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BIOPROSPECTING OF AN INVASIVE AQUATIC WEED *EICHHORNIA CRASSIPES* (MART.) SOLMS

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ABSTRACT

Eichhornia crassipes (Mart.) Solms commonly called Water Hyacinth, is an invasive aquatic macrophyte that grows at a very rapid rate in water bodies causing water pollution. It poses a threat to environment and sustainable development. It's biomass potential can be exploited for it's bioprospecting in various industries. As a step towards this goal, this preliminary work aims to understand the phytochemistry of this weed. The oil contents, its physical parameters, secondary metabolites and primary metabolites were found out using qualitative and quantitative methods, titrations and chromatographic methods. The yield of oil (2%), saponification value (189.56) and acid value (0.28) reveals it's potential in cosmetic industry and high shelf life. Presence of secondary metabolites such as phenols, flavonoids, terpenoids, cardiac glycosides, carotenoids and anthocyanidins shows it's antioxidant property and scope for drug production. The amount of reducing sugar (0.8775mg/g), protein (4.761 µg/mg) and carotenoids (0.109 mg/g) reveals it's potential as a source of vegetable. The bioprospecting of this aquatic weed in further studies helps to reduce the hazards of water pollution caused by them to some extent. The work serves a basic knowledge about this noxious weed that paves way for it's exploitation in the production of eco-friendly products.

amount of carbohydrate (reducing sugar), protein, phenol, chlorophyll and carotenoid [Sadasivam and Manickam, 1992].

RESULTS AND DISCUSSION

The yield of oil was 2%. Saponification value of the oil was 189.56 i.e. 189.56mg of KOH is required to saponify 1g of the oil completely. This value is the measure of KOH needed to add to manufacture soap from the oil, so that the soap is neither alkaline nor oily. The acid value of the oil was 0.28 i.e. 0.28mg of KOH is needed to neutralize the free fatty acids present in 1g of the oil. This value is comparatively less than that of other vegetable oils indicating high shelf life of the oil. From the study, seven compounds viz., phenols, flavonoids, carbohydrates terpenoids, cardiac glycosides, carotenoids and anthocyanidins were present while steroids, phlobatannins, tannins, saponins, alkaloids and anthraquinones were absent. The presence of two flavonoids at Rf values 0.19 and 0.36 and four anthocyanidins viz., delphinidin, petunidin, malvidin and hirsutidin were confirmed in the flower (Plate 2). The absence of alkaloids were confirmed by paper chromatography and thin layer chromatography. The amount of reducing sugar was 0.8775mg/g tissue, which is almost half of that in pulses where it is approximately 2mg /g tissue i.e. double amount of plant is needed to meet the carbohydrate source when compared to pulses. The protein content was 4.761 µg/mg tissue, which is almost 7 times less than in pulses which is approximately 28 µg / mg tissue. So the plant is not a good source of protein. The phenol content was 187.2 mg/g tissue, which is almost thrice the amount in terrestrial plants. That is it's stress tolerance is three times more than common terrestrial plants such as neem, *Centella, Ocimum* etc. The total chlorophyll and carotenoids were 2.492mg/g tissue and 0.109 mg/g tissue respectively.

The qualitative analysis of *Eichhornia crassipes* [Kurup and co-workers, 2013] showed the presence of tannin, phlobatannin, steroids, terpenoids, alkaloids, flavonoids, phenolic contents, quinone, anthraquinone and cardiac glycosides. But this study showed the absence of steroids, phlobatannin, tannin, alkaloids and anthraquinones while terpenoids, flavonoids, phenols and cardiac glycosides were

potential source of drug against heart disease. Though poor in protein content, it has been used as a source of carotene –rich vegetable in Taiwan. It has also been used as a substrate for biodiesel production. Thus the study indicates that the notorious weed *Eichhornia crassipes* can be exploited for the production of many value-added products through detailed research. The bioprospecting of this aquatic weed leads to its better utilization paving way to alleviating hazards of water pollution, for sustainable development.

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