

ANTIMICROBIAL ACTIVITY OF ALCOHOLIC EXTRACT OF *ANACYCLUS PYRETHRUM* (AKARAKARA)

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ABSTRACT

The antibacterial activity of the alcoholic and extract of *Anacyclus pyrethrum* (Akarakara) has been described in this paper. It is also use as herbal medicine and commonly distributed in Shiwalik range of Himalaya. The *Anacyclus pyrethrum* (Akarakara) shows very effective antimicrobial potential against *Bacillus subtilis*, *Escherichia coli*, *Salmonella typhi*, *Klebsiella pneumonia*, and *Staphylococcus aureus*. The minimum inhibitory conc was also finding out with the dilution of *Anacyclus pyrethrum* as 20%, 40%, 60% and 80%. The extracts of *Anacyclus pyrethrum* was prepared in alcohol and compared with the 1 unit strength of antibiotic Ciprofloxacin. The alcohol was also used as a control.

Key Words: Antibacterial, *Anacyclus Pyrethrum* (Akarakara)

INTRODUCTION

Medicinal plants sector has traditionally occupied an important position in the socio cultural, spiritual and medicinal arena of rural and tribal lives of India. System of medicine in the oral and codified streams uses medicinal plants in preventive, promotive and curative application. For thousands of years, natural products have been used in traditional medicine all over the world and predate the introduction of antibiotics and other modern drugs (Jahan *et al.*, 2011).

Natural products of higher plants may give a new source of antimicrobial agents with possibly novel mechanism of action contrary to synthetic demand for medicinal plant is increasing in both developing and developed countries due to growing recognition of natural product, being non narcotic, having no side-effects, easily available at affordable prices and sometimes the only source of health care available to the poor (Kiran, 2011).

Many plant species have been utilized as traditional medicines but it is necessary to establish the scientific basis for the therapeutic actions of traditional plant medicines as these may serve as the source for the development of more effective drugs (Saboo, 2010)

Anacyclus pyrethrum (pellitory, Spanish chamomile, or Mount Atlas daisy) is a perennial herb much like chamomile in habitat and appearance. It is in a different family (Asteraceae) from the plants known as pellitory-of-the-wall (*Parietaria officinalis*) and spreading pellitory (*Parietaria judaica*).

It is found in North Africa, elsewhere in the Mediterranean region, in the Himalayas, in North India, and in Arabian countries. Medicinally, pellitory root has a pungent efficacy in relieving toothache and promoting a free flow of saliva and making it popular as a food spice. It induces heat, tingling and redness when applied to the skin.

Ayurveda (the ancient Indian medicine system) and Siddha (the medicine system from Tamil-Nadu, a southern state in the country of India) have more uses for this plant root and it has been used for centuries as a medicine. It is called Akkal-Kara in Hindi, Akkal Kadha in Marathi, and Akkarakaaram. Oil is prepared by a method known as pit extraction.

More recently *Anacyclus pyrethrum* has been noted for its anabolic activity in mice and suggests giving a testosterone-like effect and also significantly increasing testosterone in the animal model. The variety *depressus* (sometimes considered a separate species, *Anacyclus depressus*), called mat daisy or Mount Atlas daisy, is grown as a spring-blooming, low-water ornamental.

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Chewing pyrethrum root provokes a persistent burning and partial desensitization of the tongue and nearby mucous membranes together with a pronounced increase in salivary flow. The effect is ascribed primarily to the pellitorine, less so to the 18 anacyclin. Pellitorine is a rubefacient skin irritant and sialagogue; it causes intense burning and local anaesthesia of mucous membranes. Alkyl amides are characterized by a hot taste, a local anaesthetic effect on mucous membranes and the promotion of salivation.

A local anaesthetic effect of *Anacyclus pyrethrum* is said to have been demonstrated in animal studies. No details are available. In a double-blind study in 200 dentistry patients, the local anaesthetic effect of an alcoholic extract of the roots (2%, freshly dissolved in sterile distilled water) was compared with that of 2% Xylocaine hydrochloride solution. The maximum dose of the extract was 0.2 ml, corresponding to 4 mg of the herbal drug. .

The alkyl amides from *Anacyclus pyrethrum* have insecticidal and molluscicidal effects. The insecticidal effect is said to parallel the sialagogic effect. The insecticidal effect of pellitorine is particularly pronounced.

A solution of pellitorine in Deobase (= purified kerosene, concentration not given) as a spray for house flies (*Musca domestica* L.) is said to show the same paralysing effect. Which is slightly more than half the lethal effect of the same concentration of pyrethrins? Pellitorine is also lethal to adult yellow mealworms (*Tenebrio molitor*). A 3.1% solution of pellitorine in acetone topically applied to mealworms as standardized drops under defined conditions causes immobilization of 45% after 24 hrs

It was planned to investigate that akarakara exhibit so many applications in the field of agriculture and medicines. So it is required to antimicrobial screening against pathogenic and non pathogenic organism. In the present study antimicrobial screening was carried out against *B subtilis*, *S aureus*, *E. coli*, *Klebsiella pneumonia*, *Salmonella typhi*

The minimum inhibitory conc was also finding out with the dilution of nickel II coordinated compound as 20%, 40%, 60% and 80%. The antimicrobial screening of akarakara compound carried out by four replicates to avoid the technical error. Water and DMSO also used as a control. The test organism was taken from IMTECH Chandigarh and maintained subculture in college laboratory and compared with isolates.

MATERIALS AND METHODS

Preparation of Plant Extract

The *Anacyclus pyrethrum* (akarakara) roots were collected from Bilaspur (Himachal Pradesh) in the summer season.

The freshly harvested roots of *Anacyclus pyrethrum* (akarakara) plant were brought to the laboratory and washed with tap water two three times and then washed with distilled water to remove the soil borne microorganism . The washed roots were dried in an oven at 50°C for 3-4 hrs. After drying the roots were finally grinded in a pestle mortar to get the powder form. Weigh about 60 gm powder of *Anacyclus pyrethrum* (Akarakara) in an air dried bottle. Add 100 ml alcohol to Akarakara and mix it properly. Bottle was kept in a dark place for 4 to 5 days.

After 5 days filter the extract with whattman filter paper no 42. The filtrate was collected in a air dried bottle. The sensitivity test was used to test the effects of the *Anacyclus pyrethrum* (akarakara) on the bacteria i.e *B subtilis*, *S aureus*, *E. coli*, *Klebsiella pneumonia*, *Salmonella typhi* by using discs diffusion method. The sterilized nutrient agar was inoculated with the test organism and poured in the petriplates. Plates were kept for solidification. After solidification place the discs dipped in plant extract in center position and place the control on the top and distilled water disc on bottom position. Let the plates diffused for half an hour and then incubated for 24 hrs. After incubation observe the zones of inhibition of plant extract against the given test organisms.

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RESULTS AND DISCUSSIONS

The pure extract of *Anacyclus pyrethrum*(Akarakara) gave zone of inhibition 17mm ,13mm, 14mm, 12mm against *salmonella typhi* and effective zone of inhibition were measured 12mm, 8mm,9mm, 7mm..Antibiotic (ciprofloxacin) gave zone of 26mm and the effective zone was 21mm.20%, 40%, 60%, 80% of dilutions of sample gave the zones of 8mm, 11mm, 13mm, and 15mm respectively against *salmonella typhi*. Effective zone was calculated by subtracting the observed zone from the actual diameter of disc i.e.5mm. Effective zones of inhibition for 20%, 40%, 60%, 80% dilutions were 3mm, .6mm, 8mm, and 10mm.

The pure extract of *Anacyclus pyrethrum*(Akarakara)gave zone of inhibition 16mm, 15mm, 16mm, 17mm against *E coli* and effective zone of inhibition were measured 11mm, 10mm, 11mm, 12mm. Antibiotic (ciprofloxacin) gave zone of 26mm and the effective zone was 21mm. In first test 20% ,40%, 60%, 80% of dilution gave the zones of inhibition 10mm, 12mm, 13mm, 15mm,respectively against *E coli*. Effective zone was calculated by subtracting the observed zone from the actual diameter of disc i.e.5mm. Effective zones of inhibition for 20%, 40%, 60%, 80% dilutions were5mm, 6mm, 8mm, 10mm.

The pure extract of *Anacyclus pyrethrum*(Akarakara)gave zone of inhibition 20mm, 17mm, 18mm, 17mm against *Staphylococcus aureus* sand effective zone of inhibition were measured 15mm, 12mm, 13mm, 12mm Antibiotic (ciprofloxacin) gave zone of 25mm and the effective zone was 20mm. In first test20%, 40%, 60%, 80% of dilution gave the zones of inhibition of 10mm, 12mm, 14mm, and 17mm respectively against *Staphylococcus aureus*. Effective zone was calculated by subtracting the observed zone from the actual diameter of disc i.e.5mm. Effective zones of inhibition for 20%, 40%, 60%, 80% dilutions were5mm, 7mm, 9mm, 12mm.

The pure extract of *Anacyclus pyrethrum* (Akarakara)gave zone of inhibition 15mm, 14mm, 13mm ,15mm against *Bacillus subtilis* and effective zone of inhibition were measured 10mm , 9mm, 8mm, 10mm . Antibiotic (ciprofloxacin) gave zone of 27mm and the effective zone was 22mm. In first test 20%, 40%, 60%, 80% of dilution gave the zones of inhibition 10mm, 11mm, 12mm, and 13mm respectively against *Bacillus subtilis*. Effective zone was calculated by subtracting the observed zone from the actual diameter of disc i.e.5mm. Effective zones of inhibition for 20%, 40%, 60%, 80% dilutions were 5mm, 6mm, 7mm, and 8mm.

Table 1: Antibacterial effect of *Anacyclus pyrethrum* (Akarakara)

Test Organism	Diluted Plant Extract in mm(A)				Control Water (B)	Effective Zone of Inhibition (A-B)				Ciprofloxacin
	20%	40%	60%	80%		20%	40%	60%	80%	
<i>B. subtilis</i>	10	11	12	13	5mm	5	6	7	8	22
<i>E. coli</i>	10	12	13	15	5mm	5	7	8	10	21
<i>S. typhi</i>	8	11	13	15	5mm	3	6	8	10	21
<i>S. aureus</i>	10	12	14	17	5mm	4	7	9	12	20
<i>K. pneumonia,</i>	12	13	14	16	5mm	7	8	9	11	23
		Undiluted Alcoholic extract				Control Alcohol (B)	Control water	Effective Zone of Inhibition (A-B)		
	1	2	3	4	Mean(A)					
<i>B. subtilis</i>	15	14	13	15	14	5.0	Nil	9		
<i>E. coli</i>	16	15	16	17	16	5.0	Nil	11		
<i>S. typhi</i>	17	13	14	12	14	5.0	Nil	9		
<i>S. aureus</i>	20	17	18	17	18	5.0	Nil	13		
<i>K. pneumonia,</i>	18	16	17	17	17	5.0	Nil	12		

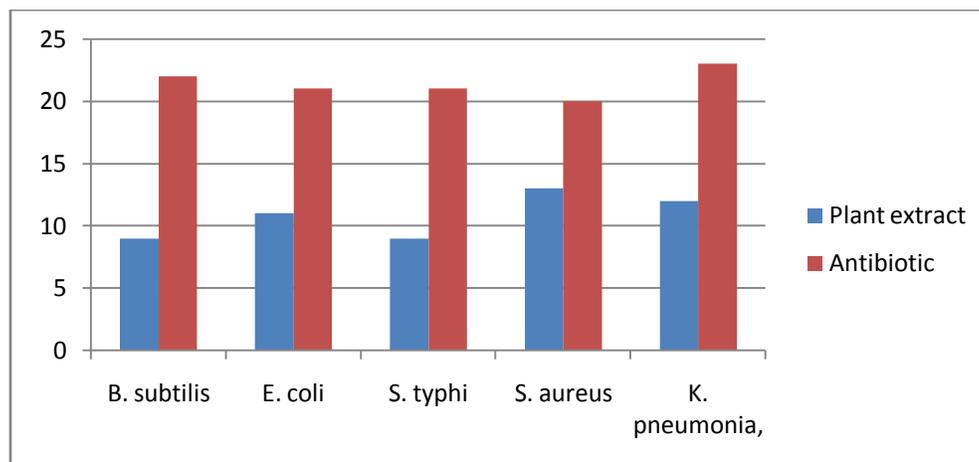


Figure 1: Antibacterial effect of *Anacyclus pyrethrum* (Akarakara) and compared with Antibiotic

The pure extract of *Anacyclus pyrethrum*(Akarakara)gave zone of inhibition 18mm, 16mm, 17mm, 17mm against *Klebsiella* and effective zone of inhibition were measured 13mm, 11mm, 12mm, 12mm Antibiotic (ciprofloxacin) gave zone of 28mm and the effective zone was 23mm. In first test 20%, 40%, 60%, 80% of dilution gave the zones of inhibition12mm, 13mm, 14mm, and 16mm respectively against *Klebsiella*. Effective zone was calculated by subtracting the observed zone from the actual diameter of disc i.e. 5mm. Effective zones of inhibition for 20%, 40%, 60%, 80% dilutions were7mm, 8mm, 9mm, 11mm.

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