

**Summary of the UGC Major Research Project
Ref.:38-235/2009 (SR)**

**TITLE :PHYTOCHEMICAL ANALYSIS AND ANTIMICROBIAL ACTIVITY OF A
FEW PLANTS OF FAMILY EUPHORBIACEAE.**

Many plants of family Euphorbiaceae were traditionally used to cure several diseases. Natural products are one of the best reservoirs of traditional medicine. The emergence of multidrug resistance of pathogens has posed problems in the clinical efficacy of many existing antibiotics. This situation has been recognized globally as a serious concern and justifies further research to discover antimicrobial agents from natural origins including plant extracts. Present study aims at evaluation of the antibacterial and antifungal activity of extracts of the different parts of following plants of family Euphorbiaceae.

- *Pedilanthus tithymaloides* (Linn.)Poit
- *Jatropha gossypifolia* Linn.
- *Kirganelia reticulata* (Poir) Baill.
- *Phyllanthus fraternus* Webster
- *Sapium sebiferum* (L.)Roxb.
- *Homonoia riparia* Lour.

Plants were collected from wild areas of Mumbai and Sawantwadi and authenticated referring to floras and Blatter herbarium specimens. Extracts of fresh and dry plant parts were prepared separately in distilled water, ethanol, methanol, acetone, chloroform, petroleum ether and DMSO. These extracts were studied for the antifungal (antidermatophytes) and antibacterial (viz. *E. coli*, *P.vulgaris*, *S. aureus* and *B. subtilis*) activity. *Trichophyton mentagrophytes* and *T. rubrum* (fungi causing skin diseases in humans) were selected for the present study from the most prevalent human pathogenic fungal species viz. *T. mentagrophytes*, *T. rubrum* and the species of *Microsporum* and *Candida* in Mumbai. The extracts inhibiting the growth of dermatophytes / bacteria were analysed for the phyto-constituents.

Following are the findings of present study:

1. The most common dermatophytes in Mumbai were *Trichophyton mentagrophytes* and *T. rubrum*.
2. As for the antifungal activity study the sporulating culture of the fungus is required, several media were prepared to get maximum and quick sporulation. The best natural sporulation medium was found to be potato, carrot, tomato, dextrose and agar with Tween 80.
3. The antifungal activity study showed that-
 - i) The extracts of *P. tithymaloides*, *J. gossypifolia*, *P. fraternus*, *K. reticulata* and *S. sebiferum* did not inhibit the growth of *Trichophyton mentagrophytes* and *T. rubrum*.
 - ii) Aqueous extracts of dry leaves and flowers of *Homonoia riparia* inhibit the growth of *T. mentagrophytes* at the conc. of 200 mg / 5 ml culture medium.
4. Antibacterial activity study showed that-
 - i) The DMSO extracts of fresh flowers of *P. tithymaloides* and leaves of *K. reticulata* inhibited the growth of *P. vulgaris*
 - ii) The DMSO extracts of fresh leaves of *P. fraternus* and flowers of *H. riparia* inhibited the growth of *S. aureus*.
 - iii) The DMSO extracts of dry flowers of *P. tithymaloides*, leaves of *K. reticulata* and male flowers of *H. riparia* inhibited the growth of *P. vulgaris* and *S. aureus*
 - iv) The aqueous extracts of dry leaves and flowers of *H. riparia* inhibited the growth of *T. mentagrophytes*.

The above results (No. 3, and 4) are summarized in the tabular form.

Plant	Part	Solvent	Organism (growth inhibited)
<i>P. tithymaloides</i>	Flowers (fresh)	DMSO	<i>P. vulgaris</i>
	Flowers (dry)	DMSO	<i>P. vulgaris, S. aureus</i>
<i>K. reticulata</i>	Leaves (fresh)	DMSO	<i>P. vulgaris</i>
	Leaves (dry)	DMSO	<i>P. vulgaris, S. aureus</i>
<i>P. fraternus</i>	Leaves (fresh)	DMSO	<i>S. aureus</i>
<i>H. riparia</i>	Leaves (dry)	Aqueous	<i>T. mentagrophytes</i>
	Male flowers (fresh)	DMSO	<i>S. aureus</i>
	Male flowers (dry)	Aqueous	<i>T. mentagrophytes</i>
	Male flowers (dry)	DMSO	<i>P. vulgaris, S. aureus</i>

5. The minimum inhibitory concentration for the extracts inhibiting the growth of the bacteria was 20 % (wt (plant material) / vol).
6. The phytochemical analysis of the extracts inhibiting the growth of microorganisms exhibited the presence of tannins, alkaloids, saponins, flavonoids, proteins, carbohydrates and steroids and triterpenoids.
7. Chromatographic analysis of these extracts for tannins showed that
 - i) gallic acid is present in all the extracts.
 - ii) there are certain components present in all the extracts whereas certain components are present only in certain extracts
8. The alkaloids were not detected in chromatographic analysis of mixture of extracted alkaloidseventhough the crude plant extracts showed the presence of alkaloids, probably due to their lossduring extraction or occurrence of false + ve test of crude extracts.
9. TLC of saponins, flavonoids, steroids and triterpenoids showed many components in the respective mixtures . Several components werecommon in all the extracts whereas certain components were present in only certain extracts.
9. The extracts did not exhibit anticancer activity.

Future scope:

Further studies should be carried out

- To isolate and identify the compounds active against the microorganisms.
- To correlate the presence of certain compounds and the antimicrobial activity
- To find out the compounds that are present in the plants studied and establish the relationship among the plants which are closely related.

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