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IN VITRO ANTIMICROBIAL ACTIVITY OF *SENECIO CHRYSANTHEMOIDES*

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ABSTRACT
The antibacterial and antifungal study is done for Senecio chrysanthemoides crude extract and its various fractions. The methanolic extract showed potent against *K. pneumonia, B. aureus,* and *S. typhi*. The methanolic and petroleum ether extract did not show any effect of *E.coli.* The *S.chrysanthemoides* crude extract shown potent activity against *E.coli, K. pneumonia* and *B. aureus* and did not show any effect of *Salmonella typhi.* The methanolic and petroleum ether extract show potent against *C. albicans, A. niger, T. ruberum* and did not showed any effect against *P. glaucum* and *A. flavus* respectively.

KEYWORDS: *Senecio chrysanthemoides,* Asteraceae, Antibacterial and Antifungal Activity.

INTRODUCTION
India has great wealth of medicinal plants and their traditional uses. The use of traditional medicinal plants as a source for relief from illness. Herbal medicine is the oldest form of health care known to mankind. Herbs have been used by all cultures throughout the history and they constitute an integral part of the development of modern civilization. Medicinal and aromatic plants and their derived are rich in antibacterial compounds which could be an alternate way to combat bacterial diseases even against some bacteria which are becoming resistant to certain synthetic medicines. The genus *Senecio* belongs to the tribe Senecioneae, is the largest and most complex genus in the family Asteraceae, which includes more than 1000 species with a worldwide distribution. It is commonly found throughout the Himalayan region at an altitude of 3500-4000m tall glabrous thickherbs, leaves large reniform, petiole winged, heads yellow whole plants aromatic.[1] About 1000 species are found in world out of which only 43 species found in India[2] The plants of this genus have been studied extensively because of the traditional medicinal. The leaves, stems and flowers are used mostly in folk medicine for the treatment of various ailments.[3]

In the third world countries, 20,000 plants species are believed to be used medicinally.[4] At present, the pharmaceutical sector in India is making use of 280 medicinal plant species, of which 175 are found in the IHR.[5]

The plants of the genus *Senecio* are used traditionally used for treatment of dysentery, conjunctivitis, infections, rheumatism, cancer, cough suppressant, asthma, bronchitis, eczema and inflammation. *Senecio aryunensis* is used in traditional Chinese medicine in northwestern China to treat dysentery, conjunctivitis and tumefaction.[6] In traditional medicine, the use of *Senecio* species for treatment of asthma, coughs, bronchitis, eczema and wound healing have also been reported.[7,8] *Senecio tenuifolius* is poisonous to livestock, but the leaves of the plant are used topically as remedy for skin diseases to reduce swelling and pain,[9]

MATERIAL AND METHODS
Plants Materials: Whole plants of *Senecio chrysanthemoides* were collected from the Tungnath (Chopta), Rudraprayag Uttrakhand India in October 2014. The plant was identified from Department of Botany, HNB Garhwal University Srinagar Uttrakhand. A Voucher Specimen (**GUH-3354**) was deposited in the Department of Botany.

Preparation of crude extract: The shade dried whole plant was crushed and boiled in ethanol at 40-50 °C temperature for 16-18 h and then ethanol soluble fraction was filtered off. The filtrate was concentrated under vacuum at low temperature (40°C) with the help of a rotary evaporator (Perfit India). A crude extract (400 g) was obtained from the filtrate.

Fractionation: The crude extract was fractionated with petroleum ether and ethyl acetate by soxhlet apparatus to yield petroleum ether (20g), ethyl acetate (250g), ethyl acetate insoluble (200g) and 30g crude extract was reserved for the biological activities.

Determination of Antibacterial activity

Collection of test organism and preparation of stock culture: The Four species of bacteria, -Escherichia coli, klebsiella pneumonia, Bacillus aureus, Salmonella typhi were isolated from infected sites of patients attending SAI Institute and Science Dehradun,India for testing. These were cultured in nutrient broth for 24 hrs and the fresh inoculums were taken for the test and reconfirmed by gram staining and sub culturing in appropriate selective media.

Preparation of standard culture inoculums of test organism: Three to four isolated colonies were inoculated in 2 mL nutrient broth and incubated till the growth in the broth was equivalent with Mac-Farland standard (0.5%) as recommended by WHO at which the number of cells was assumed to be 1.5 x 108 cfu mL-1.

Determination of Zone of Inhibition (ZOI): The antibacterial activity was assessed by agar well diffusion method. Muller Hinton agar medium was prepared by using 15g agar dissolved in 1L distilled water. Muller Hinton agar medium was poured into each Petri plate of 20 x 90mm and allowed to cool to 45°C to solidify. The freshly prepared inoculums were swabbed all over the surface of the MHA plate using sterile cotton swab. Wells of 8 mm diameter were made in the agar with a sterile cork borer. 100 µL of the working suspension/solution of different plant extracts were loaded in each well and same volume of extraction solvent for control was filled in the wells with the help of micropipette. Plates were left for some time till the extracts diffused in the medium with the lid closed and incubated at 37°C for 24 h. The tests were performed three times and the zones of inhibition were measured for each extract using a ruler and the results were recorded (Table 1).

Table 1: Zone of Inhibition (mm) of *S. chrysanthemoides* crude extract and its various fractions tested for antibacterial activity.

Microorganisms (0.1ml)	Zone of Inhibition (mm)					
	EASC (10mg/ml)	PESC (10mg/ml)	MASC (10mg/ml)	ECSC (10mg/ml)	Streptomycine (1mg/ml)	Ampicilline (1mg/ml)
Ec	15	-	-	13	09	20
KP	13	10	25	26	17	10
BA	18	12	19	04	10	08
ST	06	02	12	-	10	-

Abbreviation: EAPA = Ethyl acetate *S. chrysanthemoides* soluble extract; PEPA = Petrolium ether *S. chrysanthemoides* soluble extract; MAPA = Methyl alcohol *S. chrysanthemoides* soluble extract; ECPA = Ethyl alcohol Crude extract *S. chrysanthemoides;* EC= *Escherichia coli*, KP = *klebsiella pneumonia*, BA = *Bacillus aureus*, ST= *Salmonella typhi.*

Determination of Antifungal activity

The antifungal activity was tested by disc diffusion method**.** The Sabouraud dextrose agar plates were each similarly seeded with each fungal strain The 24 hrs. both culture of each bacterium and 7 days inoculated fungus culture were used to seed sterile Sabouraud dextrose agar at 45°C respectively, and fungal plates were incubated at 25-28°C for 7 days after which diameter of zones of inhibition were measured. Each disc filled with extract.

Table 2: Zone of Inhibition (mm) of *S. chrysanthemoides* crude extract and its various fractions tested for antifungal activity.

Test Fungal species	Zone of Inhibition (mm)				
	EASC (10mg/ml)	PESC (10mg/ml)	MASC (10mg/ml)	ECSC (10mg/ml)	Hexaconazole (1mg/ml)
niger	15	10	07	-	17
albicus	13	08	08	09	14
P. glaucum	08	-	11	14	1 8
flavus	11	10	-	11	13
T. ruberum	10	08	10	08	11

RESULTS AND DISCUSSION

Antibacterial Activity of *S. chrysanthemoides* Crude extract and its various fractions

The antibacterial activities of *S. chrysanthemoides* crude extract and its various fraction give different zone of inhibition on the organisms tested**.** The *S. chrysanthemoides* ethyl acetate extract showed more potent against all isolates of bacteria. The methanolic extract showed good activity against *K. pneumonia*, *B. aureus*, and *S. typhi* and did not show any effect of *E.coli.* All the plant extract fraction showed more activity against *B. aureus*. The methanolic and petroleum ether extract did not show any effect of *E.coli.* The *S.chrysanthemoides* crude extract shown potent activity against *E.coli*, *K. pneumonia* and *B. aureus* and did not show any effect of *Salmonella typhi.* The antibacterial activities of various fractions of *S. chrysanthemoides* compared with different standard shown in **(Figure 1).**

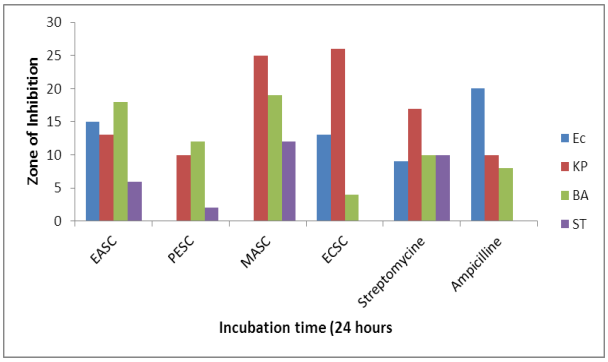

Figure 1: Comparative Antibacterial Activity of *S. chrysanthemoides* Crude extract and its various fractions against the test organisms.

Antifungal activity of *S. chrysanthemoides* Crude extract and its various fractions

The antifungal activities of *S. chrysanthemoides* crude extract and its various fractions gave different zone of inhibition on the fungal organisms tested**.** The crude and ethyl acetate extract showed more potent against all the fungal strains. The methanolic and petroleum ether extract show potent against *C. albicans, A. niger*, *T. ruberum* and did not showed any effect against *P. glaucum* and *A. flavus* respectively. The antifungal activities of various fractions of *S. chrysanthemoides* compared with different standard shown in **(Figure 2).**

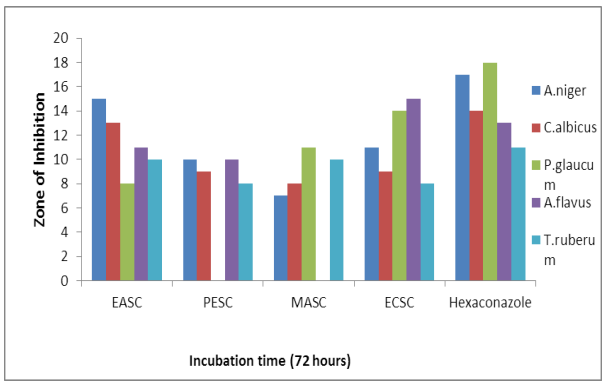

Figure 2: Comparative Antifungal Activity of *S. chrysanthemoides* Crude extract and its various fractions against the fungal species.

CONCLUSIONS

The *Senecio chrysanthemoides* crude extract and ethyl acetate extract showed more potent against all isolate of bacteria. The methanolic extract showed potent against *K. pneumonia, B. aureus*, and *S. typhi* and did not show any effect of *E.coli.* The methanolic and petroleum ether extract show potent against *C. albicans, A. niger*, *T. ruberum* and did not showed any effect against *P. glaucum* and *A. flavus* respectively.The present work revealed that the plant could be used for Herbal medicine. In conclusion, *Senecio chrysanthemoides* is an important medicinally plant and can be a potential candidate for further bio-assays which would lead to the synthesis of safe herbal drugs of global interests.

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