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The effect of Lactic Acid Fermentation on Cassava Leaves

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Introduction

- Cassava leaves are mostly considered a neglected part of the cassava plant. In some countries like Nigeria or Congo, cassava leaves are traditionally consumed with starchy dishes.
- Cassava leaves are a rich source of protein, vitamins, carotenoids and minerals. However, cassava leaves also contain a considerable amount of cyanogenic glucosides, which should be removed before human consumption.
- The main objective of this study was to examine the effect of lactic acid fermentation on cassava leaves.

Material and Methods

- Cassava leaves bought from the local market in Stuttgart were used (Fig.1).
- The cassava leaves were fermented naturally or with starter culture from the lactic acid bacteria *Bifidobacterium, Lactobacillus acidophilus* and *Streptococcus thermophilus* for 21 days at 37°C.
- The characteristics of cassava leaves and fermented cassava leaves were measured in terms of pH, electrical conductivity, colour, dry matter, ash, crude fiber, crude protein, glucose, total phenolic content and cyanide content according to standard methods.

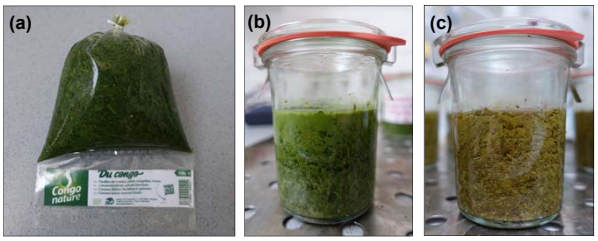

Fig.1. Cassava leaves from the market (a), cassava leaves at the 1st day of incubation (b) and fermented cassava leaves at 14th day of incubation (c)

Results

- It was found that the pH, electrical conductivity, crude fiber, crude protein, glucose and cyanide content was significantly ($p < 0.05$) decreased in fermented cassava leaves. On the other hand, the ash content and total phenolic content was significantly ($p < 0.05$) increased in fermented cassava leaves (Fig. 2).

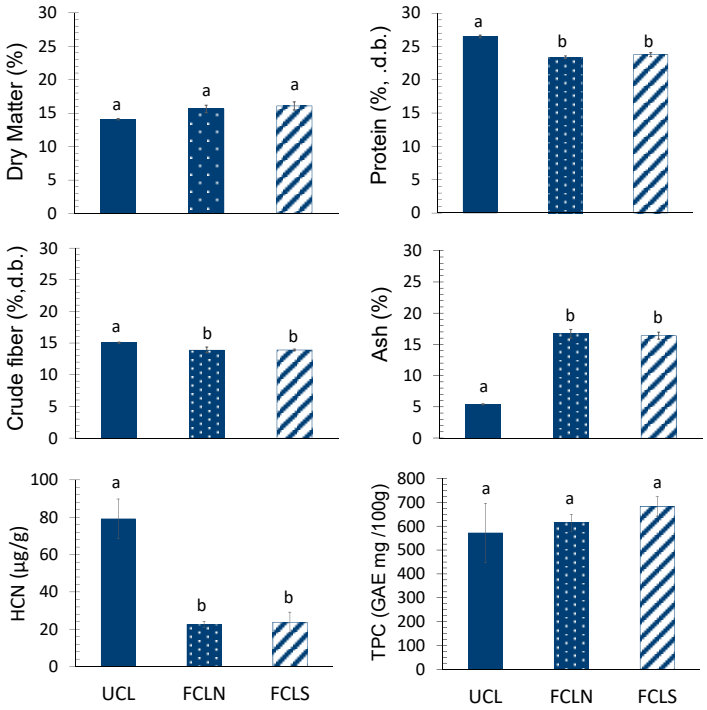

Fig.2. Proximate composition of unfermented cassava leaves (UCL), fermented cassava leaves, naturally (FCLN) and fermented cassava leaves with starter (FCLS)

- The colour parameters were significantly ($p < 0.05$) influenced by fermentation and became darker (Table. 1& Fig. 1).
- There was no significant differences between naturally fermented cassava leaves and fermented cassava leaves with a starter.

Table.1. Color parameters of unfermented cassava leaves (UCL), fermented cassava leaves, naturally (FCLN) and fermented cassava leaves with starter (FCLS)

Samples	L*	a*	b*
UCL	$32.88^{a} \pm 1.85$	$-9.07^{a} \pm 1.34$	$15.43^{a} \pm 1.74$
FCLN	$39.21^{b} \pm 1.04$	$-0.54^{b} \pm 0.45$	$21.37^{b} \pm 0.73$
FCLS	$39.04^{b} \pm 0.39$	$-0.64^{b} \pm 0.13$	$20.52^{b} \pm 0.31$

Conclusions

- The results show that lactic acid fermentation can be used as a method to detoxify cassava leaves and to retain the valuable nutrients of the cassava leaves for human consumption.

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