Mineral Compositions of Sugarcane Juice Cultivated in Papalanto, Ogun State, Nigeria

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Abstract:- **Papalanto, Ogun State is one of the locations where sugar cane (*Saccharium offinarium*) is grown and largely cultivated in Nigeria. Mineral compositions of the sugarcane juice in this area is not yet reported. Therefore, this study was carried out to determine the mineral content of the sugarcane cultivars in Papalanto, Ogun state, Nigeria. The result of the study shows that calcium is present in both the NPK-treated sugarcane (that is, fertilizers was used for this cultivar) and the untreated sugarcane (no fertilizers added) samples at about the same level. Concentrations of zinc and potassium were found to be significantly higher in the NPK- treated sugarcane samples than the untreated samples. The findings of this research work suggest that the mineral contents of the NPK-treated sugar cane are higher than their untreated counterpart. Consumption of the NPK-treated sugarcane by the people of the area and beyond should therefore be encouraged. Further work is required to detect and explain the biochemical basis for the high mineral contents of the NPK-treated sugar cane.**

Keywords: **Sugar cane, NPK-treated, Minerals, Zinc, Potassium**

Abbreviations: **NPK- N=Nitrogen, P=Phosphorus, K=Potassium**

I. INTRODUCTION

Several agricultural crops have been tried in the past in Nigeria that absolutely supported the economy. These crops mainly include groundnuts, cotton, sorghum, millet, maize, rice, and sugarcane, among others, from northern parts of the country. Crops such as cocoa, palm kennel, cassava and cashew, to mention a few, are grown in the southern parts of the country [1]. Girei and Giroh, (2012) opined that sugarcane has enormous industrial potentials. Apart from sugar which is the major industrial product obtained from sugarcane, by-products like ethanol, bagasse and molasses are produced, and are also of economic importance[2]. Ahmed (2013), emphasized on the utilization of sugarcane by-products in the paper industry, co-generation of power, and above all, serving as very important source for employment for the teeming population[3].

Presently, Godwin (2013) noted that there are about four major sugar production companies in Nigeria. Collectively, they possess installed capacity of about 120,000 metric tonnes of processed sugar annually. However, the total domestic production has been between 16,000-50,000 tonnes annually, satisfying only a meager 5% of the national demand. With all the potentials in terms of human and material resources that abound for the industry in the country, there is a huge deficit in meeting national demand [4]. However, there is no information regarding the amounts of minerals present in the NPK-treated and untreated sugarcane grown in Papalanto, Ogun state, Nigeria. Therefore, there is the need to determine the mineral composition of the sugarcane juice cultivated in Papalanto, Ogun state, Nigeria. Data generated from this study will contribute to nutrient composition database useful in the assessment of dietary intake of consumers of sugar cane.

II. MATERIALS AND METHODS

A. Sample Collection

The healthy sugarcane sample A (NPK-treated) and untreated sugarcane sample B were obtained from Papalanto, Ogun State. The authentication was carried out at the herbarium unit, Department of Botany, University of Lagos, Akoka, Lagos, Nigeria. Thereafter the stems were taken to the research laboratory of the Department of Science Laboratory Technology, Federal Polytechnic Ilaro, Ogun State, Nigeria, where they were rinsed and stored.

B. Preparation Of Sugarcane Juice

The sugarcane (*S. officinarum*) stem were peeled using a kitchen knife, cut into pieces and placed in a sugar cane crusher for the extraction of juice. The stems were crushed for about 1hr and the juice collected into volumetric flask in triplicate for mineral analysis.

C. Mineral Analysis

The mineral elements were determined by digesting 5g of the sample in per chloric and concentrated nitric acids diluted with deionized water in 50 mL volumetric flask. Calcium (Ca), Magnesium (Mg), Potassium (K), and Zinc (Z), were measured using the PerkinElmer Atomic Absorption Spectrophotometer (AAS).

III. RESULT AND DISCUSSION

Table 1 shows the mineral concentrations of sample A (NPK-treated) and sample B (untreated). Sample A has a significantly ($p < 0.05$) higher levels of magnesium (Mg), zinc (Zn), calcium (Ca) and potassium (K) than sample B.

The values obtained for calcium, magnesium, potassium, and zinc levels in the NPK-treated sugar cane are greater than those of the untreated sugarcane. This observation is similar to those reported by Hawkerford *et al.*,2012 and Jordral-Segado*et al.*,2016,[5]-[6].

Table 1: Mineral Compositions of Sugarcane Juice Determined in the Genetically Modified and Native Sugarcane Samples.

Minerals	**Sample A (NPK-treated)** Concentration (mg) (Mean±SD)	**Sample B (Untreated)** Concentration (mg) (Mean±SD)
Magnesium	18.95 ± 0.893	0.871 ± 0.039
Potassium	68.61 ± 1.298	1.626 ± 0.0198
Zinc	0.5411 ± 0.0713	0.0163 ± 0.0021
Calcium	22.33 ± 6.817	0.880 ± 0.0210

Values are expressed as mean± standard deviation

IV. CONCLUSION

The NPK-treated sugar cane juice has better mineral quality than the untreated grown sugarcane because of its high levels of potassium, magnesium, zinc and calcium, which may be due to the use of fertilizers by the farmers. Other probable scientific reasons may be investigated.

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