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STUDY OF ANTI FUNGAL ACTIVITY AND SOME BASIC ELEMENTS OF MEDICINAL PLANT *CRESSA CRETICA* LINN AGAINST FUNGI CAUSING SKIN DISEASES

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Abstract

Antifungal activity of crude solvent extract of *Cressa cretica* have been investigated against Dermatophytic fungi, *Aspergillus niger*, *Aspergillus flavus, Paecilomyces varioti, Microsporum gypseum, and Trichophyton rubrum*. The various crude solvent extracts were found to be effective against test organism but the chloroform and the aqueous extracts appeared to be most effective antifungal agents as compared to ethanol, methanol and ethyl acetate extract. More over in present study some basic elements, Al, Ca, Cu, Fe, Mg, Mn, P, S and Zn have been determined from the medicinal plant *Cressa cretica*. by using atomic absorption spectrophotometry and U.V spectrophotometry. The medicinal plant *Cressa cretica* contains considerable amount of elements which have therapeutic effects in skin diseases.

Keywords: Antifungal activity essential elements *Cressa cretica.*

1. Introduction

Medicinal plants are widely used for treatment of diseases all over the world. According to world health organization report about 80% of the world population are taking interest in indigenous medicinal plants remedies. Herbal medicines have usually been used in the form of fruit and vegetables, drugs or their extract for the treatment of the diseases and for maintenance health. (Sahito *et al*., 2003). Skin disease diarrhea, diabetes, malaria, respiratory infection, fungal and bacterial infection are the common health problem in rural areas. In under developing countries numerous medicinal plants are used traditionally which are remedial against these disease (Pinn, 2000).

Cressa cretica commonly know as oan is a traditional medicine which is utilized in many parts of Pakistan for the treatment of various fungal skin diseases like *Tinea capitis, Tinea pedis, Tinea manum,* and *Tinea corporis* etc. the plant is bitter, pungent, heating, anthelmintic, stomachic, leprosy, asthma, urinary discharges and for skin diseases. (Baquar 1989, Kirtikar Basu 1935, Shahani, Memon 1988).

Metals and its elements as well as their compounds have been used since ancient times for therapeutic as well as cosmetic effects on skin. Aluminum acetate solution, copper sulphate and lotion of zinc solution is used for skin disinfectant, cleansing agents, antiseptic, sothing and cooling effective. Calcium, magnesium manganese are used in the formation of the collagen and connective tissue. Phosphorus and sulpher are used for the treatment of scabies and leprosy. (Sahito *et al.*, 2003, Soderberge and Halimans 1982, Under wood 1981). Skin disease is one of the main problem of Sindh province which is usually caused by fungi. The present report describe the antifungal potential of different solvent extract and elemental study of *Cressa cretica* against fungi causing skin diseases.

2. Materials and Methods

Plant Material:

Cressa cretica. leaves and shoots were collected from different area of Kohistan region District Dadu and the sample were identified through literature Flora of Pakistan (Nasir and Ali 1990). The collected plant material were washed with distilled water and placed in shade at room

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temperature for two weeks. One kg of dried plant material was dip in five litter (L) of ethanol solvent in bottle for 20 days for cold percolation. The extract was filtered and concentrated under reduced pressure below 40^0C using rotary evaporator. The residue completely was dried as the syrupy liquid form. From the residue five different extracts such as ethanol ethylacetate, chloroform, methanol and aqueous extract were prepared using separating funnel. The extract were left at room temperature. The solvent were completely evaporated so that organic compounds remain in the dry form. These extracts so obtained were mixed with the sterilize water (1 g: 5 ml) and each extracts sample was applied for antifungal activity.

Collection of Dermatophytes

The dermatophytic fungi namely: *Aspergillus niger*, *Aspergillus flavus*, *Paecilomyces varioti*, *Microsporeum gypseum*, *Tricophytron rubrum* were scraped from the different body parts at skin out patient departments of Liaquat University Hospital Jamshoro and Hyderabad.

Preparation of fungal culture

Sabourad glucose-agar media. Following composition were used for this purpose. Pepton 10g, glucose 20g, Agar 20g, distil water 1000 ml with 5.4 pH. All the contents were mixed and dissolved in distilled water. The solution were autoclaved at 120^0C, 15 Lb/sq inch pressure for 20 minutes.

Treatment of different solvent extract layers:-

The human skin pathogen were treated with different extracts and result were taken after 72 hours at 30^0C. The percentage of mycelial inhibition was calculated as follows: (Usman ghani and Shameel 1986, Ali Shtayeh and Suheil 1999).

% Mycillial inhibition = [(dc-d1)/dc]x100

dc = colony diameter in control, d1 colony dia meter in treatment

Methodology for Elements determination.

A suitable dissolution method for biological sample to yield homogenous solution is a crucial first step to determine in atomic absorption spectrophotometer and U.V. techniques. The decomposition of organic matter must be completed to avoid interference by organic residue. Sample digested with nitric acid: 30% hydrogen peroxide determination of mineral elements. Appropriate working standard solution of Aluminum (Al), Calcium (Ca), Copper (Cu), Iron (Fe), Magnesium (Mg), Manganese (Mn), Phosphorus (P), Sulpher (S), Zinc (Zn) were prepared from stock standard solution (1000 ppm), in 2N nitric acid. Calibration curves were drawn for each elements using atomic absorption spectrophotometer Hitachi model 180-50 and UV-Spectrophotometer. The calibration curves obtained for concentration V.S absorbance data were statistically analyzed using fitting of state line by least square method. A blank reading was also taken and necessary correction was made during the calculation of percentage concentration of various elements. The efficiency of extraction method was checked by standard addition method. The sample was spiked with known standards and digested with nitric acid and hydrogen peroxide mixture. The matrix of standard and sample solution was same. The percentage recovery test for different elements by digestion method adopted was 98.5-99% in range.

3. Results

All the crude extracts had significance antifungal activities against most of the fungi, but the activity of inhibition varied for the fungi with respect to the type of plant extract..

Ethanol Extracts: The maximum inhibition activity was observed against *T. rubrum* 80% while moderate inhibition activities against *P. varioti* and gypsum and *A. niger* 69.1%, 66.67% and 50% and minimum inhibition activities against *A. flavus* 28.58% was measured.

Ethyl acetate Extract: The maximum inhibition activities was observed against *P. varioti*, and *T. rubrum* 81.82% and 80% while moderate inhibition activity against *M. gypseum* and *A. flavus* 76.67% and 71.41% and minimum inhibition activity against *A. niger* 62.5% was noticed.

Chloroforms extracts: The maximum inhibition activity was observed against A. niger, T. rubrum and P. varioti 95%, 92% and 90.91%. While

moderate inhibition activity against *A. flavus* 85.72% and minimum inhibition activity against *M. gypseum* 83.34% was recorded **(Table – 01)**.

Methanol Extract: The maximum inhibition activity was observed against *P. varioti* 72.73% while moderate inhibition activity against *M. gypseum* 50% and minimum inhibition activity against *A. flavus*, *T. rubrum* and *A. niger* 42.86%, 40% and 37.5% respectively was determined.

Aqueous Extract: The maximum inhibition activity was observed against *P. varioti* and *T .rubrum* 85.46% and 80% while moderate inhibition activity against *A .flavus* and *M. gypseum* 71.41% and 66.67% and minimum inhibition activity against *A. niger* 62.5% was recorded

Elements: The considerable amount of various elements such as: aluminum (Al), calcium (Ca), copper (Cu), iron (Fe), magnesium (Mg), manganese (Mn), phosphorus (P), sulpher (S), zinc (Zn) have been determined from the medicinal plant *Cressa cretica* **(Table 2.)** These elements are biologically very much important for the treatment of different skin diseases.

4. Discussion

In the present study crude extracts of the plant material obtained in polar and less polar organic solvent were tested against fungi causing skin diseases. All the crude extracts had significant antifungal activity on most of the fungi, but chloroform and aqueous extract had maximum inhibition activity 62.5- 95.2 as compared to methanol, ethylacetate and ethanol extracts there have active inhibition activity in the range of 28.58%-81.82% against test dermatophytes. Although many scientist Anjum and Khan (2003), Adedotum *et al*., (2002) Sakharkar Patel (1999), Ficker *et al*., (2003), Thebo and Abro (2000) Natarjan *et al.,* (2003), Usman and Shameel (1986), Skaikh *et al*., (1990) Bajwa *et al*., (2006) Pirzaida *et al*., (2007), have been screening the antifungal activity of medicinal plants against dermatophytes, but in this study first attmept was made to investigate the antifungal activity of medicinal plant *Cressa cretica* against dermatophytic fungi such as *Aspergillus flavus, A. niger, by M. gypseum, P. varioti, T. rubrum* casued different skin diseases like Tinea. Capitus, T. pedis, T. manum and T. corporis.

Further more nine elements aluminum (Al), calcium (Ca), copper (Cu), iron (Fe), magnesium (Mg), manganese (Mn), phosphorous (P), sulphar (S) and zinc (Z) have been analyzed in variable range from the medicinal plant *Cressa cretica*, but the considerable amount of the elements such as magnesium (Mg) zinc (Zn) is present in the range of (9534-9925) and (55.3-70.2)mg/Kg respectively. All these elements play essential role for the treatment of skin disease. (Janjua, 1990, Saily *et al.*,1994).

Table-1. Antifungal activity of different solvent extract of *Cressa cretica* Linn

Control reading at 30°c after 72 hrs (mm)	***Aspergillus niger 40***	***Aspergillus flavus 35***	***Paecilomyces varioti 55***	***Microsporeum gypseum 30***	***Tricophytron rubrum 25***
Text extract Ethanol					
Inhibited reading at 30° C after	20	25	17	10	05
72 hrs (mm) Inhibited (%)	50	28.58	69.10	66.67	80
Methanol					
Inhibited reading at 30°C after	25	20	15	15	15
72 hrs (mm) Inhibited (%)	37.50	42.86	72.73	50	40
Cloroform					
Inhibited reading at 30°C after	02	05	05	05	02
72 hrs (mm) Inhibited (%)	95	85.72	90.91	83.34	92
Ethyl acetate					
Inhibited reading at 30°C after	15	10	10	07	05
72 hrs (mm) Inhibited (%)	62.5	71.41	81.82	76.67	80
Aqueous					
Inhibited reading at 30°C after	15	10	08	10	05
72 hrs (mm) Inhibited (%)	62.50	71.41	85.46	66.67	80

Table-2. Quantity of Different Elements in *Cressa cretica* Linn.

Name of Elements	Formula	Amount mg/kg
Aluminum	A1	7.44-8.46
Calcium	Ca	15393-17248
Copper	Cu	12.2-14.3
Iron	Fe	125.2-151.1
Magnesium	Mg	9534.3-9925.3
Manganese	Mn	24.6-28.9
Phosphorous	P	70.9-87.9
Sulphur	S	397.3-308.8
Zinc	Zn	55.3-70.2

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