

Evaluation of Phytochemical Constituents and Dermal Antimicrobial Property of *Ageratum Conyzoides* Linn

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ABSTRACT:

*Since the beginning of the human civilization, plants have been the primary sources of drugs and the use of medicinal plants for healing predates the recorded history and every day new evidences are emerging that still push this recorded history even further in time. In fact even the modern medicine is dependent on plants for its medicine, a few instances- digoxin is used in cardiac problems and is obtained from digitalis leaf, quinine is an antimalarial drug and is obtained from cinchona bark, morphine is being used in palliative care in terminally ill cancer patients and this is obtained from opium poppy, aspirin is being used as an analgesic and also as antiplatelet drug and this is obtained from opium poppy. Globally 80% of the population is dependent on medicines obtained from plants for its primary health care issues and also for the alleviation of symptoms arising from ill health as these products are free from undesirable effects. There is also an ever growing demand for these plant based products in health care, nutrition, and in cosmetic industry. The present investigation is done in the field of phytopharmacology by Wound healing properties of *Ageratum conyzoides* (AC). It was studied on to the wounds by soaking sterile gauze in the extract and the wounds were histologically evaluated. The wounds treated with *Ageratum conyzoides* extract referred fewer inflammatory cells and more fibrosis than controls. It has been concluded that the ethyl acetate extract of *ageratum conyzoides* exhibits wound healing properties.*

Key Words: Phytochemical, antimicrobial, dermal, zone of inhibition, culture.

Received: 2 July 2024

Revised: 22 July 2024

Accepted: 29 July 2024

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DOI: <https://doi.org/10.5281/ZENODO.13336420>

Introduction:

Ageratum conyzoides Linn., belongs to the family Asteraceae and is a annual herb. The term *Ageratum conyzoides* (A.C.) is derived from two Greek words- Ageras & Konyz, ageras meaning- non-aging and Konzy is the Greek name for the plant *Inula helenium*, since the plant A.C resembles this plant *Inula helenium*.

Table 1 Taxonomic classification of A.C

Kingdom	Plantae-Plants
Subkingdom	Tracheobionta-Vascular Plants
Superdivision	Spermatophyta-Seed plants
Division	Magnoliophyta-Flowering plants
Class	Magnoliopsida-Dicotyledons
Subclass	Asteridae
Order	Asterales
Family	Asteraceae-Aster family
Genus	<i>Ageratum</i> L.-whiteweed
Species	<i>Ageratum conyzoides</i> L.-tropical whiteweed

OBJECTIVES:

This study is aimed at evaluating the Healing Properties of *Ageratum conyzoides* L., and also to improve the antimicrobial property of the plant extract for treating skin infections.

The specific objectives of the study are to identify the Phytochemical constituents of the extracts of *Ageratum conyzoides* L., by Qualitative Analysis.

METHODOLOGY:***Qualitative analysis for phytochemical constituents of *Ageratum conyzoides* (A.C.):***

The entire plant was dried and pounded into coarse powder. 250 g of this coarse powder was used for extraction process by using hydro, hydroethanolic, methanolic and ethyl acetate solvents. The extracts were concentrated and stored. For the purpose of phytochemical screening, the extracts were used separately and screened for phytochemicals, in particular, alkaloids, flavonoids, saponins, tannins, and terpenoids. The organisms that are commonly involved in skin infections are *E.coli*, *S.aureus*, *P. aeruginosa*. These bacteria are tested for susceptibility against all the extracts of A.C.

Preparation of plant extracts for antibacterial testing:

100 mg of each of the plant extracts were dissolved in 1 ml of sterile distilled water and labeled as per their solvent names. Further, this stock solution of 100 mg/ml was used to prepare solutions of concentrations 50%, 25%, 12.5% of all the extracts by serial dilution methods.

Preparation of bacterial culture:

The following bacterial cultures were used for the study- *Staphylococcus aureus* (MTCC 3160), *Escherichia coli* (MTCC443), *Pseudomonas aeruginosa* (MTCC 741). The *S.aureus* obtained was phenol coefficient test organism and is in nutrient agar growth medium.

The revival of the bacteria was done by mixing them with 0.5 ml of broth and then incubated at 34°C. MHA (Mueller Hinton Agar) media was prepared and poured into the plates of 100mm diameter and allowed to cool. 100 µl of the active bacterial culture was transferred to the MHA plates and allowed to dry for 10 minutes. The plates were labeled as per the solvents in the extracts (hydro, hydroethanolic, methanolic, and ethyl acetate). The testing of antibacterial properties was done in triplicates.

Preparation of discs for antibacterial activity testing:

Received: 2 July 2024

Revised: 22 July 2024

Accepted: 29 July 2024

Copyright ♥ authors 2024

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DOI: <https://doi.org/10.5281/zenodo.13336420>

The sterile discs of diameter 6mm were loaded with 100 µl of each of the extract solutions of concentrations 100 mg/ml, 50 mg/ml, 25 mg/ml, and 12.5 mg/ml and were allowed to dry. Then these discs were placed on the MHA plates that were inoculated with the bacteria. Now these plates were incubated at 34⁰C for 24 hours. After incubation period, the ZOI around each disc in the MHA plates were filed.

RESULTS AND DISCUSSION:

The results obtained were as follows:

Table- 2 Phytochemical constituents in different extracts of A.C

S. No.	Constituent	Hydro extract	Hydro-ethanolic extract (50/50)	Methanolic extract	Ethyl acetate extract
1	Alkaloids	√	√	√	√
2	Terpenoids	√	√	√	√
3	Flavonoids	√	√	√	√
4	Tannins	√	√	√	√
5	Saponins	√	√	√	√

The discs loaded with different concentrations of the plant extracts were placed on the MHA plates and incubated for 24 hours at 34⁰C. Then these plates were removed and the **Zone of Inhibition (ZOI)** around each disc was measured using a ruler. The observations were as follows:

Table 3: The mean of ZOI (in mm) of different extracts at different strengths against various bacteria

Name of bacteria	Hydro extract in mg/ml				Hydroethanolic extract in mg/ml				Methanolic extract in mg/ml				Ethyl acetate extract in mg/ml			
	12.5	25	50	100	12.5	25	50	100	12.5	25	50	100	12.5	25	50	100
S. aureus	8	10	13	15	5	8	10	12	9	12	12	14	12	16	19	24
E.coli	5	6	8	11	6	7	9	12	8	11	13	16	9	15	20	25
P.aeruginosa	NA	NA	5	11	NA	6	10	13	5	7	9	15	7	10	14	18

NA = No Activity

The values in the table 3 are obtained by rounding off the mean ZOI values in mm to the nearest value. As can be witnessed from the table 3, the highest concentration of all the extracts (100 mg/ml) exhibited the highest ZOI values in whole bacterial specimens under study. The ethyl acetate extract showed the highest ZOI towards all micro species under testing at all the study concentrations. It was also observed that all the extracts of A.C are capable of inhibiting the microbial species under at concentrations of more than 25 mg/ml. of the three bacterial species under study, dual S.aureus and E.coli exhibited the highest sensitivity towards ethyl acetate extract of A.C.

The results obtained in our study have confirmed the presence of all important phytochemical constituents in A.C, and hence validates the claims of traditional medicine of various medicinal uses of A.C. The presence of flavonoids gives strength to the claim that A.C can be used as a protectant and as wound healing agent, the presence of tannins gives strength to the claim that A.C can be used as an antioxidant, the presence of glycosides validates the claim as an insect repellent, and further the presence of saponins even strengthens the claim further that A.C is an anti-inflammatory and anti fungal agent.

CONCLUSIONS:

The wound healing properties of A.C. was reported by many authors and was also confirmed by our study and moreover the antibacterial activity was also confirmed by our study. The ethyl acetate extract of A.C in particular is active against the most common bacteria that cause skin infection, viz., S.aureus, E.coli, P.aeruginosa. The ethyl acetate extract of A.C appears promising in effectively controlling the invading bacteria in post surgical wounds and in controlling skin infections. A.C possesses both the wound healing and antibacterial properties, so this inherent property makes it ideal for developing into a compound that can be used post surgically and also pre-surgically for effectively reducing the hospital stay and also for fighting infections post surgically.

The current problem with antimicrobials is the rapid emergence of **MDR (multi-drug resistant)** microbes and the main reason for such emergence is irrational use of antimicrobials. Also the number of new antimicrobial discovery has drastically fallen these days when compared to the induction of new antimicrobials into the markets during the 1980s and 1990s coupled with MDR microbes and domains being closed for discovery of new antimicrobials, the situation of medicine is even unthinkable. Now is the time to explore new domains for inventing newer classes of antimicrobials and one such domain is exploring the already existing traditional knowledge or folk medicine, in other words, returning to nature with a modern approach and knowledge.

Plants are the major sources of raw materials for traditional medicine and many plants are being used in traditional medicine and folk lore to effectively manage infectious states and also to manage other ailments. The knowledge gained and being used for manufacturing modern pharmaceuticals can be applied to plant based medicine also. There are several advantages with plant based medicines, viz. they are easily available, economical, and safe. Now a days it has become a trend to look for plant based medicines for minor ailments to that of life threatening ailments. Also globally the share of plant based medicines is increasing at a rapid pace. At this

juncture it is necessary to propagate the economic importance of medicinal plants and also bring into practice the principles of plant based medicine.

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