Traditional starter cultures for enset fermentation: Unravelling their production and microbial composition

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Background and objective

Enset (*Ensete ventricosum*) is a drought tolerant food crop consumed in Ethiopia after fermentation into 'kocho'. In most enset growing regions, traditional starters are prepared in local households and added to the scraped enset to aid the fermentation.

The aim of this study was:

- To obtain an overview of the preparation methods and the specific usage of the starters.
- To characterize the microbial community of the starter samples.

Materials and methods

A survey in 18 districts of 7 zones in southern Ethiopia

Collecting traditional starter samples (n = 71)

Microbial counts

Illumina MiSeq sequencing

pH

- pH value ranging from 3.68 ± 0.16 to 5.62 ± 0.33 (individual districts).
- Significant differences due to different preparation procedures.

Table 1 pH of traditional starters made for enset fermentation. For the zones, means and standard deviations of at least three samples are shown. Different superscripts indicate significant differences ($p < 0.05$).

Sidama	4.84 ± 0.09^b
Wolayita	$4.60 \pm 0.09^{b,c,d}$
Dawro	3.80 ± 0.10^e
Segen	$4.94 \pm 0.39^{a,b,c,d}$
Gedeo	5.62 ± 0.33^a
Hadiya	$4.30 \pm 0.25^{d,e}$
Gurage	$4.20 \pm 0.38^{c,d,e}$

Microbial counts

Fig.1 Microbial counts of traditional starters prepared for enset fermentation. For each zone, the means and standard deviations of at least three samples are shown.

- High numbers of lactic acid bacteria (LAB).
- Enterobacteriaceae were identified in some samples.
- Clostridium* spores were present in all traditional starters. The presence of this genus can include safety risks.

Bacterial community composition

Fig 2 Nonmetric Multidimensional Scaling (NMDS) map of the bacterial communities. Each dot represents a pooled sample from each district. Dots of the same colour are from the same zone (S = Sidama, W = Wolayita, D = Dawro, S = Segen, G = Gedeo, H = Hadiya, G = Gurage).

- Most samples from the same zone have a similar bacterial community.
- Most abundant phylum: Firmicutes > Bacteroidetes > Proteobacteria.
- Lactobacillus*, *Lactococcus* and *Leuconostoc* were the dominant LAB.
- These isolates will be further considered for the development of a **commercial enset starter culture**.

Results and discussion

Reference

Andeta, A.F., Vandeweyer, D., Teffera, E.F., Woldesenbet, F., Verreth, C., Crauwels, S., Lievens, B., Vancampenhout, K. & Van Campenhout, L. (2019). Traditional starter cultures for enset fermentation: Unravelling their production and microbial composition. *Food Bioscience* 29, 37-46.

This work was supported by the 'Vlaamse Interuniversitaire Raad voor Universitaire Ontwikkelingssamenwerking' (VLIR-UOS) [grant number VLIR-TEAM ZEIN2015PR407].