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BIOSTATISTICAL ANALYSIS OF ANTIFUNGAL ACTIVITY OF STEM BARK OF *ABUTILON INDICUM* (LINN) SWEET

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ABSTRACT

Abutilon indicum Linn (Malvaceae) is a shrub distributed throughout India. The various parts of the plant (leaves, roots, seeds and seed oil) are widely employed by various tribal communities and forest dwellers for the treatment of sort of ailments. The plant contains mucilage, tannins, β-sitosterol, asparagines, flavonoids, alkaloids, hexoses, nalkane mixtures, alkanol, gallic acid and sesquiterpenes as major phytoconstituents. *Abutilon indicum* has several activity reported as anti-inflammatory, antiproliferative, anti-arthritic, analgesic, sedative, antioxidant, antimicrobial, hepatoprotective, antidiabetic, anticancer, anti-diarrhoeal, anticonvulsant, larvicidal, wound healing, antiasthmatic, diuretic, immunomodulatory and anti-estrogenic activity. The methanolic extract of *Abutilon Indicum* stem bark also showed significant antifungal activity by showing zone of inhibition of 19.23 ± 0.11and 13.33 ± 0.16 on nutrient agar medium plate against *Candida albicans* and *Aspergillus niger* when compared zone of inhibition of 25.55 ± 0.23 and 27.32 ± 0.29 of standard ketaconazole at 30µg/disc. The results were noted for zone of inhibition. The extract (methanolic) possesses zone of inhibition is proportional to its antimicrobial activity of standard antibiotic. The methanolic extract of *Abutilon Indicum* stem bark also showed significant antifungal activity by showing significant inhibition against *Candida albicans*.

KEYWORDS

Abutilon indicum, Phytochemicals, Stem bark and Antifungal activity etc.

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INTRODUCTION

Since ancient time, plant- based product has been used for health care, search is constant for brand spanking new material and their interaction with biological system[1]. Consistent with World Health Organization report, about 80% of the population, mostly in developing countries still depends on

traditional medicinal system for his or her primary health care. India is one among the twelve mega-biodiversity centers with 4 hot spots of biodiversity[2]. Over the last decade there has been a growing interest in drugs of plant origin in contrast to the synthetics that are considered unsafe to human and environment[3]. India is one among the foremost medico-culturally diverse countries within the world where the medicinal plant sector may be a part of time- honored tradition that's a respected even today[4]. The *Abutilon indicum* under the Malvaceae includes 75 genera and 1000 species mostly confined to the tropical and sub-tropical regions of the planet. In India the family is represented by 22 genera and about 110 species occurring mostly within the warmer part[5]. *Abutilon indicum* (Linn) is a crucial medicinal plant utilized in our traditional system of drugs to treat various health aliments[6]. The plant is extremely much utilized in Siddha medicines. All the parts of plant have medicinal uses[7]. The varied secondary metabolites like phenols, alkaloids, and flavonoids are found during this plant, saponins have a huge significance in pharmaceutical industry[8]. This review is on *Abutilon indicum* (Linn.) are useful for the phytochemists, pharmacologists, clinicians, researchers, scientists and toxicologists for future study. *Abutilon indicum* Linn. Is greyish-tomentose undershrubs, reaching 1m or more tall. Leaves broadly ovate or ovate-lanceolate or sub-orbicular, velvety on both the surfaces, margins dentate; petiolate. Flowers yellow or orange-yellow, solitary, axillary. Carpels 10-25, reniform, dark brown, with minute scattered, stellate hairs. The fruits are capsule, densely pubescent, with conspicuous and horizontally spreading beaks. The stems are stout, branched, 1-2m tall, pubescent. The seeds are 3-5mm, reniform, tubercled or minutely stellate-hairy, black or dark brown[9].

MATERIAL AND METHODS

Preparation of course powder

The stem bark of *Abutilon Indicum* were dried under shade and then powdered by a mechanical grinder. The powder was passed through 40 mesh sieve and stored in an airtight container for further use.

Preparation of extract

The air-dried stem bark of *Abutilon Indicum* was made into a coarse powder. The dried powder of stem bark was extracted with methanol using a Soxhlet extractor. Filtration of extract was done through muslin and the filtrate was evaporated under reduced pressure and vacuum-dried[10].

Standard Drugs

Antifungal, Ketaconazole of the concentration 30µg/disc were obtained from Baddi (Himanchal Pradesh).

Preparation of Nutrient agar media

Dehydrated nutrient agar media was used and was prepared in distilled water. The composition of the media was as given as under the medium was autoclaved at 15 lbs per square inch pressure at 1210C. Then dehydrated nutrient agar medium (28g) was accurately weighed and suspended in 1000ml of distilled water in a conical flask. It was heated on water bath to dissolve the medium completely. Direct heating was avoided as it may lead to charring of the medium components and render it useless for the purpose[11].

Sterilization of Media

The conical flask containing the nutrient agar medium was plugged with the help of nonabsorbent cotton bung. The mouth of the conical flask and the cotton bung were properly covered with aluminum foil. The medium was then sterilized by autoclaving at 15lbs per square inch pressure for 20 minutes.

Preparation of test organisms

The test organisms were maintained on slants of medium and transferred to a fresh slant once a week. The slants were incubated at 370ºC for 24 hours. Using 3ml of saline solution, the organisms were washed from the agar slants on to a large agar surface (medium) and incubated for 24 hours at 370ºC. The growth from the nutrient surface was washed using 50ml of distilled water. A dilution factor was determined which gave 25% light transmission at 520nm. The amount of suspension to be added to each 100ml agar or the nutrient broth

was determined by use of test plates or broth. The test organisms were stored under refrigeration.

Experimental method

Cup and Plate Method is used to screen antimicrobial potential of methanolic extract of stem bark of *A. indicum*. A previously liquefied and sterilized medium was poured into sterilized petriplates of 100mm size. Ten plates were prepared and kept for solidify. Five holes were made in each plate with a stainless steel borer having 6mm in diameter. The methanolic extract of the plant in the concentration of 10mg/ml were made in 1% Di-methyl Sulfoxide (DMSO). Amoxycillin (Disc-30µg/disc) and Ketaconazole (Disc-30µg/disc) were used as a standard. Micropipette was used to deliver the solutions in to holes. The volume of solution added to each hole was kept uniform (0.1ml in each hole). One strip of amoxycillin and ketaconazole (Standard) was placed aseptically to the center hole of each plate. The plated were then left for standing for 1 hr. for proper diffusion of the drug solutions. They were incubated for about 24 hours at 370°C. After 24 hours the plates were examined and the diameter of zones of inhibition was accurately measured[12].

RESULTS AND DISCUSSION

The *in vitro* anti-fungal activity of the methanolic extracts of stem bark of *Abutilon Indicum* was quantitatively assessed on the basis of zone of inhibition. The results are shown in Table No.2. The methanolic extracts studied in the present investigation exhibited varying degree of inhibition zone against the selected fungal pathogens. The methanolic extract of *Abutilon Indicum* stem bark also showed significant antifungal activity by showing zone of inhibition of 19.23 ± 0.11and 13.33 ± 0.16 on nutrient agar medium plate against *Candida albicans* and *Aspergillus niger* when compared zone of inhibition of 25.55 ± 0.23 and 27.32 ± 0.29 of standard ketaconazole at 30µg/disc.

Table No.1: Composition of Nutrient Agar medium

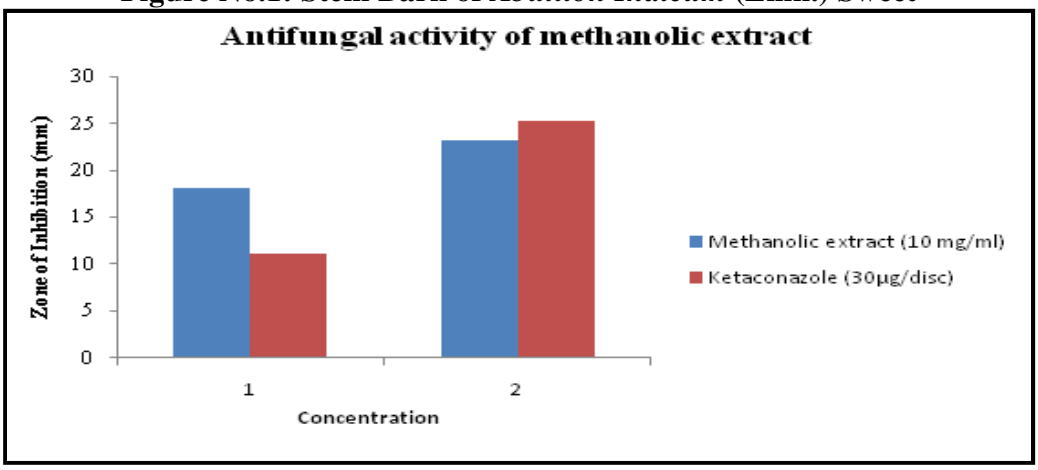
S.No	Composition	Concentration
1	Agar	15.0%
2	Peptic Digest of Animal tissue	5.0%
3	Sodium Chloride	5.0%
4	Beef Extract	1.5%
5	Yeast Extract	1.5%
6	pH	7.4±0.2 at 250°C
7	Distilled water	1000ml

Table No.2: Antifungal activity of methanolic extract of *Abutilon Indicum* stems bark

S.No	Drug	Concentration	Zone of Inhibition Values* (mm) ± SD	
			Candida albicans	***Aspergillus niger***
1	Methanolic extract	(10mg/ml)	19.23 ± 0.11	13.33 ± 0.16
2	Ketaconazole	(30µg/disc)	25.55 ± 0.23	27.32 ± 0.29

*An average of three determinations

Figure No.1: Stem Bark of *Abutilon Indicum* (Linn.) Sweet



Graph No.1: Antifungal activity of methanolic extract

CONCLUSION

The results were noted for zone of inhibition. The methanolic extract of stem bark of *Abutilon Indicum* possesses zone of inhibition is proportional to its antimicrobial activity of standard antibiotic. The *Abutilon Indicum* stem bark (methanolic extract) also showed significant antifungal activity by showing significant inhibition against *Candida albicans*.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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