



Research Article

DETERMINATION OF MINERAL ELEMENTS COMPOSITION OF ETHANOLIC STEM EXTRACT OF *SACCHARUM BARBERI*

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ARTICLE INFO	ABSTRACT
<p>Received 05th February, 2015 Received in revised form 08th March, 2016 Accepted 10th April, 2016 Published online 22th May, 2016</p> <p>Keywords: <i>Saccharum barberi</i>, Phytochemicals, Proximate analysis.</p>	<p>Aim: The aim of this work is to determine mineral elements composition of ethanolic stem extract of <i>Saccharum barberi</i>.</p> <p>Materials and Methods: Fresh stem of <i>Saccharum barberi</i> were obtained from Magongo in Ogori/Magongo Local Government Area of Kogi State, Nigeria. 350g of the dried stem was macerated in 250 ml of 80% ethanol for 72 hours to allow the solvation of the solution. The mixture was separated using muslin cloth and the filtrate was concentrated to dryness. The residue was used for phytochemical screening, proximate composition and mineral elements determination.</p> <p>Results: The yield extract was 20.0g. The phytochemical screening indicate the presence of alkaloids, flavonoids and saponins in high concentration with steroids and tannins in trace amount. The results of proximate analysis showed that moisture content, carbohydrate and crude fibre were highly concentrated in the extract (62%, $32.30 \pm 0.25 \frac{w}{w}$ and 29.20 ± 0.16) with fat, protein and ash found in traces amount. The concentration of phosphorus, calcium and magnesium were reasonably high ($178.20 \pm 1.47\text{mg}/100\text{g}$, $861.40 \pm 0.66\text{mg}/100\text{g}$, $367.10 \pm 0.98\text{mg}/100\text{g}$). However, traces amount of zinc, potassium sodium, manganese and iron were observed.</p> <p>Conclusion: The bioactive agents present visa vis its macronutrients and micronutrients had made this plant a novel source of fodder and its use as herb.</p>

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INTRODUCTION

Medicinal plants have been known and used since ancient time by most local people for managing various ailments, without actually known the chemical compositions of these plants and how the healing properties are brought about. *Saccharum barberi* is only of the widely used plants as local herb. *Saccharum barberi* belongs to the family of poaceae and the genus *Saccharum* is about 3-5m tall and 2-3cm width. It has spiral alternate leaves and it is a monocotyledon that are mostly found in the rainforest areas of the world. *Saccharum barberi* extracts exhibits antiseptic; antiviral, antidote, bacteriocidal, diurectic, laxative and demulcent properties and hence are used in the treatment of diseases such as bedsore, ulcer, cancer, malaria, cold, cough, skin burn, spleen tumor etc. (Begum, 2002; Duke, 1978; Hayashi *et al.*, 1993).

The major aim of this research is to identify the active ingredients, as well as the chemical compositions of this plant, which had placed it in its present limelight as a medicinal herb.

MATERIALS AND METHOD

MATERIALS

Chemicals and Reagents

Chemicals and reagents used in this study were of analytical grade products of May and Baker, England.

Plant Materials

Fresh stems of *Saccharum barberi* were obtained from Magongo in Ogori/Mangogo L.G.A of Kogi State, Nigeria and was identified by late Mr. Patrick Ekwonoh of Botany Department of Kogi State University, Anyigba.

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Preparation of Plant Extract

The stem bark of *Saccharum barberi* were peeled off and chopped into pieces. They were dried for 3 weeks in front of Biochemistry Laboratory and crushed into powder using a grinding mill model of binatone product of Germany.

A quantity, 350g of the powdered *Saccharum barberi* was macerated in 250ml of 80% ethanol in a stopped flask and stand for 72 hours, to allow the solvation of the solvent. The mixture was separated using a muslin cloth and the filtrate evaporated to obtain a 20g crude extract, which represent 5.7% yield.

Phytochemical Screening

The extract obtained from the *Saccharum barberi* was analysed for the presence of phytochemicals such as alkaloids, saponins, flavonoids, tannins, steroids and terpenoids using standard phytochemical screening procedures (Sofowora, 1993). Trease and Evans, 1989 and Harborne, 1984).

Proximate Analysis

The proximate analysis was carried out on the powdered sample of *Saccharum barberi*. The moisture content, ash and carbohydrate were determined as described by AOAC, 2000, while the crude protein, crude fibre and fats were determined by method described by Pearson (1976).

Micronutrient Analysis

Extract from the *Saccharum* plant (10g) was used to prepare sample used for the macronutrient determination by inserting it on crucible in ash using a muffle furnace: dilute Hcl was added to the ash, boiled and solution made up to 100ml with distilled water iron and calcium was determined by atomic absorption spectrophotometer while phosphorus was determined as phosphate by vanadomolybdate calorimetric method Pearson (1976) using the method absorption spectrophotometer. Other elements determined were Zn, Mn, Na, K and Mg.

RESULTS

Table 1 Quantitative Phytochemical Constituents of Powdered *Saccharum barberi* Stem Extracts

Photochemical	Relative Abundance
Alkaloids	+++
Terpenoids	+
Flavonoids	++++
Tannins	+
Saponins	+++
Steroids	+

Key:

- = Not Present
- + = Present in Low Concentration
- ++ = Present in Moderate Concentration
- +++ = Present in Very High Concentration
- ++++ = Abundantly Present

DISCUSSION

The phytochemical results of this study showed that the *Saccharum barberi* stem are abundantly riched in alkaloids, flavonoids and saponins with traces of other phytochemicals such as terpenoids, steroids and tannins. These bioactive agents function as defence against microorganisms as well as

pharmacological roles. Alkaloids were used for anti-bacterials activity, analgesic marcotic etc (Sofowora, 1979 and Eleikwa *et al.*, 2005). Flavonoids is a potent anti-inflammatory agent, antioxidants, anticancer, antiviral and enzymes stimulator in the production of chemical mediators (Middleton and Kandaswami, 1992; Read, 1995; James *et al.*, 2003, Oweyele *et al.*, 2008). Saponins serves as anti-nutritional factor by reducing food intake, reduce cholesterol level and serve as adjuvants vaccines, used as mild stimulants for muscle and nerves (Ouabain and Phlorizon) (Asi *et al.*, 2008). The use of the *Saccharum barberi* as fodder for assisting ruminants in alleviating these various ailments.

Table 2 Proximate Macronutrient Composition of Powdered Stem Sample of *Saccharum barberi* (Dry Matter)

Macronutrient	Dry Matter (w/w)
Water	82.0 ± 1.40
Ash	2.00 ± 0.03
Crude Fibre	32.30 ± 0.16
Fat	4.30 ± 0.25
Carbohydrate	29.20 ± 0.16
Protein	7.80 ± 0.16

Values represent mean ± SD of 3 determinations.

Table 3 Mineral Elements Composition of *Saccharum barberi* Stem Extract

Macronutrient	Dry Matter (w/w)
Calcium	861.40 ± 0.66
Iron	15.90 ± 0.25
Phosphorus	178.20 ± 1.47
Magnesium	367.10 ± 0.98
Potassium	11.60 ± 0.35
Manganese	0.95 ± 0.10
Zinc	10.90 ± 0.35
Sodium	48.20 ± 1.50

Values: Mean ± SD.

The result of the proximate analysis show that *Saccharum barberi* have high concentration of moisture, carbohydrate, and fibre with trace amount of ash, protein and fat. They are easily eaten as fodder by ruminants since fibre is not easily digestible by human gastro-intestinal tract.

The result of micro nutrient analysis show that *Saccharum barberi* high level of calcium, phosphorus and magnesium with traces of other elements such as iron, zinc, potassium, manganese and sodium.

The calcium and phosphorus are necessary for bone and teeth formation, electrolyte balance maintenance of body fluids and prevent the release of lytic enzymes and active mediators of inflammation such as 5-hydroxyl tryptamine histamine and kinnins (Phillips and Morrison, 1970 and Ujowundu *et al.*, 2008).

CONCLUSION

The present findings showed that *Saccharum barberi* have some bioactive agents (Alkaloids, flavonoids and saponins) while the macronutrients as well as the micronutrient have rich concentration of essential elements needed for live building in organism. This had aided in continuous used as fodder as well as herbal medicine.

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