



Properties of Photochemical *Eleocharis dulcis* against Pathogens

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Abstract: *The present study is that the presence of bioactive compound which present in the fruits of Eleocharis dulcis have made the plant a very important medicinal plant. The Eleocharis dulcis was selected from study of antimicrobial activity. The healthy and matured fruits were collected from Sanjay Gandhi National Park, Mumbai. Then, shaded dried and crushed into fine powder of fruit. Extract were prepared by using different solvents such as methanol and ethanol. These were kept in orbital shaker for 24 hrs, then extract was boiled in water bath to evaporate the remaining extractant and DMOS was added to resultant extract. These extract were used for performing antimicrobial activity by agar well diffusion. The phytochemical analysis of fruit ethanol extract show presence of flavnoids , alkaloids, phenol, tannis , saponins , steroids.*

Keywords: *Eleocharis dulcis*, Antibacterial activity

I. INTRODUCTION

Herbal plants constitute; amount to a reservoir of therapeutic agent and with the increase prevalence of multiple drug resistance strain against existing synthetic antibiotics there is a necessity for an alternative cure. The discovery and production of antibiotics are some of the maximum powerful and success achievements of present day science and generation for the control of infectious diseases. But, the rate of resistance of pathogenic microorganisms to conventionally used Antimicrobial agents is increasing at an alarming rate. Isolation of microbial agents much less liable to natural antibiotics and restoration of resistant isolates all through antimicrobial therapy is growing round the world (1). Now a day, the use of phytochemical for pharmaceutical purpose has gradually increased in many countries. Many plants have been used because of their antimicrobial traits, which are due to secondary like phenolic compounds which are part of essential oils, as well as tanning.

Eleocharis dulcis, the Chinese water chestnut is grass like sedge native to South East Asia. It has spread to tropical weather Africa, Madagascar, India, China, Taiwan, Japan, northern Australia and the Pacific Islands. It is one of the most popular food and unique test (2). *Eleocharis dulcis* is one of the most common economic crops in southern China, with a strong ability to absorb nitrogen, phosphorus and other nutrients (3). Among all root and tuber economic crops, *Eleocharis dulcis* the highest phosphorus content in the bulb.

A perennial, rhizomatous, semiaquatic herb, often grown as an annual crop. Rhizome short with elongated stolons, each one often terminating in a zoned, depressed globose, brownish to blackish corm, 1-4 cm in diameter. Stem erect, terete, tufted, 40-200 cm tall, 3-10 mm in diameter, longitudinally striate, distinctly transversely septate, the intersepta 5-12 mm long, hollow, smooth,



greyish to glossy dark green. Leaves reduced to some bladeless basal sheaths, 3-20 cm long, membranous, oblique or truncate at the apex, reddish brown to purple. Inflorescence a single, terminal, many-flowered spikelet, cylindrical, 1.5-6.0 x 3-6 mm, as thick as or somewhat thicker than the stem, apex obtuse to acute; glumes numerous, oblong, 4.0-6.5 x 1.7- 3.2 mm, densely imbricate; flowers bisexual, with perianth of 6-8, filiform, unequal, white to brown bristles; stamens 3, anthers linear, 2-3 mm long; style 7-8 mm long, 2-3-fid, the enlarged base persistent in fruit. Fruit an obovoid nut (achene), 1.5-2.2 x 1.2-1.8 mm, shiny yellow to brown. The leafless stems and single terminal spikelet distinguish *Eleocharis* species from most other sedges. Twelve species from the *Eleocharis* genus are classified as weeds. *E. dulcis* is distinguished from most other weedy *Eleocharis* species by its robust, perennial nature, inflorescences and thick, round, hollow stems; the species is fairly difficult to distinguish in the field.

Research has shown that vitamin B5 found in *Eleocharisdulcis* plant help in treating skin reaction from radiation. The leaf stem are used weaving bags etc. According to research, taking manganese along with other bone- supporting nutrients like calcium, vitaminD, magnesium, zinc, copper and boron can improve bone mass in women with weak bone, which is beneficial to naturally treat osteoporosis. So manganese rich food like *Eleocharisdulcis* must be included in your regular diet to prevent osteoporosis problem. *Eleocharis dulcis*, when included as an essential elements in nutrients, help normalize heartbeat.

The main aim of this investigation were to ascertain the scientific use *Eleocharis dulcis*. This investigation was find out phytochemical analysis and antimicrobial activity. The study of screening of various extract of plants to evaluate their in vitro antimicrobial activity.

II. MATERIALS AND METHOD

2.1 Plant Sample

Fresh fruit collected from National Park, Borivali East, Mumbai and prepare dried powder of *Eleocharis dulcis*

2.2 Bacterial Culture

Bacterial culture of *Escherichia coli*, *Staphylococcus aureus* were procured from the Departmental laboratory.

2.3 Collection of Plant Materials

The whole fruit was collected from National Park, Borivali East, Mumbai. The collected plant of (*Eleocharis dulcis*) washed with tap water to remove surface contamination. Then completely air dried , finally grinded into fine powder. Stored in tight pack plastic bottle for further use.

A. Preparation of Plant Methanol Extract

20g the dried powder was taken in 200 ml 60% methanol mix properly and flask were kept in room temperature in rotator shaker at 100 rpm for 72 hrs. After proper mixing , extract was filtered carefully with the help of whattman filter paper no.1. After filtration , the filtrated is boiled in boiling water bath for evaporation . After evaporation , powder form obtained .In the evaporated



add 5 ml of 10% DMSO (Dimethyl Sulfoxide) and mixed well . The extract is stored in refrigerator at 4⁰ C for further use.

B. Preparation of Plant Ethanol Extract

20g the dried powder was taken in 200 ml 60% methanol mix properly and flask were kept in room temperature in rotator shaker at 100 rpm for 72 hrs. After proper mixing , extract was filtered carefully with the help of whattman filter paper no.1. After filtration , the filtrate is boiled in boiling water bath for evaporation . After evaporation , powder form obtained . In the evaporated add 5 ml of 10% DMSO (Dimethyl Sulfoxide) and mixed well . The extract is stored in refrigerator at 4⁰C for further use.

C. Preliminary Phytochemical Analysis *Eleocharis dulcis* plant

The chemical tests were carried out ethanol extract, methanol extract using standard procedure to identify the constituents as described by (Kokate et al., 1994 and Ablude et al., 1995).

- Test for Alkaloids: Wagner's Test : About 0.5 ml of plant sample was treated with four to five drops of Wagner's reagent (2 gm of potassium iodide and 1.27 gm of iodine taken in 100 ml of water) and formation of reddish brown precipitate or coloration was observed.
- Test for Steroid: Liebermann – Burchard test : 1ml of extract was treated with drops of chloroform , acetic anhydride and Conc. Sulphuric acid and examined for the color change in red or pink.
- Test for Flavonoids: 2 ml of plant extract was taken in test tube add 5ml of dil. Ammonia solution and few drops of sulphuric acid .yellow color shows presence of flavonoids in extract.
- Test for Terpenoids: 2 ml of extract was taken in test tube add 2 ml of chloroform and add conc. Sulphuric acid observed with reddish brown indicates the presence of terpenoids .
- Test for phenols: Ferric chloride test: A fraction of the extracts was treated with aqueous 5% ferric chloride and observed for formation of deep blue or black color .
- Test of Tannins: Precipitate test : Deposition of a red precipitate when 2 ml of extract was boiled with 1ml of 1% aqueous hydrochloric acid was taken as evidence for the presence of tannins
- Test for Amino Acids and Proteins: Ninhydrin test : 2 ml of filtrate was treated with 2-5 drops of ninhydrin solution (1 % ninhydrin solution in acetone) placed in boiling water bath for 1 -2 minutes and observed for the formation of purple color.

2.4. Screening of Antimicrobial Activity

A. Preparation of Inoculum

The pathogenic bacteria culture viz, *Staphylococcus aureus* and *Escherichia coli* was inoculated into sterile Nutrient broth and incubated at 37⁰C for 3 hrs until the culture attained a turbidity is seen.



B. Determination of Antimicrobial Activity of plant of *Eleocharis dulcis* against human pathogens.

Preparation of Extract stock

The extract was prepared by dissolving ethanol and methanol extract of *Eleocharis dulcis* in dimethyl sulphoxide

Antimicrobial activity of plant extract of *Eleocharis dulcis* against human pathogens by Agar well diffusion method.

Antimicrobial activity of fruit extract was evaluated using agar well diffusion assay. Desired number of petri plates, pipettes were sterilize by autoclaving at 15lb for 15-20 minutes. Mueller Hinton agar was prepared and autoclaved at 15 lb for 15 to 20 minutes and after cool to 40 to 40°C temperature and poured in petri plates 20 ml in each plates and then allowed to solidify. Add to 0.2 ml of broth culture of *Escherichia coli*, and *Staphylococcus aureus* on each plate separately and spread it by spreader aseptically. Remove excess amount of broth from plates. Well is made in the center of the agar with the help of sterile borer and added 50µl of ethanol and methanol extract prepared was poured into each well. All the plates were incubated at 37°C for 24 hrs and observe for zone of inhibition.

III. RESULT AND DISCUSSION

3.1 Preliminary Phytochemical Analysis of *Eleocharis dulcis*.

The main purpose of this study is Phytochemical analysis and antimicrobial activity from fruit of *Eleocharis dulcis* in methanol and ethanol extraction.

Table 1: The Result of Phytochemical Analysis of *Eleocharis dulcis* fruit extract are presented in Table No. 1

Test	Fruit methanol Extract	Fruit ethanol Extract
Alkaloids	+	+
Carbohydrates	-	+
Glycosides	-	-
Flavonoids	+	+
Phenols	+	+
Tannis	+	+
Terpenoids	+	+
Sterols	+	+

+ = Positive - = Negative

According to the above study, it is concluded that the ethanol extract of fruit of *Eleocharis dulcis* have higher content of the Phytochemicals.

3.2 Antibacterial Activity of Ethanol Extract, Methanol Extract of fruit of *Eleocharis dulcis*

The antibacterial activity of fruit extract of *Eleocharis dulcis* against bacterial strains are demonstrated by agar well diffusion is as follow :

**Table 2:** Antibacterial Activity of Ethanol and Methanol fruit extract of *Eleocharisdulcis*.

Microorganism	Extract	Zone of Inhibition(mm)
<i>Escherichia coli</i>	Ethanol extract	19.5
	Methanol extract	18
<i>Staphylococcus aureus</i>	Ethanol extract	11
	Methanol extract	15

The result of antimicrobial activity of fruits extract are shown in Table No. 2. For antimicrobial activity the extracts are treated with Gram positive *Staphylococcus aureus* and Gram negative *Escherichia coli* bacteria. *E. Dilcis* was rich in flavanoids, terpenoids, steroids, and phenols (4,7,10). Some alkanoid had been reported to have anticancer and antiviral activity. Flavanoids had anti-inflammatory activity.(5.12.17).

It was observed that the extracts of *Eleocharis dulcis* showed different antimicrobial activity against the selected microorganisms. The fruit ethanol extract showed the highest zone of inhibition against *E. Coli*(19.5 mm) as compared to other extract and *S. aureus* showed the lowest zone of inhibition (11 mm). The fruit methanol extract showed the maximum zone of inhibition on *E. Coli* (18 mm) and minimum zone of inhibition on *s. aureus* (15 mm)

Eleocharis dulcis fruit was effective against to species of microorganisms tested in the study. It was concluded that dulcis plant fruit extract has a significant antimicrobial effect.

**Fig.1** Fruit of *Eleocharisdulcis***Fig. 2** Powder form of fruit of *Eleocharisdulcis*



IV. CONCLUSION

Eleocharis dulcis is rich in secondary metabolite and has numerous uses in traditional medicine to treat several ailments, ethnomedicinally reputable as anti-diabetics. It has potential for development into a phytomedicine. *E. Dulcis* is a good reservoir of diverse type of phytochemicals and makes it a potent of the antidiabetic agent. Many works are carried out in many parts of the world on *E. Dulcis* but this plant has not yet developed as a drug by pharmaceutical industries. A detailed study on the plant about the phytochemical analysis and antibacterial activity helped to promote the traditional knowledge to scientific one. *E. dulcis* is not only herb plant but also a medicinal plant. It is concluded that *Eleocharis dulcis* is a plant with a variety of ethnic medicinal uses. Many of the phytochemical analysis showed the positive results which shows the presence of their active compound.

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