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Preliminary Phytochemical and Antimicrobial Studies of *Ipomoea hederifolia* L.

Priya Kurian[1*], V. A. Aneesa[2], P. Kavitha[3], V. Soorya[4]
[1]*Associate Professor, Department of Pharmacognosy, Grace College of Pharmacy, Palakkad, India*
[2,3,4]*B.Pharm. Final Year, Grace College of Pharmacy, Palakkad, India*

***Abstract*: *Ipomoea hederifolia* Linn. is a medicinal herb belonging to the family Convolvulaceae. Ipomoea is derived from the Greek word ips and homois meaning worm like, referring to the vining habit. The Latin word hederifolia means having leaves like Ivy. It is commonly known as scarlet morning glory, scarlet creeper. *Ipomoea hederifolia* has been reported to possess oxytoxic, anti-cancer, anti-psychotic, antiinflammatory, anti-oxidant and anti-microbial properties according to indigenous systems of medicine in India. This paper reviews the important biological activity of this plant especially its antimicrobial activity.**

***Keywords*: *Ipomoea hederifolia*, ethanolic extract, phytochemicals, antimicrobial studies, formulation.**

1. Introduction

Nature is an important source of medicinal agents for thousands of years and a vast number of modern drugs have been isolated from natural sources, many of these are derived on the basis of uses of the agents as traditional medicine [1]. Natural products obtained from medicinal plants have been great contributors in the discovery of numerous clinically useful drugs [2]. Plants are livestock, which supplies individual needs as food, clothing, shelter and pharmaceuticals, like caffeine, nicotine, alcohol, and other drugs throughout the planet. They are utilized in Homeopathy, Allopathy, Unani, as well as Ayurvedic system medicine to treat the assorted diseases around the planet. Use of plants as a source of medicinal value was started before 4000- 5000 B.C., with the Chinese who were the first to use plants as therapeutics. In India use of plants as a medicine appeared from the Vedic period. From the beginning of the twentieth century, allopathic systems of medicine have achieved popularity among people, which is based on fast therapeutic actions of synthetic drugs. But the health care system has recently been shifted from synthetic to herbal medicine in universal trend [3].

Phytochemicals are biologically active, naturally occurring chemical compounds found in plants, which provide health benefits for humans further they are also known as macronutrients and micronutrients [4]. They protect plants from 'disease and damage' and contribute to the plant's colour, aroma and flavour. In general, the plant chemicals that protect plant cells from environmental hazards such as pollution, stress, drought, UV exposure and pathogenic attack are called as phytochemicals. Phytochemicals are accumulating in different parts of the plants, such as in the leaves, roots, and stems, flowers, fruits or seeds [5]. Many phytochemicals, particularly the pigment molecules, are often concentrated in the outer layers of the various plant tissues. Levels vary from plant to plant depending upon the variety, processing, and growing conditions.

2. Materials and Methods

Collection and authentication:

Plant used in the present study, *Ipomoea hederifolia* was collected from Athaloor, Palakkad, Kerala. The plant material was identified and authenticated by Dr. Maya. C. Nair, Associate Professor, Department of Botany, Govt. Victoria College, Palakkad and the herbarium (AKS001) was deposited in the Department of Pharmacognosy, Grace College of Pharmacy, Palakkad.

Preparation of the extract:

Leaves of the plant were collected from Athaloor, Palakkad, Kerala and was washed, shade dried and coarsely powdered. Defatting of the leaves was carried out by using petroleum ether. The extract was prepared by Soxhlet extraction of powdered material. The coarsely powdered leaves were packed in a thimble and 400 ml of ethanol was used for extraction in a round bottom flask. The extraction was continued till the solution in the siphoning tube was colourless. The extract obtained was collected and concentrated by gentle heating. The concentrated extract was the total ethanolic extract. The prepared extract was stored in refrigerator and used for phytochemical analysis.

Preliminary Phytochemical Screening of the Extract:

By employing standard phytochemical tests, the ethanolic extract of *Ipomoea hederifolia* was screened for the presence of various phytoconstituents like steroids, alkaloids, tannins, flavonoids, and glycosides.

Antimicrobial Screening:

The total ethanolic extract of the leaves of *Ipomoea hederifolia* and the formulation prepared using the extract were tested for their antimicrobial activity against various bacterial strains like gram positive bacteria; *Bacillus subtilis* (ATCC-6633), gram negative bacteria; *Escherichia coli* (NCIM-1056).

*Corresponding author: priya.chackala@gmail.com

All the strains used for bacteria were collected from the Department of Biotechnology, Grace College of Pharmacy, Palakkad, Kerala. All the strains used were pure cultures purified and preserved by the method of Raistrick and Hetherington as stab slant cultures at a temperature of 4^0C.

Antibacterial Activity:

The leaf extract and the prepared formulation were tested for their zone of inhibition against gram positive bacteria *Bacillus subtilis* and gram-negative bacteria *Escherichia coli*. The present investigation was undertaken to test whether there is any antimicrobial activity against the selected bacteria. Finally, the antimicrobial potency of the plant extract as well as the formulation was assured by standard method (cylindrical method or tube assay method) against the selected strains and the results so obtained was compared with the standard antibiotic Gentamycin.

Two-Fold Serial Dilution Technique:

The *invitro* antimicrobial activity was carried out against 24 h old cultures of bacterial strain and the medium used was double strength nutrient broth (Hi-Media). The extracts were tested in the concentration range of 50-200 µg/ml and solutions were prepared by dissolving in dimethyl sulfoxide (DMSO). The plates used for antibacterial assay were incubated at 37±1 ºC for 24 h under aseptic condition.

Formulation of Herbal Ointment Using Tee of Ipomoea hederifolia:

Procedure for Preparation of Herbal Ointment:

The ointment base was prepared initially by weighing accurately grated hard paraffin which was placed in evaporating dish on water bath. After melting of hard paraffin remaining ingredients were added and stirred gently to aid melting and mixing homogeneously followed by cooling of ointment base.

Herbal ointment was prepared by mixing accurately weighed neem and turmeric extract to the ointment base by levigation method. To prepare a smooth paste with two or three times its weight of base, gradually incorporating more base until to form homogeneous ointment, finally transferred to a suitable container.

Evaluation of Herbal Ointment:

Colour and Odour:

Physical parameters like colour and odour were examined by visual examination.

Consistency:

Smooth and greasiness were observed.

pH:

The pH of prepared herbal ointment was measured by using digital pH meter. The solution of ointment was prepared by using 100 mL of distilled water and set aside for 2 h. The pH was determined in triplicate for the solution and average value was calculated.

Spreadability:

The spreadability was determined by placing excess of sample in between 2 slides which was compressed to uniform thickness by placing a definite weight for definite time. Then note the diameter of the sample in centimeter.

Extrudability:

The formulation was filled in collapsible tube container. The extrudability was determined in terms of ointment required to extrude 0.5 cm of ribbon of ointment in 10 seconds.

Solubility:

Soluble in boiling water, miscible with alcohol, ether, chloroform

Washability:

Formulation was applied on the skin and then ease extent of washing with water was checked.

Stability study:

Physical stability test of herbal ointment was carried out for 4 weeks at various temperature conditions like 2 ºC, 25 ºCand 37 ºC the herbal ointment was found to be physically stable at different temperature, that is 2 ºC, 25 ºC, 37 ºC within 4 weeks.

Screening of the ointment for antimicrobial activity:

The antimicrobial activity of ointment formulation evaluated against gram-positive and gram-negative bacteria by standard cup plate method and the zone of inhibition were measured. *Bacillus subtilis* and *Escherichia coli* were used for screening of antimicrobial activity.

3. Results and Discussion

Table 1
Preliminary phytochemical evaluation

Phytoconstituents	Results	
Alkaloids	-	+
Carbohydrates	-	+
Flavonoids	-	+
Glycosides	+	+
Phenolics	-	+
Saponins	-	+
Proteins& Amino acids	-	-

Antimicrobial Screening:

Zone of inhibition of different concentration of the total ethanolic extract of *Ipomoea hederifolia*

Table 2
Zone of inhibition of TEE with *Bacillus subtilis* and *Escherichia coli*

Concentration (mg/ml)	Escherichia coli (gram -ve)	Bacillus Subtilis (gram +ve)
	Zone of inhibition in mm	
50	11	14
100	13	16
150	16	17
200	18	18
Standard	20	19
Control	-	-

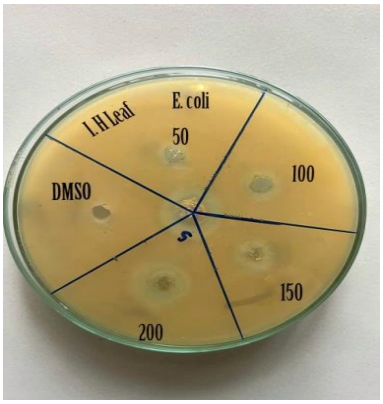

Fig. 1. Zone of inhibition of *Bacillus subtilis*

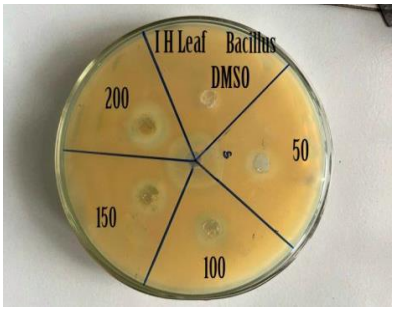

Fig. 2. Zone of inhibition of *E.coli*

Table 3
Antimicrobial screening of the formulation

Formulation	***Escherichia coli* (gram -ve)**	***Bacillus subtilis* (gram +ve)**
	Zone of inhibition in mm	
Herbal ointment of *Ipomoea hederifolia* (TEE)	16	15
Standard	20	19
Control	-	-

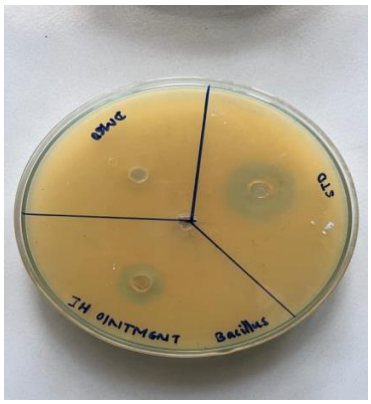

Fig. 3. Zone of inhibition of bacillus subtilis

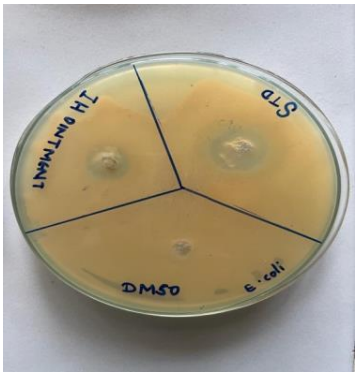

Fig. 4. Zone of inhibition of Escherichia coli

4. Conclusion

This paper presented a study on the Phytochemical and antimicrobial studies of *Ipomoea hederifolia* L.

References

[1] Cragg GM New man DJ. Medicinals for the Millennia. Annals of the New York Academy of sciences, 2001:953-3-25.
[2] Vaghasiya Y. Screening of some medicinal plants for antimicrobial properties phytochemical and pharmacological studies of a selected medicinal plant. Saurashtra University Theses service, 2009:4(1):143-157.
[3] Krishnaraju AV, Rao TVN, Sundararju D, Vanisree M, Tsay, HS, Subbarju GV. Assessment of bioactivity of Indian medicinal plants using brine shrimp (Artemia salina) lethality assay. Int. J of applied sciences and engineering, 2005:2(3):125-134.
[4] Hasler CM, Blumberg JB. Symposium on phyto chemicals: biochemistry and physiology. The journal of nutrition. 1999:129(3):756-757.
[5] Saranaraj P, Sivasakthi S, Deepa MS Phytochemistry of pharmacologically important medicinal plants – A Review. Int. J of Current Research in Chemistry and Pharmaceutical Sciences, 2016:3(11):56-66.
[6] Raveendra Reddy, Sanjeeva Kumar A, Rama mohangupta. Preliminary phytochemical And Standardization parameters of Ipomoea Quamoclit Linn Whole Plant –An Ethnomedicinally Important Plant. Int. J of Pharmacy and Pharmaceutical Sciences. 2014;6(7):162-165.
[7] Indian Pharmacopoeia 1996;(2); A53-A54, A100-A108.
[8] K. R. Khandelwal, Practical Pharmacognosy Techniques and Experiments, 2012;(22);25.1-25.9.
[9] Ralte V. Evaluation of phytochemical contents of Ipomoea cairica (L) Sweet-a qualitative approach. Science Vision. 2014;14(3):145-51.
[10] Pochapski MT, Fosquiera EC, Esmerino LA, Dos Santos EB, Farago PV, Santos FA, Groppo FC. Phytochemical screening, antioxidant, and antimicrobial activities of the crude leaves' extract from Ipomoea batatas (L.) Lam. Pharmacognosy magazine. 2011 Apr;7(26): 165.
[11] Jocl UC, Uwabunkconye OC. Comparative phytochemical study of the parts of Ipomoea species. Journal of Medicinal Plants. 2020;8(4):257-61.
[12] Renuka K, Ravishankar K. Preliminary phytochemical investigation and in vitro study of antioxidant, antimicrobial and anticancer activities of ethanolic extract of Ipomoea quamoclit. World Journal of pharmaceutical Research. 2014 Aug 6;3:612-26.