ABSTRACT

Medicinal plants have been used in virtually all cultures as a source of medicine from ancient times. The widespread use of herbal remedies and healthcare preparations are described in ancient texts such as the Vedas and the Bible. These are obtained from commonly used traditional herbs and medicinal plants and have been traced to the occurrence of natural products with medicinal properties.

The use of traditional medicine and medicinal plants in most developing countries as a customary basis for the maintenance of good health is observed throughout the world. In recent times an increasing dependence on the use of medicinal plants has compelled to the extraction and development of several drugs and chemotherapeutics from these plants as well as from traditionally used rural herbal remedies. Beside, the herbal remedies have become more popular in the treatment of minor ailments and also due to its non side-effects and increasing costs of personal health maintenance.

The knowledge of traditional and folklore medicine is followed from generation to generation is rich in domestic recipes and communal practice. The best known examples of traditional medicine are well-developed systems such as acupuncture and ayurvedic medicine that have been widely used to conserve human health in China and India. There is a feeling among natural products chemists and microbiologists alike that the multitude of potentially useful phytochemicals that could be synthesized chemically is at risk of being lost permanently. Ethnobotany aims to utilize the impressive array of knowledge assembled by indigenous people about the plant and animal products they have used to maintain health.
The practise of traditional medicine is widespread in China, India, Japan, Pakistan, Sri Lanka and Thailand. In India herbal medicines make use of legumes found in the Caesalpiniaceae, the Fabaceae, and the Mimosaceae. Nowadays, herbal medicinal preparations are more in demand than mainstream pharmaceutical products.

Marathwada possesses a very rich flora with a total of 1645 species belonging to 746 genera of 155 families. The Leguminosae family (the Caesalpiniaceae, the Fabaceae, and the Mimosaceae) account for 72 genera containing 217 species. This appears to be one of the dominant groups among plant community in this region.

Few plants from Marathwada have been studied for pharmaceutical properties. The work on the Leguminosae family (the Caesalpiniaceae, the Fabaceae, and the Mimosaceae) is particularly poor in this region related with antimicrobial and phytochemical studies. The majority of work is concerned with taxonomy and physiology. However, some members of the Leguminosae are reputed to have medicinal properties and are used to treat various diseases.

One hundred and forty seven species from the fifty genera of Fabaceae, Thirty four species belonging to eleven genera of Caesalpiniaceae and thirty six species of the eleven genera of Mimosaceae are known to occur in Marathwada. Among these thirty five species from the twenty two genera of Fabaceae, Ten species belonging to six genera of Caesalpiniaceae and eight species of the four genera of Mimosaceae were screened for their antimicrobial activity in the preliminary study. The objective was to select species with higher activity for further chemical investigation to isolate the active compounds by means of bioactivity guided fractionation.
Seasonal surveys were made to collect plants from Marathwada. Plant materials were collected from the region and were identified after critical examination in the PG Department of Botany, Shivaji Mahavidyalaya, Udgir following standard flora. The plant materials collected were processed and used in this study within the year of collection. The plant parts collected were shredded and dried completely in oven at 50°C for 72 h. The dried materials were then ground into fine powder and stored in airtight containers at room temperature till extraction. Crude extracts were prepared from the same plants by extracting 2 g dried material with 20 ml distilled water, ethanol and ethyl acetate for 30 min, respectively. Extracts were filtered and dried under vacuum. The samples were then air dried and redissolved to make 10 ml solution for antimicrobial testing.

Antimicrobial activities of the plant extracts (free from alcohol/ethyl acetate and converted into aqueous) was evaluated by disc-diffusion method expressed by diameter of zone of inhibition in mm for fungal human pathogens *Candida albicans, Trichophyton rubrum* and test bacteria whereas fungal plant pathogens were tested by spore germination method and inhibition of germ tube.

Cultures of the bacteria used were *Escherichia coli* and *Staphylococcus aureus* and fungal pathogen *Candida albicans, Trichophyton rubrum* were obtained from NCL, Pune, SGGSW Hospital Nanded, GMC, Aurangabad while plant pathogenic cultures were obtained from Botany Research Laboratory Science College, Nanded and IARI, New Delhi. Results are presented as the mean of three experiments and three replicates.

Two grams of dried powdered material was ground with 2 ml 10% ammonia solution and then mixed with 7 g basic aluminium oxide (activity grade I). This mixture was then packed loosely into a glass column and 10
ml CHCl₃ was added. The alkaloids were eluted with 5 ml CHCl₃. The elute was collected and evaporated down to 1 ml and used for TLC. TLC studies were carried out employing Aluminum thin layer chromatography plates (silica gel 60 F 254; 20×20 cm) (Germany) and preparative thin layer chromatography glass plates (silica+indicator, 1 mm, G 1510/LS 254; 20×20 cm) were purchased from Merck, Darmstadt, Germany.

The maximum activity was recorded in *Abrus precatorius* (L.) and *Acacia nilotica* (L.) Del., so they were further studied in detail and were subjected to biological assays. Tests were carried out after the first results showed antimicrobial activity against human as well as plant pathogens. These assessments of activities were extended to study the effect against fungal pathogens and bacterial pathogens of human and plants.

Microbial infections are important health problems of humans as well as plants throughout the world. Plants are a possible source of antimicrobial agents. In this study, the plant parts viz. roots, bark, seeds, leaves etc. were extracted separately in water, ethanol and ethyl acetate. These aqueous extract, ethyl acetate extracts and ethanol extracts from these two species were assayed against a collection of human and plant pathogens. The results show that *Abrus precatorius* and *Acacia nilotica* possess important antimicrobial potential. All the extracts from various plant parts of both the species showed antimicrobial activity against five or more pathogenic strains of bacteria and fungi.

A comparison between the two types of bacteria also reveals that Gram +ve strains (*Staphylococcus aureus* and *Corynebacterium sp.*) were more sensitive than Gram –ve strains (*Escherichia coli* and *Xanthomonas malvacerum*). This may be attributed to the structural differences of the cell wall of the two types of bacteria, Gram –ve possessing a multilayered
structure bounded by an outer cell membrane, whereas a Gram +ve bacterium has a single layer.

Antifungal activity was higher in the studied plants against human pathogens (*Candida albicans* and *Trichophyton rubrum*) than plant pathogens (*Alternaria solani* (Ell. & Mart.) Jones & Grout. and *Helminthosporium turcicum* Pass). In these assays the two types of fungi also reveals that human pathogens were more sensitive than plant pathogens. This may be attributed to the nutritional habits of the both the pathogens, as plant pathogens are more familiar with most of plant origin compounds.

The extracts from both the plants were subjected to solvent extraction for the characterization of major group of compounds found in these plants. These fractions were further purified employing TLC and the compounds were separated and used for assay. Almost in all the cases the phenolic constituent were more effective against all the pathogen studied.

Lastly, a chapter on the ethnobotanical studies of these two plants is added. This encompasses the knowledge accumulated so far in the ancient texts and various herbal knowledge of the folklore medicine.