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THE NUTRITIONAL CHARACTERISTICS OF THE BOERHAAVIA DIFFUSA L. PLANT (BUDS)

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ABSTRACT

Boerhavia diffusa L. (family Nyctaginaceae) is a most widely studied plant and has a long history of uses by the indigenous & tribal people and in Ayurvedic and Unani medicines. The whole plant of B. diffusa are used in traditional medicine for the treatment of diabetes, stress, dyspepsia, abdominal pain, inflammation, jaundice, enlargement of spleen, heart diseases. The aim of this study was to examine the organoleptic character, phytochemicals, and physico-chemical analysis of buds from Boerhavia diffusa L. (family Nyctaginaceae) plant. An organoliptic research was carried out on the color, taste, fragrance, and physical condition of the component buds of the Boerhaavia diffusa plant. Powder material extracted with water, chloroform and the methanol to identify the phytoconstituents (alkaloid, steroid, amino acid, protein, saponin, and glycoside). The physico-chemical analysis's total ash, acid insoluble ash, water soluble extractive value, alcohol soluble extractive value, and chloroform extractive value, in addition to the pH values of the 1% and 10% aqueous solutions. Phytochemical screening showed that all of samples positively contain alkaloid, steroids and protein. According to the physico-chemical parameter, the pH values of the 10% aqueous solutions is high. There is 9% total ash and 11.11% acid insoluble ash. Chloroform has a high water soluble extractive value. When various extracts of plants are applied, it indicates that an extensive variety of phytochemicals and physic-chemicals exist in significant quantities in the buds of the Boerhaavia diffusa L. plant.

KEYWORDS: boerhavia diffusa, glycoside, ph value, phytochemicals.

INTRODUCTION

Boerhaavia diffusa Linn. commonly known as 'Punarnava' is an abundant creeping weed found all over India.[1] In old Indian books of medicine such as the Charaka Samhita and Sushrita Samhita, it is mentioned that the Ayurvedic preparations made from punamava-namely, punarnavastakakvath, punarnavakshar, and punarnavataila – were used for the treatment of various ailments. The whole plant of B. diffusa is a very useful source of the drug punarnava, which is documented in Indian Pharmacopoeia as a diuretic.[2] The whole B. diffusa plant (fresh as well asdried) is the genuine source of the drug punarnava, and is considered official in Indian Pharmacopoeia. The plant was named in honor of Hermann Boerhaave, a famous Dutch physician of the 18th century.[2] Boerhaavia, aherbaceous plant, belongs to the Nyctaginaceae (four o'clock) family, order Thymilae, group Dicotyledons and phylum Angiosperms.[3] About 40 species of Boerhavia are widely distributed throughout the tropical and subtropical regions of the world, with many variations in South and North America.[4] The plant grows in a creeping manner, and it has been found to grow more during the rainy season because the species Boerhaavia tends to grow in wet soil and in sandy, stony, and clayey soils found near dried up water resources, as well as riverbeds, hill slopes, and mountains.[5] B. diffusa is also referred to as common hogweed or red spiderling. Because it is a member of the order Caryophyllales, it is a dicotyledonous herb or shrub. As a member of the Nyctanginaceae family, it is a four o'clock plant. B. diffusa is a herb with green leaves, pinkish or purplish stems, and purple campanulate flowers that branches laterally at ground level.[6,7] The tiny, subcapitate blooms, which are mostly red or rose but sometimes exist in white forms, are present in groups of four to ten in tiny bracteolate umbrellas. Achenes are detachable, ovate, oblong, hairy, glandular, five ribbed, anthocarpous, and viscid on the ribs. The seeds sprout prior to the monsoon season. During the wet season, the plant grows rapidly, and in October and November, fully developed seeds appear. The plant spreads from one location to another because of its solid nature, which causes it to attach to human clothing and animal legs. Indigenous communities have long utilized various components of the B. diffusa plant in their traditional medical practices. The plant's applications in Indian traditional medicine have garnered a lot of attention. The plant's parts are used to cure a variety of conditions, including cancer, jaundice, dyspepsia, inflammation, splenic enlargement, stomach pain, and stress relief.[9,10] The medication punarnava, which is listed as a diuretic in Indian Pharmacopoeia, may be obtained from the entire B. diffusa plant, which is a very helpful source.[2] The plant occurs by many of various names in Indian languages, including itsit in Punjabi, satodi in Gujarati, mukaratte in Tamil, biskhafra in

Hindi, thazhuthama in Malayalam, and gadhapuma in Bengali. They are cooked and eaten in ketplaces. The Garhwal Himalayan people of Uttaranchal treat tumors with its roots. The Bhils of Madhya Pradesh's Jhabuadistrict implement the root paste to treat bloody dysentery. The plant's infusion is administered to treat warts in the body. The root juice is used in treating asthma,scanty urine, and internal inflammation disorders. B. diffusa is used for curingailments such as leukorrhea, rheumatism, and stomach ache by the Sahariya tribein the Lalitpur district of Uttar Pradesh. This plant is also used by the tribes ofAmbikapur district (Madhya Pradesh) for the treatment of elephantiasis. In theIndo-Nepal Himalayan terai region, the tribals harvest this plant for medicinalpurposes, mainly for flushing out the renal system, and to treat seminal weaknessand blood pressure.[11] As a method of hormonal control, flowers and seeds are utilized.[12] Therapeutic and carminative preparations are produced with the seeds.[13] This plant has alkaloids in its roots and fatty acids and both allantoin in its seeds. It has also been asserted that boerhavin and boerhavic acid are found in the plant's green stalk.[14]

MATERIALS AND METHODS

SAMPLE COLLECTION:- Boerhavia diffusa is a widespread weed found in waste areas. Its seeds are obtained from ditches, dams surrounding the pods, marshy areas along river ridges, cannal areas, and marshy areas in the district of Merrut, Uttar Pradesh.

PREPRATION OF SAMPLE:- After being cleaned with distilled water, the samples were allowed to air dry for two weeks at room temperature in the shade. An electric blender was used to grind the dried material into a powder. Until additional analysis, the powder remained in a refrigerator in an airtight container.

PREPRATION OF EXTRACT:- 100 gm of dried powdered sample was extracted with water, chloroform and methanol by continouous hot extraction using Soxhlet extraction apparatus at a temperature for 6 hours not exceeding the boiling points of the solvents for preliminary phytochemicals.

1. Organoleptic analysis:-The organoleptic analysis[15] observed the fresh plant's physical condition, color, taste, and smell, as well as the B. diffusa powder.
2. Preliminary phytochemicals:-100g of powdered material extracted with water, chloroform, and methanol in sequential order for initial phytochemical screening Following one solvent extraction step, the extract was subjected to a set of qualitative

analytical tests to identify the presence of several phytoconstituents, including amino acids, proteins, alkaloids, steroids, saponins, and glycosides.

3. Physicochemical characterization:-The quality of medicinal plant material as a drugs is determined using many physicochemical criteria, such as total ash, acid insoluble ash [16], water soluble extractives, alcohol soluble extractives[17], and chloroform soluble extractives.

RESULT

1. Organoleptic properties:- The fresh plant of B. diffusa was dark green in colour, with thephenolic smell and little bitter, taste. The whole plant drug powderwas solid, free flowing in nature and green in colour, with nocharacteristic odour. It was little bitter in taste.
2. Preliminary phytochemical:- The buds of the plant boerhaaviadiffua Linn. Collected and analyzed the various standardization parameters. Preliminary phytochemical results showed the presence or absence of certain phytochemicals in the drug. The tests performed using water, chloroform and methanol extracts. Phytochemical test revealed the presence or absence of alkaloid, steroid, saponin, glycoside, amino acid protein results are given in table.

Table 1: Preliminary Phytochemical Tests for Different Solvent Extract of Buds of Plant Boerhaavia Diffusa Linn.

PHYTOCONSTITUENTS	WATER EXTRACT	CHLOROFORM EXTRACT	METHANOL EXTRACT
ALKALOID (Dragendorff's test)	++	+	+++
STEROID (Liebermann-Burchard test)	++	+++	+++
SAPONIN (NaOH solution)	+	+	-
GLYCOSIDE (Brontragar's test)	-	-	-
AMINO ACID (Ninhydrin test)	-	-	+
PROTEIN (Xanthoproteinic test)	+++	++	+

Physico-chemical parameters of the Boerhaaviadiffusa Linn.Are tabulated in Table 2. The pH value of 1% and 10% w/v aqueous solution is acidic (5.3, 5.5) in nature. Analytical results showed total ash value content was 9%. The negligible amount of acid-insoluble value was 11.11%. The water soluble extractive value was 8.8%. The alcohol soluble extractive value 7.2%. The chloroform water soluble extractive value 12.8% and the results given in table 2.

Table 2: Physico-Chemical Parameters of Buds of Plant Boerhaaviadiffusa Linn.

S. NO.	PARAMETERS	RESULTS
1	1% aqoueous solution ph value	5.3
2	10 % aqoueous solution ph value	5.5
3	Total ash	9%w/w
4	Acid insoluble ash	11.11%w/w
5	Water soluble extractive	8.8%w/w
6	Alcohol soluble extractive	7.2%w/w
7	Chloroform water soluble extractive	12.8%w/w

CONCLUSION

The early phytochemical study used in the current investigation indicates that amino acids and glycosides are absent from the water and chloroform extracts. There are no glycosides or saponins in the methanolic extract. In the physicochemical analysis, the neutral pH value of the 10% aqueous solution is higher than that of the 1% aqueous solution. Chloroform has a high water soluble extractive value.

DISCUSSION

According to the current study's early phytochemical analysis, the water and chloroform extracts lack amino acids and glycosides. Glycoside and saponin are not present in the methanolic extract. 10% aqueous solution's ph value in the physicochemical analysis is higher than that of 1% aqueous solution. The water soluble extractive value of chloroform is high. One excellent source of phytochemicals is the boerhaavia diffusa L. extract that can be found in Meerut uttar Pradesh. Research is being conducted in labs to identify the active ingredients that contribute to the high therapeutic value.

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