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Preliminary assessment of 'kudeme'- a traditional cassava-based inoculum – for amylolytic and cellulolytic enzyme activities

Dziedzoave, N.T.^a, Graffham, A.J.^b, Westby, A.^b, and Plahar, W.A.^a.

^aFood Research Institute, Box M.20, Accra, Ghana.

^bNatural Resources Institute, University of Greenwich, Central Avenue, Chatham, Kent ME4 4TB, United Kingdom.



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BACKGROUND

- 'Kudeme' is used in the production of fermented cassava dough (Agbelima)
- It improves the texture, colour and aroma of the product (Sefa-Dedeh, 1989)
- Microflora of kudeme is dominated by *Bacillus* sp. (Amoa-Awua and Jakobsen, 1995)
- *Bacillus* isolates tested positive for tissue degrading enzymes.
- Can enzymes be exploited for other uses?

OBJECTIVES

- To assess enzyme levels at different fermentation times
- To assess possibilities for enhancing enzyme development

MATERIALS AND METHODS

- 2 Kudeme types evaluated at 3 Fermentation times (fresh cassava was used for day 0 measurements).
- Enzymes Assayed
 - Alpha amylase
 - Amyloglucosidase
 - Limit dextrinase
 - Cellulase

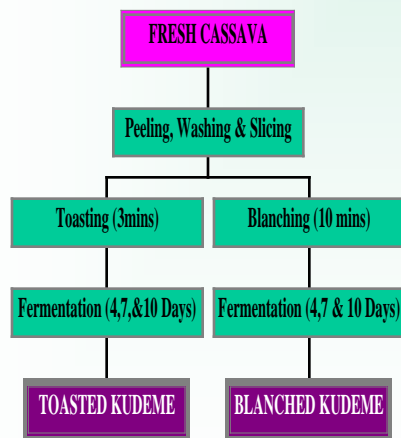


Figure 1. Flow chart for kudeme preparation

RESULTS AND DISCUSSION

- Blanched kudeme showed higher enzymatic activity than toasted kudeme (Figures 2-5).
- Enzyme activity reduced with fermentation time after day 4.
- The predominant enzyme is alpha amylase

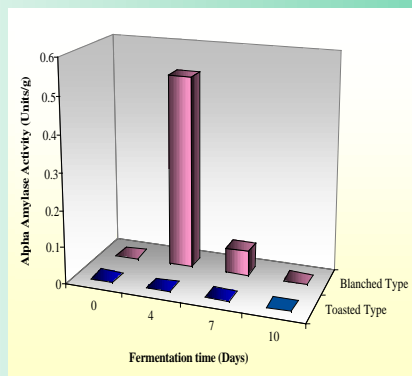


Figure 2. Change in alpha amylase activity of kudeme with fermentation time.

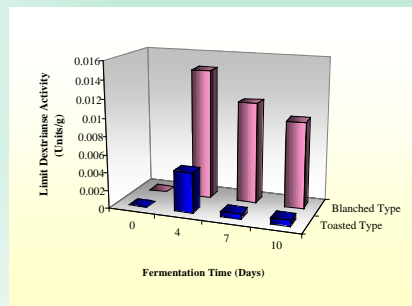


Figure 3. Change in limit dextrinase activity of kudeme with fermentation time

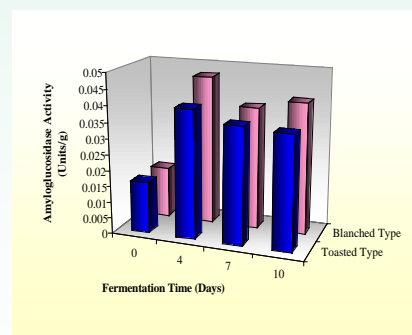


Figure 4. Change in amyloglucosidase activity of kudeme with fermentation time

- Limit dextrinase activity showed significant difference for both kudeme type and fermentation time.
- Amyloglucosidase is the only enzyme for which both kudeme types and fermentation times compared favourably with each other.

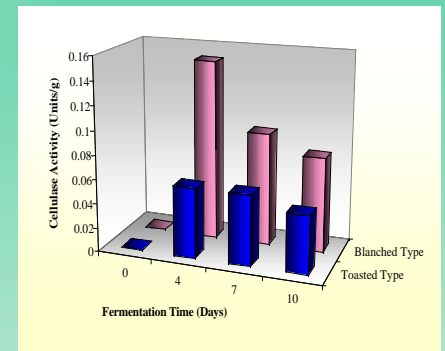


Figure 5. Change in cellulase activity of kudeme with fermentation time

- Relative differences between kudeme types and fermentation times could be due to differences in physico-chemical properties of the raw material after the initial heat treatment. These factors affect microbial growth.
- Differences in microbial growth may consequently affect enzyme development.

CONCLUSIONS

- Optimum enzyme levels occur on or before fermentation day 4.
- Enzyme levels are low but sufficient to cause tissue degradation.
- Process conditions (eg. Cooking method) affect enzyme development.
- Enhancement of enzyme activity could make kudeme a potential source of enzymes for the production of dextrans and glucose syrups from starchy materials.

REFERENCES

- Amoa-Awua, W.K.A. and Jakobsen, M. (1995). The role of *Bacillus* species in the fermentation of cassava. *Journal of Applied Bacteriology*, **79**, 250-256.
- Sefa-Dedeh, S. (1989). Effects of particle size on some physico-chemical characteristics of agbelima (cassava dough) and corn dough. *Tropical Science* **29**, 21-32.