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Research Article

Survey and Screening of Leguminous Plants from Marathwada Region for their Medicinal Properties

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ABSTRACT:

A survey of leguminous plant form Marathwada carried out and 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 antibacterial activity in the preliminary study. This study shows the potential of leguminous plant as understudied and underutilized source of medicinal plants.

Keywords: Survey, Screening, leguminous plants, Marathwada region.

[I] INTRODUCTION

It is estimated that there are 250,000 to 500,000 species of plants on Earth. Relatively small percentages (1 to 10%) of these are used as foods by both humans and other animal species. It is possible that even more are used for medicinal purposes[1]. Marathwada possesses a very rich flora with a total of 1645 species belonging to 746 genera of 155 families[2]. 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 activities and phytochemistry. 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. Bacteria cause important human diseases, especially in tropical regions. Despite the existence of potent antibiotic and antifungal agents, resistant or multi-resistant strains are continuously appearing, imposing the need for a permanent search and development of new drugs. In an effort to discover new lead compounds screening of plant extracts to detect secondary metabolites with relevant biological activities was done. The aim of this study was to survey and screen leguminous members found in Marathwada region for medicinal plant extracts that could be useful for the development of new tools for the control of infectious diseases. Therefore, a systematic study was undertaken..

[II] MATERIALS AND METHODS

2.1. Collection of plants:

Seasonal surveys were made to collect plants from Marathwada region. Plant materials were collected from the region and were identified after critical

examination following standard flora [2]. Herbarium sheets were prepared and voucher specimens are deposited in the Department of Botany, Yeshwant Mahavidyalaya, Nanded.

2.2. Cultures:

The Cultures of the bacteria used *Escherichia coli and Staphylococcus aureus* were procured from Department of Microbiology, Yeshwant Mahavidyalaya, Nanded. The cultures were maintained on the medium suggested by the respective laboratory and sub-culturing was done fortnightly. The cultures were incubated in an incubator, while the cultures were stored in refrigerator.Nutrient agar media was used for screening and culture maintenance.

2.3 Preparation of Powder:

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 at 50ºC for 72 h. The dried material were then ground in to fine powder and stored in airtight containers at room temperature till extraction. Crude extracts were prepared from the same plants by extracting 2g dried material with 20ml distilled water, ethanol and ethyl acetate under for 30 min, respectively. Extracts were filtered and dried under vacuum. The samples were then air dried and redissolved to 10ml solution for antimicrobial testing [3].

2.4 Extraction of Plant Tissue*:*

The plant part powder was added to ethyl alcohol and was allowed to boil for further 4-5 minutes on a water-bath under hood. 10ml of ethanol was used for every gram of powder. The extract was cooled; the contents were filtered through several layers of muslin cloth. The ground powder was re-extracted by boiling in alcohol for 3min. to ensure the complete removal of contents. The extracts were pooled, centrifuged at 5000rpm and the volume was adjusted to represent 10 ml/gram of fresh weight of tissue (ml/gfw).

This extract was directly used for analysis qualitatively and quantitatively following methods suggested by Harborne [4] and Mahadevan and Sridhar [5].

2.5 Screening for Antibacterial Properties

Antimicrobial activities of the plant extracts of the extract (free from alcohol/ ethyl acetate and converted into aqueous) was evaluated by well-diffusion method expressed by zone of inhibition mm in diameter.

The bioassay was carried out by using 1ml of inoculum ($1X10^6$ colony forming units) prepared from an overnight Nutrient Broth culture for given test bacteria were used. 1ml of the resultant spore /cell suspension was poured in the Petri plate and the plates were poured with respective medium was used to seed each prepared plate. The medium were allowed to solidify. Using a sterilized cork borer wells of 5mm diameter were made in the solidified inoculated medium and the plate area uniformly. The wells were filled with 0.5ml of extract. Plates were then incubated aerobically at 37ºC for 24 h for bacteria and at 25ºC for 72 h for fungi.

Similarly, wells containing standard concentration of antibiotics (Streptomycin and Tetracycline) were used to compare the antibacterial property of the plant extract. Pure antibiotics (Streptomycin and Tetracycline) were purchased from Hi-media, Mumbai. One hundred mg of each antibiotic was dissolved separately in 1000 ml sterile distilled water, 0.5ml was used to fill the wells[3].

[III] RESULTS

Numerous medicines have been derived from the knowledge of tropical forest people and clearly there will be more in the future. This alone is a reason enough for any and all programmes to be concerned with the conservation, development, and protection of tropical forest regions. Human needs and problems are primary component of any conservation programme.

It is therefore necessary that systematic cultivation of medicinal plants be introduced in order to conserve biodiversity and protect threatened species. Systematic cultivation of these plants could only be initiated if there is a continuous demand for the raw materials.

3.1 Leguminosae Members From Marathawada

Marathwada region 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) accounts 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 phytochemistry. 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 [2]. 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.

	Family Fabaceae (Papilionaceae) (22 genera and 35 species)
1.	*Abrus precatorius* L. (Gunj)
2.	*Alysicarpur rogusus* (willd.)
3.	*Alysicarpur tetragonolobus* Edgew in J.
4.	*Alysicarpus pubescens* Lawin wt. Icon
5.	*Arachis hypogea* L. Bhuimug
6.	*Butea Monosperma* (Lamk) (Palas)
7.	*Cajanus cajan* (L.) (Tur)
8.	*Cicer arietinum* L. (Chana)
9.	*Clitoria ternatea* L. (Gokarna)
10.	*Crotolaria hirsuta* Willd
11.	*Crotolaria juncea* L. (Taag)
12.	*Crotolaria retusa* L. (Khulkhula)
13.	*Erythrena verigata* L. (Pangra)
14.	*Goniogyna hirta* (Willd)
15.	*Indigofera cordifolia* Heyne ex Roth.
16.	*Indigofera duthiei* Drum ex Naik (Barbada)
17.	*Indigofera linifolia* (L.f)
18.	*Indigofera tinctoria* L. (Neel)
19.	*Lablab purpureus* (L.) (Waal.)
20.	*Medicago sativa* L. (Lasunghas)
21.	*Melilotus indica* (L.) (Ranmethi)
22.	*Mucuna pruriens* (L.) Baker in Hook
23.	*Phaseolus vulgaris* L. (Shrawan ghewda)
24.	*Pisum sativum* L. (Matar)
25.	*Pongamia pinnata* (L.) (Karanj)

26.	*Psoralea corylifolia* L. (Bawchi)
27.	*Sesbania bispinosa* (Jacq.) (Ranshevri)
28.	*Sesbania grandiflora* (L.) (Hatga)
29.	*Sesbania sesban* (L.) (Shevri)
30.	*Tephrosia hamiltonii* Drumm in Gamble (Unhali)
31.	*Tephrosia pumila* (Lamk)
32.	*Tephrosia purpurea* (L.)
33.	*Vigna radiata* (L.) Moog
34.	*Vigna trilobata* (L.) Moogi
35.	*Vigna unguiculata* (L.) Chawli

	Family Caesalpinaceae (6 genera and 10 species)
36.	*Bahunia purpurea* L.
37.	*Bahunia racemosa* Lamk (Apta)
38.	*Caesalpinia pulcherima* (L.) (Shankasur)
39.	*Cassia fustula* L. (Amaltas)
40.	*Cassia obtusifolia* L. (Tarwad)
41.	*Cassia occidentalis* L.
42.	*Cassia tora* L. (Taroda)
43.	*Delonix regia* (Boj ex Hook) Gulmohur
44.	*Parkinsonia aculeata* L.
45.	*Tamarindus indica* L. (Imli)

	Family Minosaceae (4 genera and 8 species)
46.	*Acacia campbellii* Gamble
47.	*Acacia furnesiana* (L.) Willd (Devbabhul)
48.	*Acacia nilotica* (L.) Del (Babul)
49.	*Acacia sinuata* (Lour) (Shekakai)
50.	*Albizia lebbeck* (L.) Willd (Shirish)
51.	*Mimosa prainiana* Gamble
52.	*Mimosa pudica* L. (Lajwanti)
53.	*Pithecellobium dulce* (Roxb) (Vilaytichinch)

3.2 Antibacterial activity of plants from Leguminosae family

Following plant showed activity against the test bacterium. Some plant showed only antibacterial activity while some plant exhibited only antifungal activity; the plants exhibiting both the activity are listed here. Among these the two plants exhibiting the higher activity against fungi as well as bacteria were selected for further studies.

	Name of the plant	**Zone of inhibition(mm)**	
	Family Fabaceae (Papilionaceae) (22 genera and 35 species)	***E. coli***	***S.aureus***
1.	*Alysicarpur rogusus* (willd.)	**5**	**4**
2.	*Alysicarpur tetragonolobus* Edgew in J.	**4**	**4**
3.	*Alysicarpus pubescens* Lawin wt. Icon	**3**	**3**

4.	*Arachis hypogea* L. Bhuimug	**4**	**4**
5.	*Butea Monosperma* (Lamk) (Palas)	**4**	**3**
6.	*Cajanus cajan* (L.) (Tur)	**6**	**3**
7.	*Cicer arietinum* L. (Chana)	**3**	**4**
8.	*Clitoria ternatea* L. (Gokarna)	**4**	**3**
9.	*Crotolaria hirsuta* Willd	**2**	**4**
10.	*Crotolaria juncea* L. (Taag)	**2**	**2**
11.	*Crotolaria retusa* L. (Khulkhula)	**3**	**4**
12.	*Erythrena verigata* L. (Pangra)	**4**	**3**
13.	*Goniogyna hirta* (Willd)	**3**	**2**
14.	*Indigofera cordifolia* Heyne ex Roth.	**5**	**2**
15.	*Indigofera duthiei* Drum ex Naik (Barbada)	**4**	**3**
16.	*Indigofera linifolia* (L.f)	**2**	**2**
17.	*Indigofera tinctoria* L. (Neel)	**5**	**4**
18.	*Lablab purpureus* (L.) (Waal.)	**3**	**2**
19.	*Medicago sativa* L. (Lasunghas)	**4**	**3**
20.	*Melilotus indica* (L.) (Ranmethi)	**3**	**4**
21.	*Mucuna pruriens* (L.) Baker in Hook	**2**	**3**
22.	*Phaseolus vulgaris* L. (Shrawan ghewda)	**4**	**4**
23.	*Pisum sativum* L. (Matar)	**3**	**4**
24.	*Pongamia pinnata* (L.) (Karanj)	**6**	**5**
25.	*Psoralea corylifolia* L. (Bawchi)	**5**	**4**
26.	*Sesbania bispinosa* (Jacq.) (Ranshevri)	**4**	**4**
27.	*Sesbania grandiflora* (L.) (Hatga)	**3**	**3**
28.	*Sesbania sesban* (L.) (Shevri)	**4**	**4**
29.	*Tephrosia hamiltonii* Drumm in Gamble (Unhali)	**4**	**3**
30.	*Tephrosia pumila* (Lamk)	**6**	**3**
31.	*Tephrosia purpurea* (L.)	**3**	**4**
32.	*Vigna radiata* (L.) Moog	**4**	**3**
33.	*Vigna trilobata* (L.) Moogi	**2**	**4**
34.	*Vigna unguiculata* (L.) Chawli	**2**	**2**
	Family Caesalpinaceae (6 genera and 10 species)		
35.	*Bahunia purpurea* L.	**4**	**3**
36.	*Bahunia racemosa* Lamk (Apta)	**3**	**2**
37.	*Caesalpinia pulcherima* (L.) (Shankasur)	**5**	**2**
38.	*Cassia fustula* L. (Amaltas)	**4**	**3**
39.	*Cassia obtusifolia* L. (Tarwad)	**2**	**2**
40.	*Cassia occidentalis* L.	**5**	**4**
41.	*Cassia tora* L. (Taroda)	**3**	**2**
42.	*Delonix regia* (Boj ex Hook) Gulmohur	**4**	**3**
43.	*Parkinsonia aculeata* L.	**3**	**4**
44.	*Tamarindus indica* L. (Imli)	**2**	**3**
	Family Minosaceae (4 genera and 8 species)		
45.	*Acacia campbellii* Gamble	**3**	**4**
46.	*Acacia furnesiana* (L.) Willd (Devbabhul)	**6**	**5**
47.	*Acacia nilotica* (L.) Del (Babul)	**5**	**4**

48.	*Acacia sinuata* (Lour) (Shekakai)	**4**	**4**
49.	*Albizia lebbeck* (L.) Willd (Shirish)	**3**	**3**
50.	*Mimosa prainiana* Gamble	**4**	**4**
51.	*Mimosa pudica* L. (Lajwanti)	**4**	**3**
52.	*Pithecellobium dulce* (Roxb) (Vilaytichinch)	**6**	**3**

[IV] DISCUSSION

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.

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This focus on human needs requires assessing the importance of regional forests in traditional systems of medicine, and it also requires provisions that allow for any activities to have minimal negative impact on the accessibility to these medical resources. The documentation of medicinal uses of plants is becoming increasingly urgent because of the rapid loss of the natural habitat for some of these plants due to anthropogenic activities [8].

Many plants are used for their therapeutic values and this has a twofold effect on the world's flora. On one hand, the demand for herbs, particularly in parts of India, has brought some plants near extinction. Even the simplest plant may have a future importance that we cannot predict. Efforts to develop drugs from medicinal plants should address diseases and health problems seen in developing countries as well as diseases which primarily affect developed countries' population. Saving the world's plant resources calls for more protection and management, more research, and an increasing level of public awareness about our vanishing heritage.

Indigenous and local communities are concerned that the rate of knowledge erosion has never been so high, as it is in the current generation, and that such knowledge erosion poses an even more serious threat to the conservation of biological diversity than resource erosion. There is, therefore, an urgent need to formulate an array of incentive measures to ensure that members of the younger generations will want to learn, value, adapt and apply the traditional knowledge, innovations and practices of their elders[9].

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