

The Effects of *Lactobacillus plantarum* and *Leuconostoc mesenteroides* Co-inoculation During Enset Fermentation: Physicochemical, Microbial Dynamics and Proximate Profile.

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Background and objective

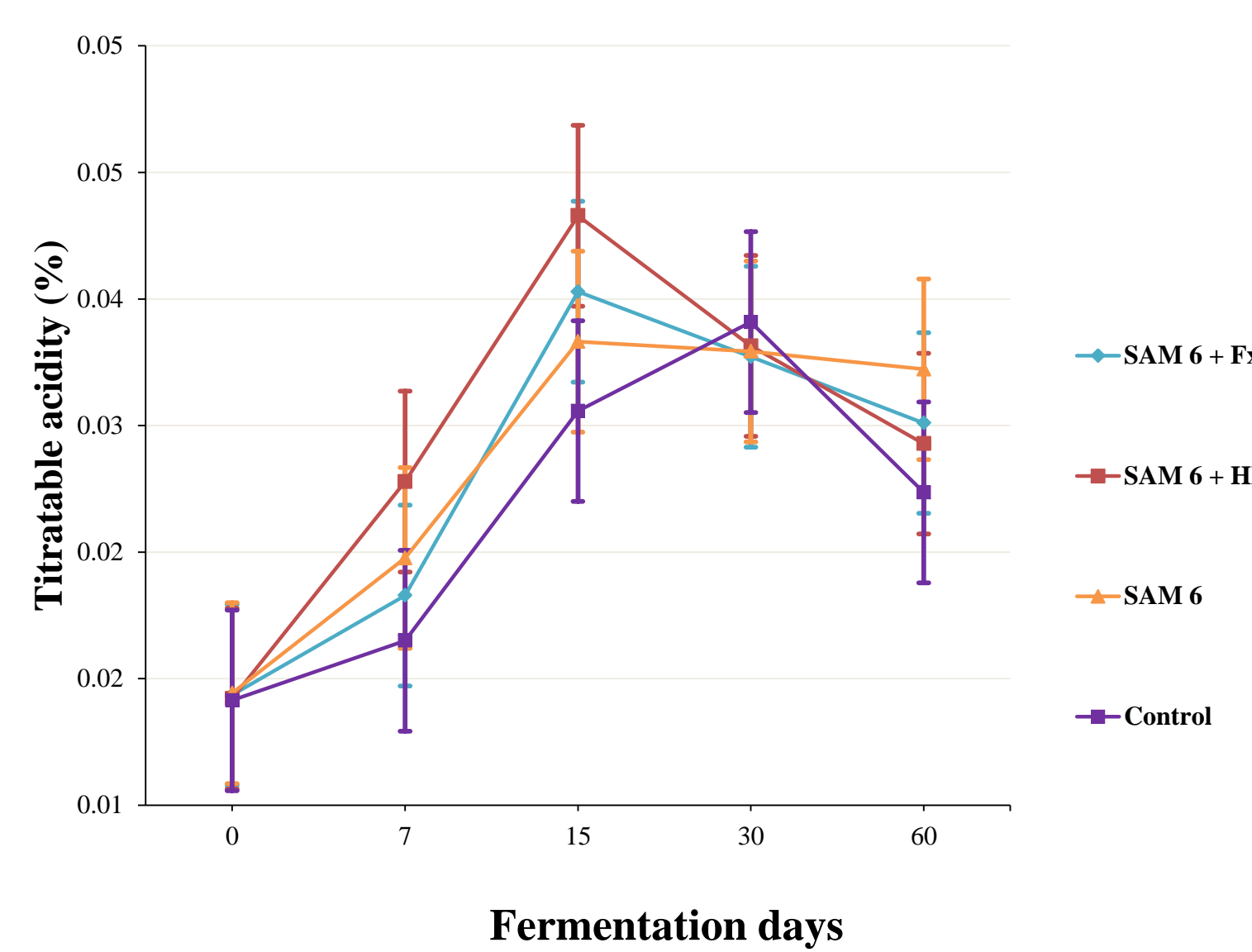
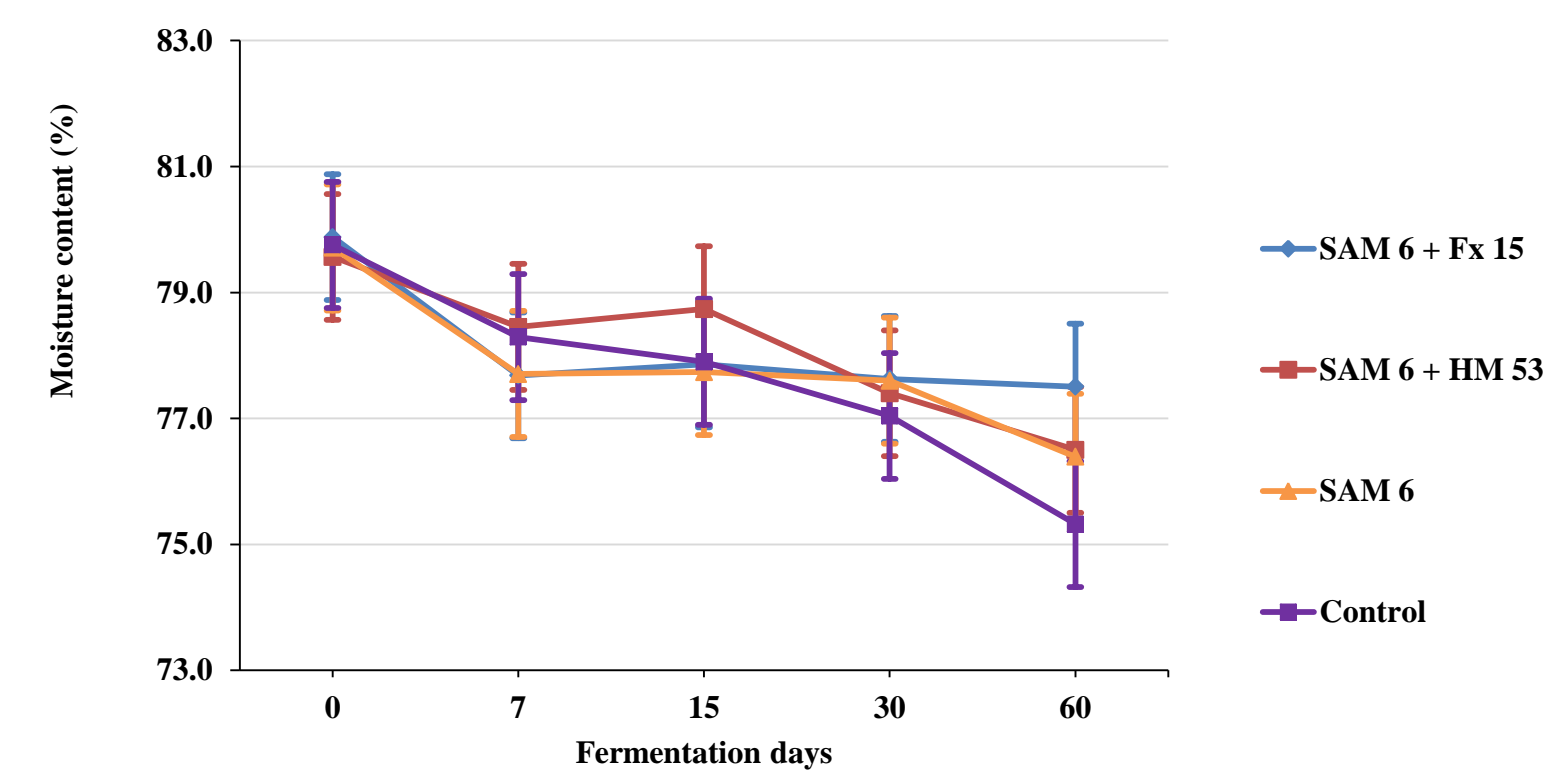
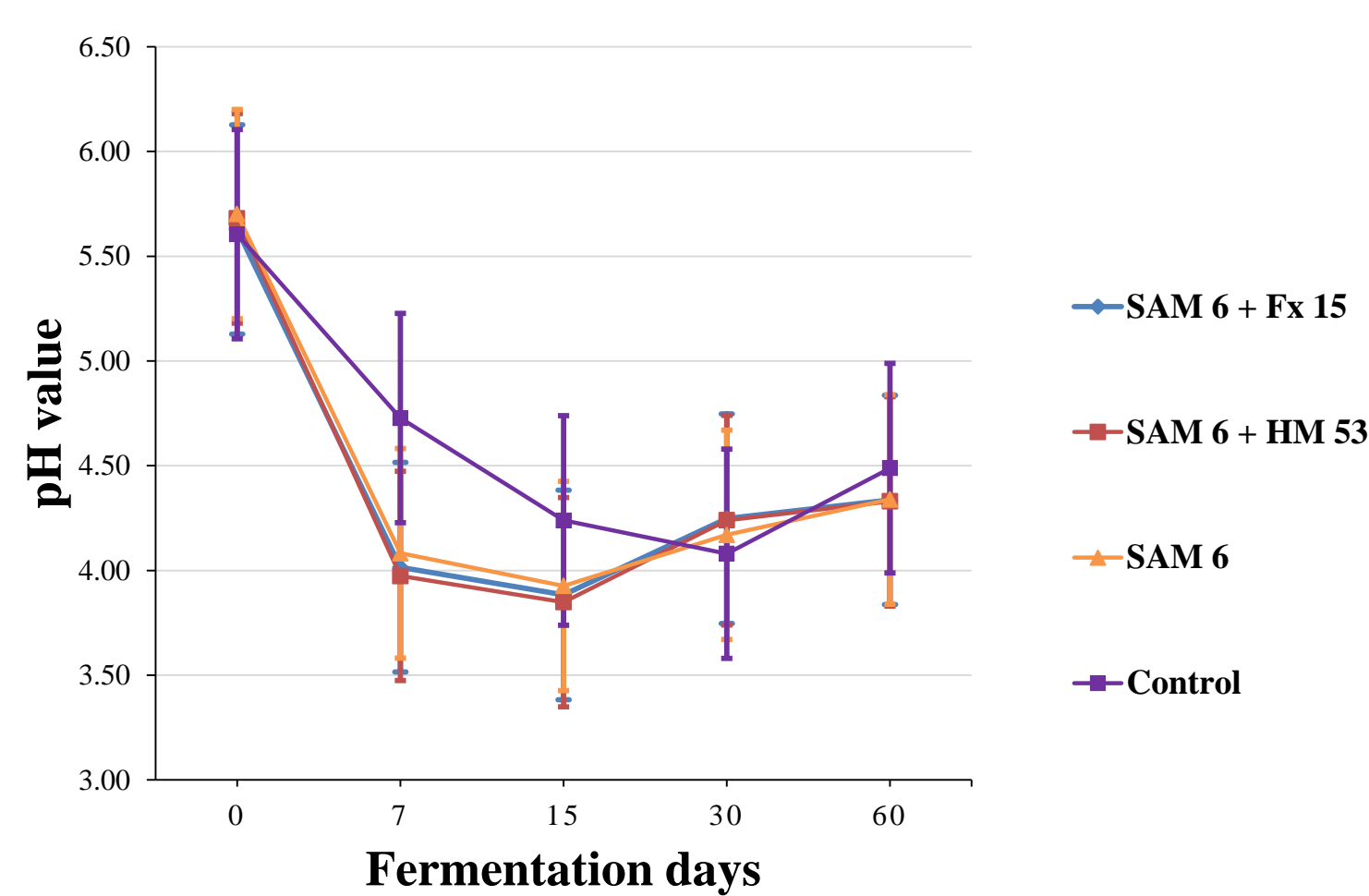
Enset is a monocarpic, perennial, and monocotyledonous plant that originated and domesticated in Ethiopia [1]. The plant is commonly cultivated as food crop only in Ethiopian highlands [1,2]. Kocho is the major food product obtained from scraped pseudostem and decorticated corm of enset plant through a long fermentation process. The traditional enset fermentation process is time-consuming, labor-intensive, and inconsistent in quality. This resulted poor quality products and variable sensory property. This study was aimed to investigate the effects of *Lactobacillus plantarum* and *Leuconostoc mesenteroides* co-inoculation on physicochemical and microbial

dynamics during enset fermentation.

Materials and methods

Four enset plants (two Gena and two Maze varieties) were collected from Chench district and processed using the new enset processing devices. The processed enset mass was divided into four equal parties and inoculated with SAM6 + Fx15, SAM6 + HM53, SAM6 and on left as control. Then allowed to ferment in sauerkraut jar for two months at Gircha field experimental site. Physicochemical and microbial dynamics were monitored [3].

Results



Figures 2: physicochemical parameters

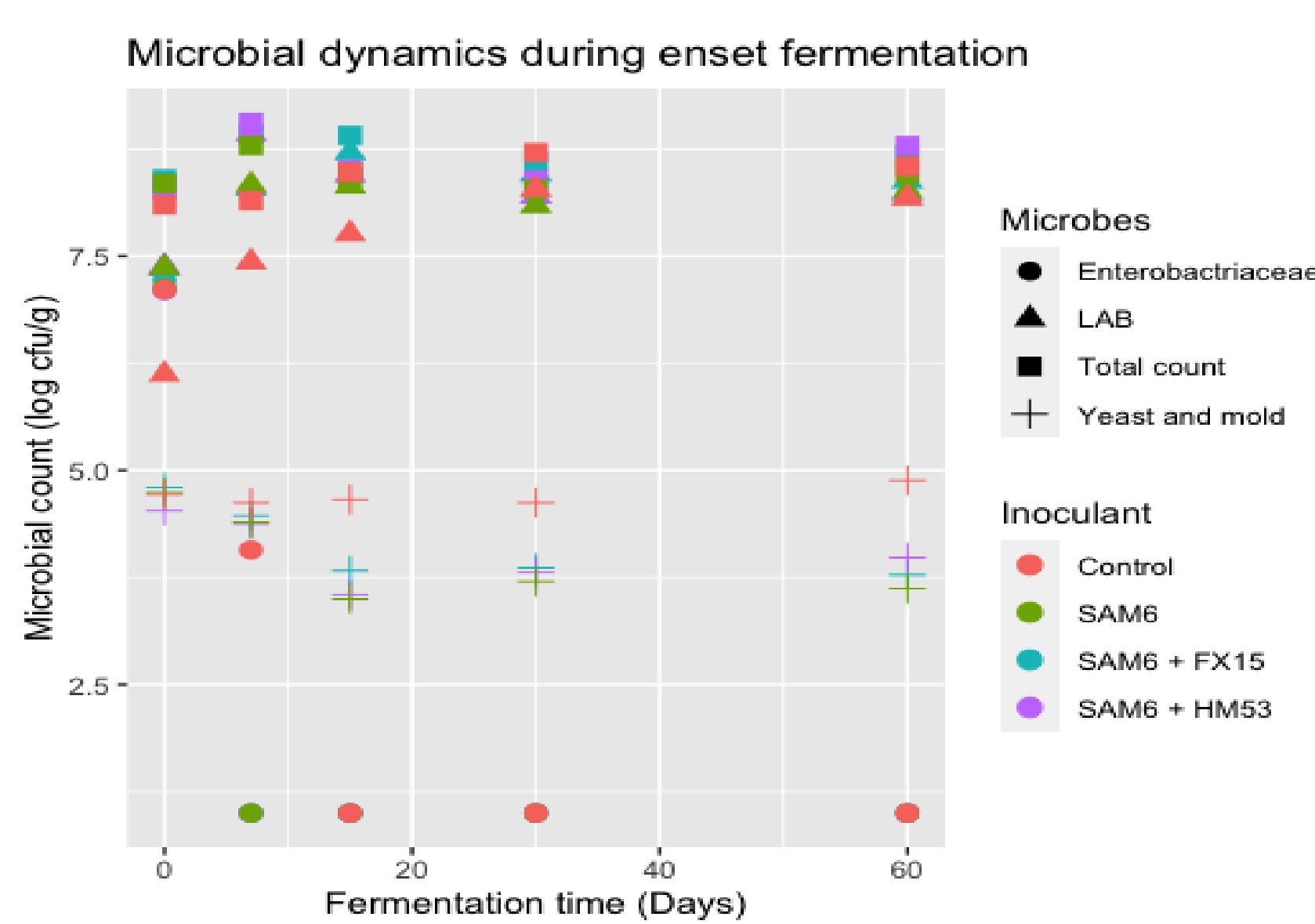


Figure 3: Microbial dynamics during Enset fermentation



Figures 1: Enset processing machines and treatments

^{a, b, c, d} Different superscripts per treatment within the same column indicate significant differences ($p < 0.05$).
^{A, B} Different superscripts per fermentation day within the same column indicate significant differences ($p < 0.05$).

Days	Inoculants	Dry matter base (%)					
		Ash	Crude Fiber	Crude Fat	Crude Protein	Moisture content	Total carbohydrate
Day 0	SAM 6+Fx 15	5.15 ± 0.29 ^{aA}	6.07 ± 3.07 ^{aA}	3.06 ± 0.18 ^{aA}	2.71 ± 0.18 ^{aA}	79.9±0.25 ^{bcA}	3.11 ± 0.10 ^{aA}
	SAM 6+ HM 53	5.13 ± 0.21 ^{aA}	5.97 ± 1.33 ^{aA}	2.85 ± 0.43 ^{aA}	2.65 ± 0.23 ^{aA}	79.6±1.12 ^{cA}	3.8 ± 0.01 ^{dA}
	SAM 6	5.17 ± 0.76 ^{aA}	6.05 ± 1.00 ^{aA}	3.05 ± 0.13 ^{aA}	2.32 ± 0.18 ^{aA}	79.7±0.28 ^{abA}	3.71 ± 0.01 ^{cA}
	Control	5.33 ± 0.58 ^a	5.93 ± 1.19 ^{aA}	2.92 ± 0.68 ^{aA}	2.45 ± 0.32 ^{aA}	79.8±0.28 ^{aA}	3.57 ± 0.01 ^{bA}
Day 60	SAM 6+FX 15	6.40 ± 0.20 ^{aB}	1.08 ± 0.45 ^{aB}	0.73 ± 0.09 ^{aB}	1.31 ± 0.32 ^{aB}	77.5±0.12 ^{aB}	12.98 ± 0.0 ^{dB}
	SAM 6+ HM 53	4.35 ± 0.10 ^{bA}	1.17 ± 0.53 ^{aB}	0.82 ± 0.15 ^{aB}	1.46 ± 0.18 ^{aB}	76.5±0.24 ^{bB}	15.7 ± 0.10 ^{aB}
	SAM 6	5.95 ± 0.41 ^{aA}	1.60 ± 0.31 ^{aB}	0.80 ± 0.15 ^{aB}	1.25 ± 0.13 ^{aB}	76.4±0.06 ^{bB}	14 ± 0.06 ^{cB}
	Control	5.8 ± 0.13 ^{aA}	2.05 ± 0.05 ^{aB}	1.06 ± 0.12 ^{aB}	1.58 ± 0.09 ^{aB}	75.3± 0.50 ^{cB}	14.21 ± 0.01 ^{bB}

Table 1: Proximate compositions of Enset fermented under field conditions

Discussions and Conclusion

- **Titratable acidity increases as fermentation day increased, while pH and moisture content were decreased. The increment in titratable acidity is due to the production of organic acids by the action of lactic acid bacteria, which is in agreement with the finding reported by [3].**
- **Total aerobic counts were high in all kocho samples, Enterobacteriaceae counts reach below detectable level at 7th day for inoculated and 15th day for controls.**
- **Yeast and mold counts decreased as fermentation proceed to the end.**
- **As fermentation day increased to 60 days, crude fat, crude protein, and crude fiber were decreased, while ash content and total carbohydrate were increased for both inoculated and the uninoculated kocho.**
- **Co-inoculant of SAM 6 + HM 53 performs better in pH reduction and faster colonization of enset mass than sole inoculant and controls, propagating such inoculants to commercial level address the problems related to enset fermentation.**

References

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