Fortifying Fermenting Enset (*Ensete ventricosum*) with Moringa and Garden Cress: Physicochemical and Microbial Profiling

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Background and objective

Enset (*Ensete ventricosum*) is an important food security crop• for over 20 million Ethiopians (1). The fermented food product (kocho) is a good source of starch (65 %) and soluble sugars (9 %), but it is low in protein (< 4 %) and fat (< 1 %). Moringa leaves are rich in protein, iron, lipids, beta carotene, vitamin C and E, in which enset based food products lacks it [2]. Hence, fortifying enset based foods with moringa leave powder and garden cress seed will have a huge impact to compact malnutrition and stunting in the region. Therefore, the aim of this study was to assess the physicochemical and microbial dynamics during fortified-enset fermentation.

Materials and methods

Six enset plants were processed using enset processing machines (Fig. 1) and fortified each with 3 % shed-dried *Moringa stenopetala* (MS) and *Moringa oleifera* (MO) leave powder, *Lepidium sativum* (LS) seed powder and the fourth treatments left as a control (C). The fortified enset mass were allowed to ferment for two months in a Sauerkraut jars. Samples were taken on days 0, 7, 5, 30 and 60. The pH and moisture content were measured. Also, microbial dynamics were determined using the plate count method as described by Andeta et al. (2018) [3].

Results

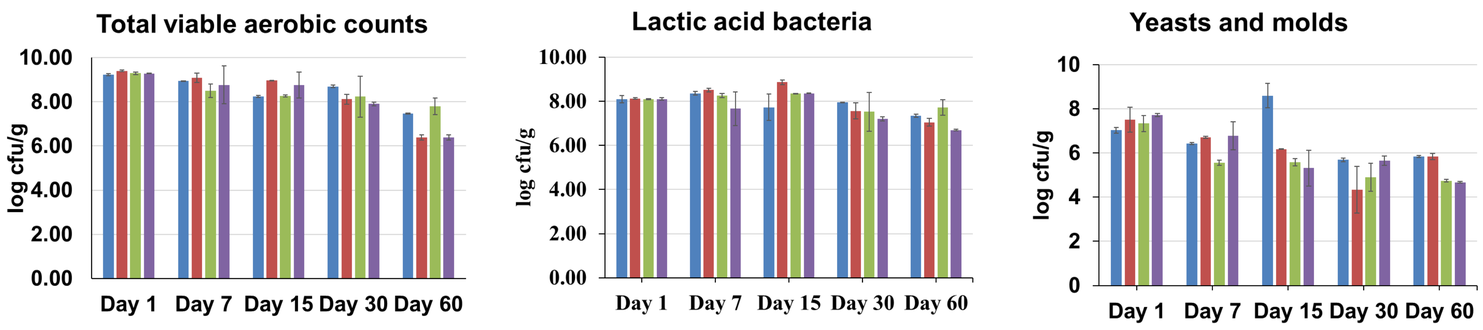

Fig. 2 Microbial counts of fortified enset in a Sauerkraut jar in function of fermentation time

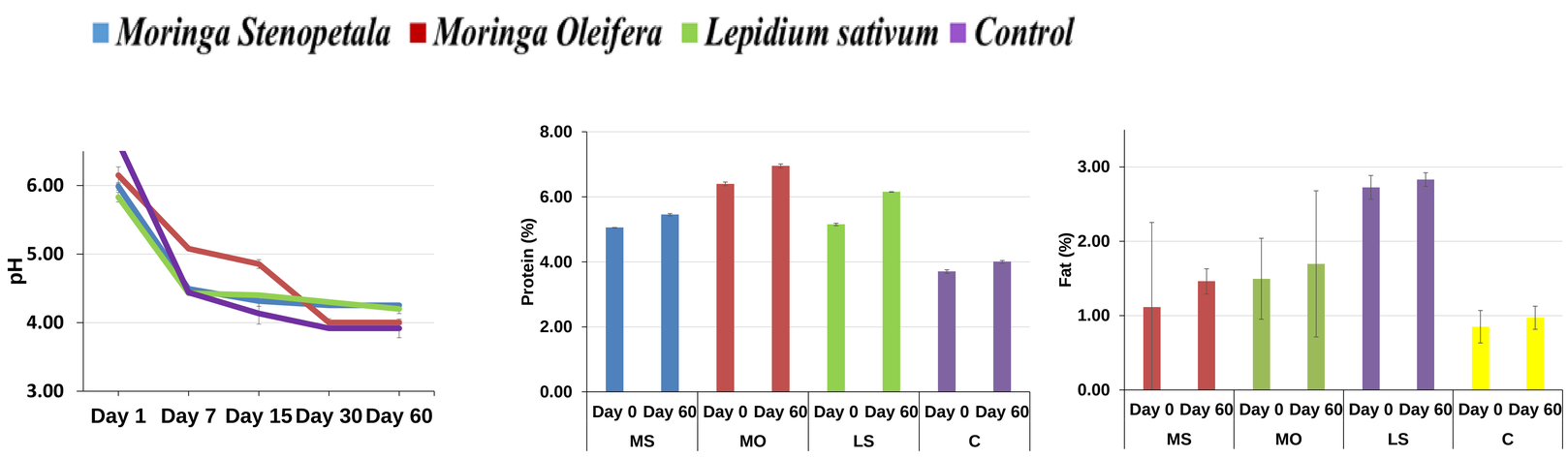

Fig. 3 pH (A), protein (B) and fat (C) contents of fortified enset sample in function of fermentation time

Fig. 1. Enset plant (A), fermented and fortified enset samples (B), enset pseudostem scraping machine (C), Enset Corm milling machine (D)

Discussion

- Enset fortified with MS, MO and LS showed a significant ($p < 0.05$) pH reduction from day 0 to day 60, i.e from 5.99 to 4.25, 6.15 to 4.00, 5.83 to 4.28, respectively.
- The total aerobic count attained a maximum of 9.23, 9.40,9.29 and 9.28 log cfu/g for MS, MO, LS and C, respectively. It attained low count on Day 60.
- Addition of moringa leave powder to fermenting enset significantly decreased *Clostridium*, yeast and mold and Enterobacteriaceae counts, whereas it increased Lactic acid bacteria counts as compared with the control.

References

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