academicJournals

Vol. 5(5), pp. 98-100, May 2013
DOI: 10.5897/JPP12.043
ISSN 2141-2502 ©2013 Academic Journals
http://www.academicjournals.org/JPP

Journal of Pharmacognosy and Phytotherapy

Short Communication

Chemical composition of the methanolic leaf and stem bark extracts of *Senna siamea* Lam.

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Accepted 30 April, 2013

The study was conducted to evaluate some chemical constituents of the leaf and stem bark of *Senna siamea*. Standard methods were used in all the analysis. Preliminary phytochemical screening indicated the presence of flavonoids, tannins, polyphenols, anthraquinones, saponins, and glycosides. Quantitative study of some phytoconstituents showed a significant difference of ($p < 0.05$) between the leaf contents and that of the stem bark with the exception of tannins. The results of elemental analysis revealed that the levels of potassium (K), sodium (Na), magnesium (Mg) and manganese (Mn) differed significantly ($p < 0.05$) when leaf contents were compared with that of the stem bark, while nickel (Ni), chromium (Cr), iron (Fe) and copper (Cu) contents were not statistically ($p < 0.05$) different. This result indicated that *S. siamea* has great potentials as it contains active pharmaceutical ingredients.

Key words: *Senna siamea*, phytochemicals, elemental compositions.

INTRODUCTION

Medicinal plants contain physiologically active constituents, which over the years have been exploited in traditional medical practice for the treatment of various ailments (Okigbo and Igwe, 2007). Plant extracts from them have been used for the cure of many disease conditions, and some of their effectiveness have been established (Sofowora, 1993). Researches are currently being conducted on medicinal plants/extracts to isolate and purify the active fractions for preparation of drugs from natural sources (El-mahmood and Amey, 2007) due to their less toxic effects and affordability (Mohammed et al., 2010). *Senna siamea* Lam. (Irwim and Barneby-*Cassia siamea* Lam.) (Fabaceae, Caesalpiniaceae) (El-mahmood and Doughari, 2008), or in Hausa as ''Malga'' (Bala, 2006), was introduced to Africa from tropical Asia. It is widely grown throughout tropical Africa. It belongs to Caesalpiniacea (Von maydell, 1986). *S. siamea* has been reported to be used in the management of constipation, diabetes, insomnia (Tripathi and Gupta, 1991), hypertension, asthma, typhoid fever, and diuresis (Hill, 1992). Leaves and bark of medicinal plants were reported to be used locally as antimalarial medications (Lose et al., 2000). The flowers and young fruits were used as curries (Kiepe, 2001).

This work was undertaken to investigate the phytochemical constituents and elemental compositions of the leaves and stem bark of *S. siamea* against the background of the uses of the plant parts by traditional herbalists.

MATERIALS AND METHODS

Plant collection and extraction

Leaves and stem bark of *S. siamea* were collected in April, 2005 within the premises of Bayero University, Kano. The plant parts were authenticated by botanists in the Department of Biological Sciences, Bayero University, Kano. Leaves and stem bark were

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Table 1. Qualitative phytochemical screening of the leaves and stem bark of *S. siamea.*

Phytochemicals	Leaves	Stem bark
Anthraquinones	+	+
Alkaloids	+	+
Tannins	+	+
Saponins	+	+
Flavonoids	+	+
Polyphenols	+	+
Glycosides	+	+

(+) detected.

Table 2. Quantitative phytochemical constituents of *S. siamea.*

Samples (g/100 g)	Leaves	Stem bark
Alkaloids	10.5±0.71[a]	4.75±0.21[b]
Saponins	8.1±0.35[a]	4.4±0.28 [b]
Flavonoids	19.3±0.57[a]	12.4±1.57 [b]
Tannins	4.8±0.28[a]	5.9±0.28 [b]

All values are means ± SD of four replicates. Values with different superscripts along a row are statistically different ($p < 0.05$).

each separately washed, wiped-dry, sun-dried, cut into small pieces and subsequently reduced to coarse powder. Fifty grams of each leaves and stem bark were separately extracted overnight with methanol, with intermittent vigorous shaking. Each extract was filtered, concentrated with a rotary evaporator and dried over a water bath at 45°C. The residue from each plant part was used for phytochemical screening.

Phytochemical analysis

Methanolic extracts of each plant parts were used for preliminary phytochemical analysis using standard methods; alkaloids, saponins, flavonoids (Sofowora, 1993); anthraquinones (Harbone, 1973) and tannins (Trease and Evans, 1978). For the quantitative determination of some phytochemicals, the method of Bohm and Koupai-Abyazani (1994) was used for flavonids, while alkaloids, saponins and tannins were analysed using that of Wasagu et al. (2005).

Elemental analysis

Elemental composition of each plant part was carried out on the ash sample obtained by the dry-ashing method (Tracey, 1980). The ash sample from each plant part was quantitatively transferred to a 500 cm^3 beaker, using distilled water of 100 cm^3. Concentrated hydrochloric acid of 10 cm^3 was added and the solution boiled for several minutes. After cooling, each solution was then diluted to 500 cm^3 and then filtered. The resulting solution was used to measure the absorbance of elements analysed using atomic absorption spectrophotometer (model sp 2900); sodium and potassium were determined using a flame photometer (model Gallen-kamp FGA-300-C).

RESULTS AND DISCUSSION

Preliminary qualitative phytochemical screening of the leaves and stem bark of *S. siamea* revealed the presence of anthraquinones, alkaloids, tannins, polyphenols, glycosides, saponins and flavonoids in both the leaves and stem bark (Table 1). To further ascertain the preliminary result, a quantitative estimation of some phytochemicals were carried out, and the result showed that the leaves content were significantly ($p < 0.05$) higher than that of stem bark (Table 2). These active phytochemicals are known for their medicinal activity as well as physiological actions; as such they confer the therapeutic potentials of all medicinal plants. Alkaloids, saponins, and tannins have been reported to inhibit bacterial growth and protective to plants against fungal infections (Doughari and Okafor, 2008). Anthraquinones were reported to be used as a laxative (Amadi et al., 2006). Flavonoids were reported to suppress tumour growth and prevent blood clots (Seyfulla and Borisora, 1990). Thus, the medicinal uses reported of *S. siamea* in managing constipation, its antimicrobial and antimalarial uses may be attributed to the presence of these phytochemical constituents. These results are in accordance with the previous report (Smith, 2009). Although, Bukar et al. (2009) reported the absence of flavonoids, saponins and alkaloids in ethanolic and chloroform extracts, it could be as a result of different solvent used.

In addition to phytochemical composition, the elemental profile of medicinal plants is another important factor that determines the medicinal value of these plants. The levels of Mn, Cr, Mg, Na, and K (mg/100 g) of *S. siamea* leaves (Table 3) differ significantly ($p < 0.05$) from that of the stem bark, while Cu, Pb, Ca, Zn and Ni in the leaves content did not differ significantly from that of the stem bark. The need for supplementary diet rich in these minerals cannot be overemphasized for many reasons; they play a vital role for man and other animals as curative and preventive agents in combating diseases, nutritive and catalytic disorders (Abulude et al., 2006). They also help towards the catalytic activity of many enzymes and hormones (Nzikou et al., 2010). Thus, intake of these elements should be such that does not lead to any form of health disorder as some clinical abnormalities were reported due to high level of some minerals. The result of this work agrees with the report of Ingweye (2010).

Conclusion

The result of this study supports the fact that *S. siamea* carries some active biocomponents that have therapeutic potentials, and as well support the local uses of this plant. However, these local medicinal uses are subject to further scientific verification.

Table 3. Elemental composition of the leaves and stem bark of *S. siamea*.

Elements (mg/100 g)	Leaves	Stem bark
Copper	0.49±0.11[a]	0.69±0.10[b]
Iron	6.74±0.17[a]	5.51±0.25[a]
Manganese	0.72±0.24[a]	0.88±0.18[b]
Lead	0.06±0.02[a]	0.11±0.03[b]
Chromium	1.49±0.08[a]	1.05±0.11[b]
Nickel	2.99±0.38[a]	3.36±0.25[a]
Calcium	87.72±1.75[a]	96.49±1.76[b]
Zinc	11.08±9.14[a]	17.99±8.01[a]
Magnesium	126.31±0.61[a]	47.29±0.90[b]
Sodium	350.88±87.72[a]	263.16±87.72[b]
Potassium	257.01±19.90[a]	116.82±4.70[b]

All values are means ± SD of four replicates. Values with different superscripts along a row are statistically different ($p < 0.05$).

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