

Effect of *Moringa oleifera* Leaf Flour on The Oxalate Content and Colour of Cocoyam: A Response Surface Approach

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Abstract

Introduction: Cocoyam contains anti-nutrients that limits its use as food for man and livestock. Oxalic acid and oxalates are the main limiting factors in the use of cocoyam. Their presence gives a pungent taste or causes irritation when consumed in unprocessed food substances. Several attempts have been made to reduce the oxalate content of cocoyam. These methods do not eliminate it as itching is still reported by many consumers. The use of *Moringa oleifera* leaf flour as an antioxidant for reducing the oxalate content of cocoyam is limited. This work studied the Effect of *Moringa oleifera* leaf flour on the Oxalate content and colour change of cocoyam using a response surface approach.

Methodology: Design Expert (13) software was used in the design of experiment. The process variables were boiling time, concentration of *M. oleifera* leaf flour and quantity of cocoyam. A total of 21 achicha ede samples were used for this study.

Results and Discussion: The Proximate analysis (%) showed that the samples differed significantly ($p < 0.05$), with values that ranged between 4.39-6.35, 0.37-0.56, 1.58-2.03, 1.48-1.86, 4.46-6.36, and 83.24-86.85, for protein, fat, ash, fibre, moisture, and carbohydrate respectively. Also, the values for the methanolic extract of *M. oleifera* leaf flour at concentrations of 10, 12.5, 15, 17.5, and 20 mg/mL, were 15.5, 18.33, 24.55, 29.14, 35.66% and 4.66, 5.55, 6.68, 7.25, 8.80% for DPPH and ABTS radical scavenging assays respectively. Further analysis revealed that the Oxalate content and colour change of the samples ranged between 0.25-0.86 and 0.01-0.35 mg/100g respectively. Sensory evaluation results revealed that cocoyam cooked with *M. oleifera* leaf flour was liked very much (8.95).

Conclusion: The optimal condition for preparing achicha ede was boiling cocoyam for 1.29 h with the addition of 15 g of *M. oleifera* leaf flour. Achicha ede prepared under this condition had an oxalate content of 0.39 mg/100g, colour change of 0.19 and overall acceptability of 6.64. *M. oleifera* leaf flour can be used as a natural source of antioxidants for preventing the crystallization of the calcium oxalate crystals present in cocoyam.