

Original Article

Phytochemical assessment of *Eichhornia crassipes* from River Nun, Nigeria

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E-mail: sylvesterizah@yahoo.com**Abstract**

Eichhornia crassipes is an invasive, free floating aquatic herb with adventurous root system. They constitute nuisance in the water ways. This study evaluated the qualitative phytochemical concentration of *Eichhornia crassipes* from River Nun, Nigeria. The study found that tannins and alkaloids are high present, glycosides and saponins and flavonoids are moderately present in most of the samples. This study confirms that *Eichhornia crassipes* from River Nun could be used for antimicrobial and chemotherapeutic agent.

Keywords:

Antimicrobial, Macrophytes, Invasive, Phytochemistry

1. Introduction

A non-native, exotic, foreign species introduced to an ecosystem other than its original home is often referred to as an alien [1]. Most alien naturalize in their new environment and form a part of existing landscapes and ecosystems [1]. Some alien species colonize willfully and compete native species for water, light, nutrient and space [1]. For instance, *Eichhornia crassipes* which is a monocotyledon herb belonging to Pontederiaceae family [2,3] is an invasive perennial alien found in several water ways. It's to native of Brazil from where it spread to other part of South America [3-5] and Africa. *Eichhornia crassipes* is considered as one of the most productive plant species in the world and the worst aquatic weed [3,6,7].

Eichhornia crassipes is euryhaline which can thrive in fresh as well as marine ecosystem. Due to its invasive properties, it can be harvested for practical utilization to minimize its cost of removal in the water ecosystem due to the nuisance they constitute when in abundance thus [6,7]. *Eichhornia crassipes* have been several referred to as one of the most dangerous aquatic herb which causes ecological and environmental problems [8,9].

Despite, the nuisance *Eichhornia crassipes* constitute, it has beneficial properties including its utilization in the pharmaceutical industry [8, 10], development of new chemotherapeutic agents [1], Larvicidal and pupicidal activity [11], antioxidant activity [12,13], wound healing activity [14], antitumour activity [15], bioactive compounds [16], anti-inflammatory [17], antiaging [18], antiagal [5], antifungal [14,19], antibacterial [5,14,20,21]. Joshi and Kaur [21] demonstrated that methanol, ethanol and aqueous extract of *Eichhornia crassipes* can be used for the control of bacterial infections associated with *Bacillus subtilis*, *Staphylococcus epidermidis*, *Escherichia coli* and *Pseudomonas aeruginosa*.

In Nigeria several water bodies abound in the Niger Delta region. Bayelsa state has several river tributaries. River Nun is a major River in the region that emptied into the Atlantic Ocean just as River Orashi and Forcados that emptied into the ocean in Rivers and Delta state respectively. Some residents of the state especially in the rural communities deposit their wastes into aquatic ecosystem. *Eichhornia crassipes* abound in the River Nun which aids in the remediation of pollutants from the water. This study aimed at assessing the phytochemistry of *Eichhornia crassipes* from River Nun.

2. Materials and Methods

2.1 Plant material: *Eichhornia crassipes* samples were harvested from River Nun in Amassoma, Southern Ijaw Local Government Area of Bayelsa state. The samples were collected from five locations of 300 meters apart across a period of six weeks with two weeks intervals. The samples were transported to the laboratory where they were washed with running tap water. The *Eichhornia crassipes* samples comprising of the root, stem and leaves were dried under the sun light, before transferring the oven at temperature of 50°C for 72 hours. The samples were then blended together (i.e leaves, stem and roots) and preserved in sterile Ziploc bag prior to phytochemical screening.

2.2 Qualitative Phytochemical screening of *Eichhornia crassipes*

The plant was extracted with water using the method previously described by Joshi and Kaur [21] and Lalitha and Jayanthi [4]. The qualitative screening for tannins, saponins, flavonoids, glycosides and alkaloids were analyzed using previously described methods [4, 22 – 25].

3. Results and discussion

The phytochemistry (alkaloid, flavonoids, tannins, saponin and glycosides) from *Eichhornia crassipes* harvested from River Nun at Amassoma axes, Bayelsa state, Nigeria is presented in Table 1. Alkaloids was highly present in all the sampling points across the batches apart from location A in batch I and III and station E in only batch I were they are moderately present. Like alkaloids, tannins are highly present in the *Eichhornia crassipes* from the different sampling stations across the batches apart from station A, C and E in batch I and B, C and E in batch III were they are moderately present. Glycosides are moderately present in all the samples across the batches apart from sample from location E in batch III were they occur in high quantity. Saponin is low in batch I apart from location B. Saponin are also moderate in batch II and III apart from location C in batch II and location A in batch III were they occurred in high quantity. Beside location C and D in batch I (which occurred in low concentration), flavonoid concentration was low; moderate in batch II apart from location D where they occurred in abundance. And in batch III it was low in location E, moderate in location A and high in location B, C and D. The variation with regard to the concentration of the phytochemical in the different location across the batches could be attributed to fluctuation in the water physico- chemistry of the water due to the deposition of wastes in the water as well as accumulation of pollutants.

Table 1: Phytochemical assessment of *Eichhornia crassipes* from River Nun, Nigeria

	Batch I					Batch II					Batch III				
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Alkaloids	+++	+++	+++	++	++	+++	+++	+++	+++	+++	+++	+++	+++	++	+++
Flavonoids	+	+	++	++	+	++	++	++	+++	++	++	+++	+++	+++	+
Tannins	++	+++	++	+++	++	+++	+++	+++	+++	+++	+++	++	++	+++	++
Saponins	+	++	+	+	+	++	++	+++	++	++	+++	++	++	++	++
Glycosides	++	++	++	++	++	++	++	++	++	++	++	++	++	++	+++

+ Low; ++ moderate; +++ high

The phytochemical found in *Eichhornia crassipes* from River Nun is comparable to the concentration found in the same plants from other locations. Baral and Maharjan [1] reported saponin, alkaloid and glucoside in *Eichhornia crassipes* from several regions of Kathmandu and Pokhara Valley, Nepal. Joshi and Kaur [21] reported that methanol, ethanol and aqueous extract of *Eichhornia crassipes* contain alkaloids, while tannin is found in aqueous and methanolic extracts and flavonoid is only presented in aqueous and ethanol extracts. Lalitha and Jayanthi [4] reported presence of alkaloids and flavonoids in fresh ethanolic extract of *Eichhornia crassipes*. Kayathri et al. [3] reported the presence of alkaloids, flavonoids, glycosides, saponins and tannins in *Eichhornia crassipes* using different extract materials. Kandukuri et al [26] reported that *Eichhornia crassipes* contain tannins, saponins and alkaloids but lack glycosides in dry methanolic extract. Due to the presence metabolic properties of Alkaloids and flavonoids in *Eichhornia crassipes* it can be used as antiviral, antibacterial, antimicrobial and anticancer agents [4].

4. Conclusion

Plants including macrophytes play essential role chemotherapeutic agents production. Phytochemical assessment was carried out on *Eichhornia crassipes* from River Nun Nigeria. The plants showed the presence of many metabolites including tannins, saponins, flavonoids, glycosides and alkaloids which have pharmaceutical and medicinal properties as well as anti-aging, anti-tumor, anti-oxidants etc

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