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Investigation of anti-fungal activity of flowers of *Tecoma stans* (L.) Juss. Ex Kunth

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Abstract
Fungal infections is one of the most prominent disease. It occurs in almost every person once in their life. *Tecoma stans* (L.) Juss. Ex Kunth commonly known as Piliya belongs family Bignoniaceae is an evergreen ornamental garden and street plant present in wild state. Almost every part of the plant is used medicinally for the treatment of various diseases. The flowers of the plant are used in the treatment of fungal infection, inflammations, stomach pain, diabetes and many others disorders of human being. The present paper deals with the antifungal activity of flowers of the selected plant. PEE, CE, EE and AE of flowers of *T. stans* were evaluated for anti-fungal activity and zone of inhibition were recorded.

Keywords: Flowers, *Tecoma stans*, antifungal activity

Introduction
Fungal diseases are a global public health problem. Although fungal diseases can affect anyone, including travelers, they pose a serious threat to people who have weakened immune systems, such as those who have cancer or HIV/AIDS. Fungal infection, also called mycosis, is a skin disease caused by a fungus. There are millions of species of fungi. They live in the dirt, on plants, on household surfaces, and on your skin. Sometimes, they can lead to skin problems like rashes or bumps [1].
Skin disease is a major problem throughout the world, and to cure bacterial and fungal skin infection is the most challenging task. To combat skin problems, various pharmaceutical companies produce different products and/or drugs. However, due to microbial drug resistance problems, this process requires searching for alternative sources of chemically synthesized ones. Many researchers have been working on medicinal plants based on traditional knowledge, and this research has been a tremendous source of bioactive compounds. These compounds have different biological activity against skin disease–causing bacteria as well as fungi, and possess many health-protective effects. Attention to these aspects should lead in a new direction for commercialization and provide insight into the understanding of some promising plant species used for the treatment of skin diseases [2].
Tecoma stans (L.) Juss. Ex Kunth. Family. Bignoniaceae present in wild throughout India is an ornamental medicinal plant commonly known as Piliya (H), Yellow trumpetbusy, Yello bell (E). Traditionally all parts of the plant is used as medicine for the cure of the treatment of various diseases. Leaves, barks and roots have been used for a variety of purposes in the field of herbal medicine. Bark shows smooth muscle relaxant, mild cardio tonic and chlorotic activity. Applications include the experimental treatment of diabetes, digestive problems, control of yeast infections and other medicinal applications. It contains several compounds that are known for their catnip like effects on felines. The root of the plant is reported to be a powerful diuretic, vermifuge and tonic. A grinding of the root of *Tecoma stans* and lemon juice is reportedly used as an external application and also taken internally in small quantities as a remedy for snake and rat bites [3-4].
During past few years plant derived extracts and their isolated phytochemicals are gaining importance and are also a new emerging area of research. In last two decades anti-fungal effects in the category of anti-microbial is of great interest [5-6]. The present study was designed to evaluate the flowers extracts of *T. stans* widely used to treat the fungal infection as mentioned in traditional system of medicine.

Material and Methods
Collection of herbs and their authentication
The plant parts viz., TSF: *Tecoma stans* (Flowers), was collected in the months of September-December 2018 from the various local sites of Malwa region of Madhya Pradesh and identified & authenticated by Dr. S. N. Dwivedi, Prof. and Head, Department of Botany, Janata PG College, A.P.S. University, Rewa, (M.P.) and was deposited in our Laboratory. Voucher specimen no. P/TS-F/1210 was allotted.

Successive extraction of selected herb
Sample were shattered and screened with 40 mesh. The shade dried coarsely powdered plant material (250 gms) were loaded in Soxhlet apparatus and was extracted with petroleum ether (60-62 °C), Chloroform, ethanol and water until the extraction was completed. After completion of extraction, the solvent was removed by distillation. The extracts were dried using rotator evaporator. The residue was then stored in dessicator and percentage yield were determined.

Anti-fungal of extracts [7-10]
Fungal strain
Fungal strain i.e., *Candida albicans, Cryptococcus neoformans* and *Aspergillus flavus* were used for the present investigation. The innoculum of strains were transferred to the recultured before staring the lab work.

Screening of Anti-fungal activity (Disc diffusion method)

Preparation of Disc

Disc of whatsmann filter paper of one quarter inch in diameter was prepared and the same was sterilized using autoclave.

Preparation of samples entrapped disc

The accurately weighed flower extracts of *T. stans* were dissolved in methanol of different stock solutions (10, 20, 30, 40, 50 µg/ml**)** solutions were prepared. All the dilution prepared was applied to whatsmann filter paper disc using a micropipette. The disc were then dried and sterilized.

Preparation of culture plate

The sabouraund's agar and mueller Hinton agar media were prepared by dissolving media in 1000 ml of distilled water and sterilized by autoclave at 121 ^{0}C for 1 hour. The media were cooled and poured in sterilized petri plate to solidified at room temperature.

Evaluation of Zone of inhibition

The re-cultured fungal strains were used for antifungal evaluation. The strains were streak on the Mueller Hinton media and the drug entrapped patches were placed. For negative control disc of distilled water and for positive control amphotericin B disc (10 µg) were used. The petri plates were kept in incubator for 24 hrs. After 24 hrs the petri-plates were checked for zone of inhibition. The zone of inhibition diameter was recorded with the help of zone reader scale. The zone of inhibition was calculated by subtracting diameter of sample or standard or control by diameter of disc. The more the zone of inhibition the more will be antifungal activity.

Statistical analysis

All the reading obtained were analyzed using one way analysis of variance i.e., ANOVA. Student t-test was used. The values are found to be statistically significant (**P*<0.00, ***P*<0.01). All the values obtained are expressed as mean± standard error means (SEM).

Results and Discussion

The investigation of the efficiency of plant extract in induced systemic and local infection model is of quite interesting. There are several mimics that the real conditions of infected organism and at the same time the achievements of the direct effects of the extract. Several scholars have evaluated the effects of plant extracts in systemic infections and in inducted fungal infection. Plants have various phytochemicals such as flavonoids, alkaloids, saponins, terpenoids which are responsible for anti-fungal properties. Anti-fungal activity of flowers of *Tecoma stans* were evaluated. The zone of inhibition of PEE, CE, EE and AE extract on *Candida albicans*, *Cryptococcus neoformans* and *Aspergillus flavus* were presented in table 1. Results indicate (Graph 1) that all the EETSF and AETSF have significant anti-fungal activity when compared with standard drug amphotericin B.

Table 1: Anti-fungal activity of Flowers Extract of *Tecoma stans* (L.) Juss. Ex Kunth

S/No.	Test/Extract	Zone of Inhibition (mm)
1.	Negative Control	4.85±0.28
2.	Positive Control	21.32±0.03**
3.	PEETSF	5.19±0.09*
4.	CETSF	8.20±0.04*
5.	EETSF	19.65±0.20**
6.	AETSF	20.09±0.14**

Note: All values are expressed as Mean (X) ±SEM, (n=3). One way ANOVA followed by student test, values are statistically significance **P*<0.001, ***P*<0.01 when compared with control and standard.

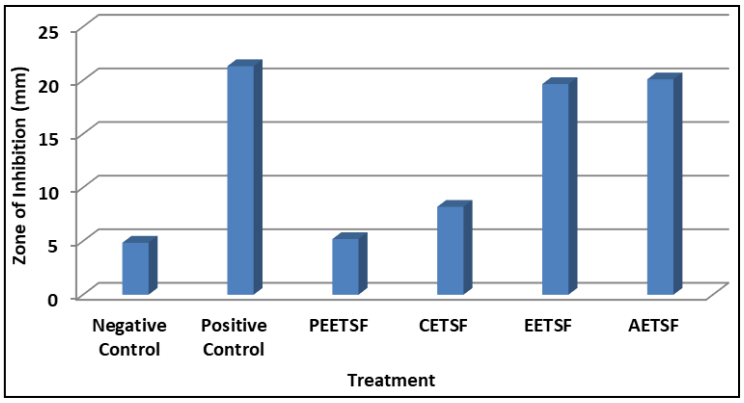

Fig 1: Anti-fungal activity of Flowers Extract of *Tecoma stans* (L.) Juss. Ex Kunth

Conclusion

Natural drugs have great potential to cure various kinds of skin diseases caused by bacterial and fungal strains, which screened many indigenous people depending on medicinal plants all over the country. On the basis of traditional knowledge with its holistic and systemic approach, various scientists have worked on different parts of particular medicinal plants (leaf, stem, flower, root, bark, fruit) using different methods to cure skin-related problems. Several promising medicinal plants used in various countries, alone or in combination with synthetic drugs, might be of future relevance to modern medicine not only in treating skin diseases but also as potential sources for maintaining proper health. The potent plants showed biological activity due to the phytoconstituents present in them. In the present investigation antifungal activity of PEE, CE, EE and AE of flowers of Tecoma stans were carried out against three fungal strains i.e., *Candida albicans*, *Cryptococcus neoformans* and *Aspergillus flavus*. The result indicates that EE and AE possess significant anti-fungal activity when compared to standard drug. Further research is warranted to isolate the compounds responsible for the observed biological activity will be of great interest to developed new phyto-formulations.

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