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Investigating microbial fermentation effects on cassava leaf nutrient profile: A pre-processing method for human consumption

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Abstract

Cassava (*Manihot esculenta*) holds significant importance as a staple food in food-insecure regions of Ethiopia, primarily valued for its tuberous root. Moreover, cassava leaves are renowned for their high vitamin content and supplementary protein, offering a cost-effective solution to protein deficiency in local communities. However, their consumption is limited by elevated levels of cyanide, tannin, and potentially harmful phytin. In recent years, fermentation methods employing diverse probiotic microorganisms have emerged as crucial strategies to mitigate the presence of antinutritional factors and improve the nutritional profile of cassava leaves. This study aimed to evaluate the effectiveness of microbial fermentation in reducing cyanide and antinutrients, specifically tannic acid and phytic acid, in cassava leaves. Fresh cassava leaves sourced from the University of Hohenheim greenhouse underwent fermentation under various conditions: natural fermentation, fermentation with *Saccharomyces cerevisiae* (S.c), fermentation with *Lactobacillus acidophilus* (La), and a co-culture of both inoculums, over 15 days at 30°C. Results indicated a significant reduction in cyanide content across all fermentation conditions, with the highest decrease observed in samples fermented with La, showing a reduction of 66.92 %. Tannin content experienced a notable decline during the initial 7 days of fermentation, while total phenolic content exhibited a significant increase, particularly in samples subjected to co-culture fermentation, showing a rise of 69.65 %. In conclusion, microbial fermentation holds promise in mitigating cyanide and antinutrient levels in cassava leaves, potentially detoxifying them to a degree suitable for human consumption. Further exploration and optimisation of this technique are recommended to enhance its efficacy as a pre-processing approach for improving the safety and nutritional quality of cassava leaves. Continued research into optimal fermentation conditions and probiotic microorganism selection could unlock the full nutritional potential of cassava leaves while ensuring their safety for widespread consumption.

Keywords: Antinutrient composition, health benefits, human consumption

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