Phytochemical Investigation of *Digitaria eriantha* as a potential medicinal crab grass

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Abstract

Poaceae, which includes grasses, is a family of monocotyledonous plants. Grasses are an important category within this family. There are around one hundred secondary metabolites that have been identified from various types of grass. Compounds that are naturally occurring and physiologically active and may be found in *Digitaria* species are referred to as phytochemicals. Phytochemicals not only operate as the plant's natural defensive system, but they also give the plant its colour, scent and flavour and they have the ability to prevent diseases. In present study phytochemical analysis, total phenolic content, total flavanoid content, total carotenoid estimation and antioxidant potential were checked in plant extract of *Digitaria eriantha*.

Keywords: Phytochemicals, antioxidant, carotenoid, antioxidant

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1. Introduction

Plants are the main source of nutrition and medicine. Plants are playing a very important contribution in the life of man since ancient times. The knowledge of their medicinal and edible value properties has been given throughout the ages and cultures. *Digitaria eriantha* belong to the family poaceae. Poaceae (Gramineae), is a very large family of monocotyldenous plants. The members of this family of plants are found in the widest variety of habitats around the planet. The Poaceae family has taken the lead in the production of sugar, bamboo and grazing grains, putting them at the top of the economic food chain. It is one of the most numerous families of vascular plants. The Poaceae family has a wide variety of phytoconstituents, including terpenoids, steroids, saponins, volatile oils, flavanoids and fatty acids. The majority of plants belonging to the Poaceae family are used in traditional medicine for a variety of purposes, including treating diabetes, treating anthemism, treating ulcers, acting as astringents and diuretics, providing antioxidant protection, reducing hypersensitivity and reducing inflammation. [1]. As grasses have biological activities therefore scientist founding grasses as source of future medicines[2]. *Digitaria eriantha* utilized extensively for grazing, hay or in silage making. *Digitaria* is the most competitive C_4 weeds of horticulture , agriculture and turfgrass landscape in temperate and tropical regions[3]. *Digitaria eriantha* is erect or ascending grass reaches upto the height of 35-180 cm tall. *Digitaria eriantha* require warm and moist environment for its fast growth. *Digitaria eriantha* have thick and deep root system which help in improvement of aggregate stability of soil. Some *Digitaria* species were proven to possess antimicrobial and antioxidant activities[4]. In the present study we have explore phytochemical potential of *Digitaria eriantha.*

2 Materials and methods

2.1 Collection of plant Plant material (*Digitaria eriantha)* was collected from different areas of Rohtak (Haryana), India and was identified by Raw Material Herbarium and Museum, Delhi, CSIR-NISCAIR. The plant material after collection was rinsed twice with distilled water. After cleaning, plant material was shade dried at room temperature. Further it was converted into powder with the help of a mixer grinder and stored in air tight container at 4°C till further use.

2.2 Extraction procedure:-Plant extract prepared by using soxhlet apparatus. Powdered plant material was extracted separately in three different solvents i.e. acetone, methanol, ethanol (1:5 W/V) with the help of soxhlet apparatus. Plant material (50g) was taken in a thimble prepared from Whatman filter paper No. 1 and placed in extraction chamber of the soxhlet apparatus. Extraction solvent (250ml) was poured in distillation flask and soxhlet apparatus was assembled. During the extraction period, cold water flow was maintained at a constant level in the condenser part of the assembled soxhlet apparatus. Cyclic flow of the extraction solvent was observed between extraction chamber containing thimble and the distillation flask. This cyclic flow was continuously maintained for two to three days till the solvent became colorless in the extraction chamber. The distillation flask containing extracted plant material and extraction solvent was removed from the apparatus. The extract obtained was concentrated by solvent evaporation. The material obtained was weighed and stored at 4°C till further use. [7]

2.3. Phytochemical analysis

The quantitative phytochemical analysis of phenols, flavonoids, alkaloids, saponin, glycosides, steroids, tannins, terpenoids and carotenoids in the plant extracts were checked using standard procedure[17]. Total phenolic content, total flavanoid content and total tannin content was estimated by standard procedure[5].

2.4 Antioxidant assay Antioxidant concentration were checked in plant extract prepared in organic solvent as per standard method of DPPH assay. [6]

3. RESULTS AND DISCUSSION

3.1 Percentage yield of plant extracts Plant extracts from the aerial parts of *Digitaria eriantha* were prepared in acetone, ethanol and methanol using soxhlet appratus. The percentage yield was checked in all three solvents and it was ranged from 2.7 % to 8.1 %. The plant extract prepared in methanol had the highest yield (8.1%), followed by the plant extract prepared in acetone (6.4%). The plant extract prepared in ethanol yielded the lowest percentage (2.7%).

3.2 Phytochemical constituents

Quantitative phytochemical analysis was performed on all of the phytochemical ingredients to determine the presence of phenols, flavonoids, alkaloids, saponin, glycosides, steroids, tannins and terpenoids. Results showed that these phytochemicals were present in the sample (Table 1). It was possible to determine the total phenolic content, the total flavonoid content, the total tannin content and the carotenoid estimation.

All phytochemicals were found in plant extract prepared in methanol. The presence of all other phytochemicals was found in plant extract prepared in acetone except terpenoids. Whereas, except tannin all other phytochemicals was present in ethanol. Methanol was also demonstrated to be an effective solvent for the extraction of phytoconstituents[8]. In methanol extract of *Artemisia scoparia* also reported presence of phenols, flavanoids, alkaloids, steroids, saponins, terpenoids and glycosides, supporting the findings of my investigation[9].

Table 1: Phytochemical constituents obtained from plant extracts prepared in three different solvents

Sr. no	Phytochemicals	Acetone	Ethanol	Methanol
1	Alkaloids	+*	+	+
2	Flavonoids	+	+	+
3	Glycosides	+	+	+
4	Phenols	+	+	+

5	Saponin	+	+	+
6	Steroids	+	+	+
7	Tannins	+	-	+
8	Terpenoids	-*	+	+

+*Presence, -*Absence

3.3 Total phenolic content (TPC)

Plant extract prepared in methanol extract had maximum concentration of TPC (37.53 mg GAE/g), followed by ethanolic extract (24.48 mg GAE/g). However, acetone extract (15.99 mg GAE/g) had the lowest value as shown in (Fig 1). High level of TPC also found in methanol extract of *E. prostrate*, which is similar to above investigation[9][10].

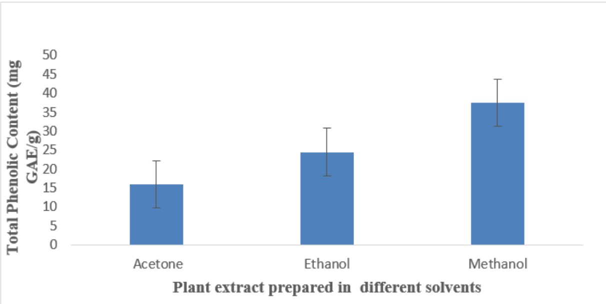

Figure 1: Total phenolic content estimation in plant extract prepared in three different solvents

3.4 Total Flavonoid content (TFC)

When plant extract was checked for TFC, ethanolic extract had the highest value (93.175 mgQE/g), followed by methanol extract (66.64 mgQE/g). Among all the plant extract prepared in acetone had the lowest TFC value (33.22 mg QE/g) (Fig 2). Several researcher demonstrated plant extract made in methanol are a significant source of phenolic and flavanoid content[11]. On the contrary in our study TFC was found in high amounts in ethanol extract and the lowest was found in acetone extract.

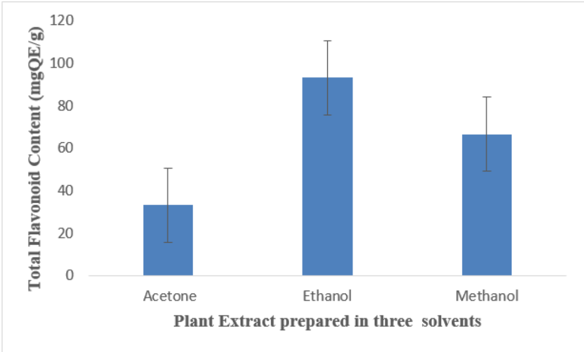

Figure 2: Total flavanoid contentof plant extracts prepared in different solvents

3.5 Total tannin content

When the plant extract was examined, methanolic extract had the greatest concentration of tannin (32.75 Tannic acid mg/ml), followed by ethanolic extract (21.0 Tannic acid mg/ml). However, acetone extract (15.22 Tannic acid mg/ml) had the lowest value (Fig 3). Similarly *Hypochaeris radicata* plant extract of leaves and roots prepared in methanol had the greatest estimated total tannin content.[12]

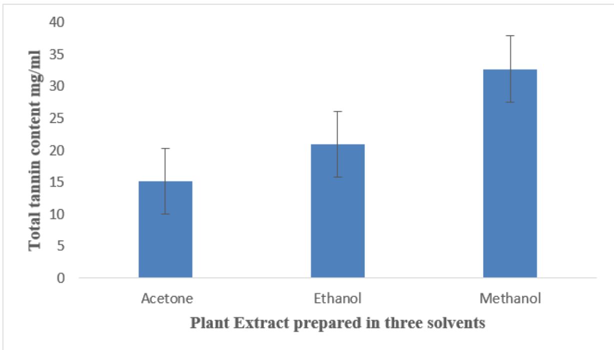

Figure 3: Total tannin content in plant extracts prepared in three different solvents

3.6. Total carotene content (TCC)

Results of TPC, TFC, TCC and phytochemical screening were analyzed, the maximum phytochemical were found in methanol solvent, carotenoid estimation was carried out with the plant extract prepared in methanol (mg/100g). In methanolic plant extract chlorophyll a content was 1.293 mg/100g, carotenoid content was 1.051 mg/100g and chlorophyll b was 1.005 mg/100g. Methanolic extract of *Mespilus germanica* posses high carotenoid content[13]. Higher carotenoids content also found in methanolic extract of pumpkin flesh extract[14].

3.7 Antioxidant assay

Analysis of the *Digitaria eriantha* plant's antioxidant capacity were done using non-enzymatic methods. The outcomes are listed below:

3.7.1 DPPH assay

Percentage scavenging activity were checked in plant extract prepared in methanol, ethanol, acetone (Fig 4). It was found that percentage scavenging activity was maximum in plant extract prepared in methanol as compared to control (ascorbic acid) followed by plant extract prepared in ethanol and acetone. Methanolic extract of *Withania coagulans* has higher antioxidant activity than aqueous extract which is consistent with our results[16]. Antioxidative capability of methanol extract was also reported using the DPPH test and an IC 50 value[15].

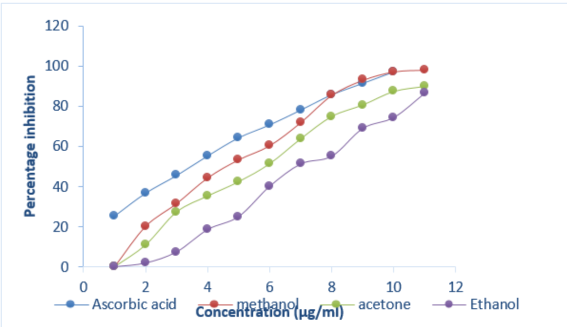

Figure 4: Percentage inhibition percentage of DPPH by plant extracts of *Digitaria eriantha* and ascorbic acid

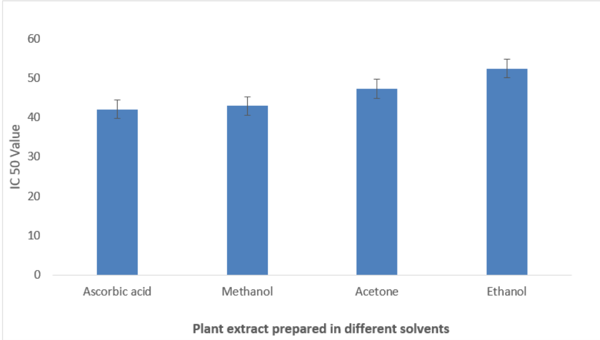

Figure 5: IC-50 values obtained for plant extracts and ascorbic acid

4. Conclusion-

For estimation of phytochemical constituents in *Digitaria eriantha* plant extract were prepared in methanol, ethanol and acetone. Overall aerial plant extract of *Digitaria eriantha* which was prepared in methanol was having maximum concentration of all phytochemical constituents. Percentage scavenging activity was also found best in plant extract of *Digitaria eriantha* prepared in methanol.

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