus* 9 mm and 11.9 mm zone of inhibition respectively. The minimum inhibitory concentration was evaluated and it ranged from 20.03 - 40.03mg/ml. There was significant reduction of microorganisms in milk treated with the water extracts than the fermented milk without any treatment; *Lippia javanica* on *S. aureus* caused 2.98 log reduction and on *C. albicans* it caused 2.99 log reduction at day 3 of fermentation. The lethal concentration LC₅₀ of the aqueous plant extracts against brine shrimps ranged from 5.1 – 26.81mg/ml. Fermented milk with water extracts had better quality properties; total plate count was within the cultured milk range 10⁶ – 10⁹. The chemical composition of the fermented milk with water extracts; *Lippia javanica* at day 3 of fermentation had the highest fat content 4.8%. Sensory characteristics of fermented milk treated with plants water extracts were most preferred; *Lippia javanica* 4.05 out of 8 points.

The results obtained in this study, indicated that the indigenous plants possessed both antioxidative and antimicrobial activity. Therefore these plants may be exploited as source of natural food preservatives. It was recommended that further investigations should be carried out on the specific phytochemicals in the plants and the specific lactic acid bacteria responsible for fermentation of the milk preserved with the plants extracts.