Research

COMPARATIVE PHYTOCHEMICAL STUDIES OF DIFFERENT SOLVENT EXTRACTS OF *COMMELINA BENGALENESIS LINN.*

[1]Md. Ali Akbar Hossain; [2]Md. Selim Hossain; [1]Kaniz Fatema; [1]Benazir Ahmed Siddique; [3]Hanif Sikder ;[3]Md. Sohel Sarker; [1]Preeti Jain.

[1]Department of Pharmaceutical Sciences, North South University, Bashundhara, Dhaka-1229, Bangladesh.

[2]Department of Pharmacy, Gono Bishwabidyalay (University),Mirzanagar, Savar, Dhaka-1344, Bangladesh.

[3]Department of Pharmacy, University of Asia Pacific, Dhanmondi, Dhaka-1205, Bangladesh.

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ABSTRACT

Medicinal plants have bioactive compounds which are used for curing of various human diseases and also play an important role in healing. *Commelina bengalenesis Linn* is commonly used as traditional remedy for various ailments. Qualitative preliminary phytochemical screening was carried out for n-butanol, ethyl acetate, ethanol, 70% methanolic extract of *Commelina bengalenesis Linn* leaves. The phytochemical screening of the extracts of *Commelia bengaleneasis Linn* exhibit the presence of several phytochemical secondary metabolites like tannins, saponins, steroids, gums and carbohydrates, reducing sugars, alkaloids and terpeniods. The results suggest that the 70% methanolic extract shows the presence of maximum phytochemical compounds than other extract during screening. Our findings provided evidence that subsequent crude extracts of the plant contains medicinally important bioactive compounds. Further investigation required to find out lead compounds.

KEYWORDS: *Commelina bengalenesis Linn*, Medicinal plants, Crude extract, Phytochemical screening, Secondary metabolites.

Corresponding Author: Md. Ali Akbar Hossain

Mobile: +880-1911450554

E-Mail ID: akbar_bd@yahoo.com , mdaliakbarhossain@yahoo.com

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INTRODUCTION

Traditional knowledge of medicine has long been used since ages for curing various human ailments. The medicinal plants are widely used by the traditional medical practitioners for curing various diseases in their day to day practice [1]. The plants that possess therapeutic properties or exert beneficial pharmacological effects on the animal body are generally designated as "Medicinal plants" [2]. As defined by WHO "A medicinal plant is one which contains substances that can be used for therapeutic purposes or which, is a precursor for synthesis of useful drugs". Recently, the World Health Organization estimated that 80% of people worldwide rely on herbal medicines for some part of their primary health care. About 60-80% of world populations still rely on plant based medicines [3].

The medicinal plants are useful for healing as well as for curing of human diseases because of the presence of phytochemical constituents [4].

Medicinal plants contain some organic compounds which provide definite physiological action on the human body and these bioactive substances include tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids [5, 6]. These compounds are synthesized by primary or rather secondary metabolism of living organisms. Secondary metabolites are chemically and taxonomically extremely diverse compounds with obscure function.

Commelina is a genus of approximately 170 species commonly called dayflowers due to the short lives of their flowers. They are less often known as widow's tears. It is by far the largest genus of its family, Commelinaceae. The Swedish taxonomist Carl Linnaeus of the 18th century named the genus after the two Dutch botanists Jan Commelijn and his nephew Caspar, each representing one of the showy petals of *Commelina communis*.

In Bangladesh, Dholpata is the local name of *Commelina bengalenesis Linn*. belong family of Commelinaceae. It is a perennial herb native to tropical Asia and Africa, commonly known as Bengal day flower or Dew flower. It is used in the Indian subcontinent as a folk medicine for the treatment of variety of ailments [7, 8, 9]. It is large, straggling annual herb up to 40 cm long with rooting at basal nodes and characterized by attractive small bluish-violet flowers. Leaves are ovate-elliptic or oblong, shortly triangular, bright green in color and 4-7 cm long. The spathes are green, funnel-shaped, compressed and about 1.5 cm long. Capsules are broadly ovoid-oblong and 4-5 mm long. Seeds are ovoid.

The plant is used for treatment of leprosy, headache, fever, constipation; jaundice and snake bite [10-12]. The plant is also used for mouth thrush [3,6], inflammation of the conjunctiva, psychosis [13], epilepsy, nose blockage in children [14], insanity [15] and exophthalmia. *Commelina bengalenesis Linn* is used medicinally as a diuretic, febrifuge and anti-inflammatory [16-19]. It is used as an animal fodder, eaten by humans as a vegetable in Pakistan, also used their medicinally, but with different purported effects, including as a laxative and to cure inflammations of the skin as well as leprosy [20]. The plant is also reported to have antitumor, anticancer and antioxidant activity [21, 22,23].

MATERIALS AND METHODS

1. *Plant material and Extraction process*

Leaves of *Commelina bengalenesis Linn* were collected from Jajira, Shariatpur, Bangladesh in July, 2012 and the plant was identified by the Expert of the National Herbarium, Mirpur, Dhaka, Bangladesh. Accession number DACB- 3811 was retained there for further references and the specimen was preserved in the phytochemistry and Pharmacology Laboratory, North-South University Bangladesh. The Leaves of the plant was kept in shadow environment for 3 days, crushed by hands and dried again. Then the crushed parts of the plants were ground into coarse powder with the help of a mechanical grinder. The powder was stored in an airtight container for further experiment.

The dried powders of leaves (600 gm) were dissolved in n-butanol, ethyl acetate, 95% of ethanol and 70% methanol solvent in room temperature (25±2 °C) subsequently. The extract was concentrated by evaporation under reduced pressure at different temperature using rotary evaporator (EYELA rotary vacuum evaporator, N-N series-CCA-111) to have concentrated samples of different color extracts.

Fig 1(a): n-butanol extract

Fig 1(b): Ethyl acetate extract

Fig 1 (c): Ethanol extract

Fig 1 (d): Methanol extract

Fig 1: Crude extract in petridish

2. Phytochemical screening

A preliminary phytochemical screening of n-butanol, ethyl acetate, ethanolic, methanolic extract of *Commelina bengalenesis Linn* was carried out.

The freshly prepared crude extract was qualitatively tested for the identification of chemical constituents, such as, alkaloids, flavonoids, steroids, saponins, terpenoids, gums and tannins. The tests were carried out by a suitable method [24] and in each test 10% (w/v) solution of the extract was taken unless otherwise mentioned in individual test.

Alkaloids

Dragendroff's test: 2 ml solution of the extract and 0.2 ml of dilute hydrochloric acid were taken in a test tube. After adding 1 ml of Dragendroff's reagent, orange brown precipitate indicated the presence of alkaloids.

Flavonoids

A few drops of concentrated hydrochloric acid were added to a small amount of extract solution. Immediate appearance of a red color indicated the presence of flavonoids.

Saponins

1 ml solution of the extract was diluted to 20 ml with distilled water and shaken in a graduated cylinder for 15 minutes. 1 cm layer of foam indicated the presence of saponins.

Gums & Carbohydrates

Molisch test was performed for the existence of gum in the sample. 5 ml solution of the extract was taken and then Molisch's reagent and Sulphuric acid were added. Appearance of red violet ring at the junction of two liquids indicated the presence of gums.

Tannins

Ferric chloride test: About 0.5 g of extract was dissolved in 5 to 10 ml of distilled water and filtered. A few drops of 5% ferric chloride solution were added to the filtrate. A greenish black precipitate was formed which confirmed the presence of tannins.

Terpenoids

Salkowski test**:** 5 ml of the extract solution was mixed in 2 ml of chloroform, and concentrated H_2S0_4 (3 ml) was carefully added to form a layer. A reddish brown coloration of the inter face was formed to show positive results for the presence of terpenoids.

Reducing Sugars

Fehling's test: In a test tube 1mL of Fehling's A and 1mL of Fehling's B solution were added. These mixed solutions were boiled for a minute. Then equal amount (2mL) of test solution was added. Brick red precipitate was observed which confirmed the presence of carbohydrates.

Steroids

2 ml of acetic anhydride was added to 0.5 g of the extract of each with 2 ml of H_2S0_4. The colour changed from violet to blue or green in some samples indicating the presence of steroids.

RESULTS

Preliminary phytochemical screening of the methanol extract of *Commelina bengalenesis Linn* the presence of various bioactive components of which flavonoids, alkaloids, terpenoids, tannins, gums and carbohydrates were the most prominent and the result of phytochemical test has been summarized in the Table 1

Table 1: Qualitative analysis of Phytochemicals

Extract Code	Tanins	Flavonoids	Saponins	Gum& Carbohydrates	Steroids	Alkaloids	Reducing Sugar	Terpenoids
n-butanol	-	++	-	+ +	-	+	++	+++
Ethyl acetate	-	-	-	-	-	++	-	+++
Ethanol	++	++	++	+	++	++	++	++
70% methanol	++	++	++	++	+	++	++	+++

Key: +++ = Present in high concentration, ++ = moderately present, + = Trace amount present, - = the absence of phytochemicals.

DISCUSSION

The present study revealed that the plant of *Commelina bengalenesis Linn* has showed that the presence of alkaloids, steroids, flavonoids, saponins, tannis, terpenoids, reducing sugar, gum may have bioactive principles.

Phytochemicals generally have medicinal potentials and serve in some cases as blueprints for the synthesis of potent drugs [25, 26]. Some alkaloids are analgesics e.g. morphine; antimalarials e.g. equinine; tranaquilizers e.g. reserpine, etc. Tannins and flavonoids are polyphenols with reported antimicrobial properties [27,28].Since *Commelina bengalenesis Linn* extracts contain alkaloids, tannins, flavonoids etc, from the hypothesis it can be said, this extract may have antimicrobial, analgesic effects.

CONCLUSION

In the present investigation, we can conclude that the n-butanol, ethyl acetate, ethanolic and methanolic extracts of *Commelina bengalenesis Linn* may have various pharmacological effects due to presence of some essence chemical constituents which supports the traditional use of this plant in various diseases as traditional medicine. Further investigations are required to find active component of the extract and confirm the pharmacological effect of this plant.

AUTHOR CONTRIBUTIONS

This research work was carried out in collaboration between all research members. Preeti Jain conceived and designed the study. Md. Ali Akbar Hossain, Md. Selim Hossain, Kaniz Fatema, & Benazir Ahmed Siddique performed the experiments. Hanif Sikder,

Md. Sohel Sarker helped to finish the experimental works. Md. Ali Akbar Hossain managed the literature searches, analyses of the findings & wrote the paper. All authors read and approved the final manuscript.

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