Pharmacognostic Studies of Some Indigenous Medicinal Plants of Pakistan

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ABSTRACT

Medicinal plants constitute an effective source of traditional and modern medicines. The plant is a biosynthetic laboratory, not only for chemical compounds but also a multitude of the compounds. The present research work was confined to study the macro, microscopic features and analysis of powdered drug of Acacia modesta Wall., Acacia nilotica (L.) Delile, Berberis lycoium Royle and Zanthoxylum alatum D. C. Prod. These studies were carried out in Botany laboratory of University of Arid Agriculture, Rawalpindi during 2004. These species are used as miswak (tooth brush) by local people of Pakistan in different areas. Anatomical features such as, fibres, parenchyma cells, vessels and pith were identified during microscopic studies. Powdered miswak of Acacia modesta Wall., Berberis lycoium Royle and Zanthoxylum alatum D. C. Prod. were soluble in sulphuric acid only while insoluble in other solvents i.e., hydrochloric acid, acetic acid, benzene and water. Powdered miswak of Acacia nilotica was insoluble in these solvents. Powdered drug of these species did not retain their original colour in cold and hot tests and on dry filter paper, when mixed in various solvents.

Key words: Pharmacognosy, Indigenous medicinal plants, Pakistan.

INTRODUCTION

Since the beginning of human civilization, people have used plants as medicine. Perhaps as early as Neanderthal man, plants were believed to have healing power. The earliest uses are found in Babylonia circa 1770 BC in the code of Hammurabi and in ancient Egypt circa 1550 BC. In fact, ancient Egyptians believed medicinal plants to have utility even in the after life of their pharaohs. Plants have been recorded from the Giza pyramids and can be found on display in a dark corner of Cairo Museum (Anna, 1993).

Pakistan is one of the few places on earth with such a unique biodiversity, comprising of different climatic zones with a wide range of plant species. Approximately 6000 plant species with medicinal properties are found in Pakistan. There is a dire need on the part of manufacturers of allopathic and herbal medicines to carryout systematic research on medicinal plants to save foreign exchange spent on their imports (Shanwari, 1989).

Traditional Unani medicine is a part of our culture and Pakistan is one of those countries where traditional Unani medicine is popularly practiced among the large segment of its population. It originated in Greece, founded by old ancient Greek philosophers and was used and documented by Muslims during the glorious period of Islamic civilization. It was brought to the Indo-Pak subcontinent by muslim scholars and practiced here for centuries. It also benefited from the ayurvedic system of medicine, which was an important component of hindu civilization. Traditional Unani medicine heavily depends on medicinal plants, apart from using animals and minerals. Pakistan has a varied climate and is quite rich in medicinal herbs, though scattered over a large area. All the plants are growing wild and no systematic attempt has been made to carryout their pharmacognostic investigation of medicinal plants (Ahmad et al., 2003).

In Pakistan medicinal plants are primarily used by tibb dawakhanas (medical centers of indigenous physicians known as hakims). Unfortunately, very little attention has been paid to the pharmacognostic and ethnobotanical aspect of plants, as hakims are only concerned with the floral and vegetative parts of medicinal plants without any regard to their botanical characteristics, or distribution in the various ecological zones of Pakistan. Herbs are not only used in the ayurvedic system of treatment but in the preparation of many allopathic and homeopathic drugs, no wonder these herbs are now being commercially exploited for the extraction of various ingredients (Hlaq, 1983).

Many of the plants which are used for various ailments have either not been properly investigated or the findings have not been correlated with phytochemical and pharmacological studies. Medicinal plants are those plants which are used directly or indirectly in the extraction of the drug for the treatment of ailments. Medicinal plant botanists are trying to explore the precious assets of medicinal plants for the suffering humanity. In the world 30% of the pharmaceutical preparations are manufactured from plants (Khan, 1979).

The present work is also in continuation of the exploration of medicinal wealth of Pakistan with special reference to Acacia modesta Wall., Acacias nilotica, Berberis lycoium Royle, Zanthoxylum alatum D. C. Prod.

Keeping in view the medicinal importance of these selected species, the objectives of the present study are:

- To study the anatomy, powdered drug analysis and chemical tests of selected species.
- To investigate the indigenous medicinal plants for pharmacognosy and pharmacology which might be useful for further investigation by botanists, pharmacologists, microbotanists, phytochemists or some other academic disciplines.
- Studies of indigenous medicinal plants to disseminate the dynamics of local knowledge and challenge modern health care development.

MATERIALS AND METHODS

**MATERIAL COLLECTION**

The plant material was collected from the natural habitat of various localities. Branches of Acacia modesta Wall. and Acacia nilotica were collected from hills of district Attock. Branches of Berberis lycoium Royle and Zanthoxylum alatum D. C. Prod. were collected from Murree hills. The branches were cleaned, washed and dried under shade for 20 days and in the oven for 24 hours at 100 °C. Then branches were cut into small pieces.

**POWDERED DRUG**

The dried small pieces of branches were powdered by means of pestle and mortar and electric grinder. The macroscopic study was made. The physical characters of powdered drug that are colour, smell and taste were studied. The powdered drug was numbered and preserved in the bottles to avoid contamination.

**HISTOLOGY**

The microscopic features of the powdered drug were studied in 1% chloral hydrate, glycerine and Iodine solution. For permanent mounting the safranin, hematoxylin and xylene were used. The various tissues were identified and microphotography were done with the help of Olympus microscope.
ACCA MODERA WALL.

MACROSCOPIC AND ANATOMICAL FEATURES

Acacia modesta Wall. is a shrub of the family Fabaceae. It is commonly known as phulai or phulai and is widely distributed in India, Pakistan, and other parts of the subcontinent. The flowers are white or yellow in color and are followed by pods that are used in medicine. The leaves are pinnate and the flowers are in clusters.

Chemical Analysis

The powdered miswak of Acacia modesta Wall. was found to be soluble in sulphuric acid. It was also found to be soluble in water and alcohol. The powdered material was tested for its solubility in various solvents using cold and hot tests and on dry filter paper. The results are shown in Table 1 and Table 2.

Table 1: Solubility of powdered drug of selected medicinal plants in various solvents by cold and hot tests

<table>
<thead>
<tr>
<th>Plant</th>
<th>Solvent</th>
<th>Cold Test</th>
<th>Hot Test</th>
<th>Cold Test</th>
<th>Hot Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia modesta</td>
<td>Water</td>
<td>Yellow</td>
<td>Red</td>
<td>Yellow</td>
<td>Red</td>
</tr>
<tr>
<td></td>
<td>Alcohol</td>
<td>Light</td>
<td>Insol.</td>
<td>Light</td>
<td>Insol.</td>
</tr>
<tr>
<td></td>
<td>Sulphuric</td>
<td>Yellow</td>
<td>Insol.</td>
<td>Yellow</td>
<td>Insol.</td>
</tr>
</tbody>
</table>

Table 2: Colour analysis of powdered drug of selected medicinal plants by filter paper

<table>
<thead>
<tr>
<th>Plant</th>
<th>Colour</th>
<th>Filter Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia modesta</td>
<td>Light maroon</td>
<td>Brown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maroon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maroon</td>
</tr>
</tbody>
</table>

2. ACACIA NITOLICA Linn.

MACROSCOPIC AND ANATOMICAL FEATURES

Acacia nitolica Linn. is a perennial shrub or small tree belonging to the family Fabaceae. It is found in India, Pakistan, and other parts of the subcontinent. The flowers are yellow or white in color and are followed by pods. The leaves are pinnate and the flowers are in clusters.

Chemical Analysis

The powdered miswak of Acacia nitolica was found to be partially soluble in sulphuric acid. It was also found to be soluble in water and alcohol. The powdered material was tested for its solubility in various solvents using cold and hot tests and on dry filter paper. The results are shown in Table 1 and Table 2.

3. BERBERIS LYCIUM ROYLE ROYAL.

MACROSCOPIC AND ANATOMICAL FEATURES

Berberis lychnium Royle is a shrub of the family Berberidaceae. It is found in the northern areas of Pakistan and also in Iran. It is a medium sized shrub. Locally it’s fruit is edible, powdered roots are used in throat inflammations. Medicinally it’s extract is used in ophthalmia. The leaf is used in chronic diarrhoea and piles (Zaman, 1970). The juice is applied over the eye as useful household remedy in acute conjunctivitis and chronic ophthalmia. Washing unhealthy ulcers with Berberis juice is considered useful (Khan et al., 1999).

Chemical Analysis

The powdered miswak of Berberis lychnium was found to be soluble only in sulphuric acid. It was also found to be soluble in water and alcohol. The powdered material was tested for its solubility in various solvents using cold and hot tests and on dry filter paper. The results are shown in Table 1 and Table 2.

4. ZANTHOXYLUM ALATUM D. C. PROD. RESPB.

MACROSCOPIC AND ANATOMICAL FEATURES

Zanthoxylum alatum D. C. Prob is a shrub of the family Rutaceae. It is a medium sized tree. Locally it’s fruit is edible, powdered roots are used in throat inflammations. Medicinally it’s extract is used in ophthalmia. The leaf is used in chronic diarrhoea and piles (Zaman, 1970). The juice is applied over the eye as useful household remedy in acute conjunctivitis and chronic ophthalmia. Washing unhealthy ulcers with Zanthoxylum juice is considered useful (Khan et al., 1999).

Chemical Analysis

The powdered miswak of Zanthoxylum alatum was found to be soluble only in sulphuric acid. It was also found to be soluble in water and alcohol. The powdered material was tested for its solubility in various solvents using cold and hot tests and on dry filter paper. The results are shown in Table 1 and Table 2.

The simple method to determine the solubility of powdered drug was adopted. 5 gram powdered drug was mixed in 20 ml sulphuric acid, hydrochloric acid, acetic acid, benzene and water. Each test tube was shaken and boiled. Method followed is that of Evers and Smith (1955). The retention of original colour of powdered materials were noted in various solvents in cold and hot conditions. Filter paper was also used to find out change in colour.

RESULTS AND DISCUSSION

1. Acacia modesta Wall.

MACROSCOPIC AND ANATOMICAL FEATURES

Acacia modesta Wall. is a shrub of the family Fabaceae. It is found in the hilly tracts of Murre, Galliyat etc. The fruit is used in medicine. The leaf is used in chronic diarrhoea and piles (Zaman, 1970). The juice is applied over the eye as useful household remedy in acute conjunctivitis and chronic ophthalmia. Washing unhealthy ulcers with Berberis juice is considered useful (Khan et al., 1999).
The wood showed vessels, fibres, pith with few cells. The two official barks are curved or quilled fragments, about 1 Mm. thick; outer surface brownish-gray, inner surface whitish in colour.

Chemical Analysis

The powdered miswak of Zanthoxylum alatum D. C. Prod was soluble in sulphuric acid only. It did not retain its original dark grey colour in various solvents by cold and hot tests and on the dry filter paper (Table 1.2).

CONCLUSION

It is concluded that medicinal plants have contributed hugely to the traditional and western medicines through providing ingredients for drugs or having played central roles in the drug discovery. Pakistan has a variety of climate and soil conditions and is quite rich in medicinal plants, but no systematic attempt has been made to work on these natural resources properly. Many of the plants which are used for various ailments have either not been properly investigated or the findings have not been correlated with phytochemical and pharmacological studies.

It is suggested that a nation wide survey of medicinal plants should be carried out to update the inventory of existing natural drug plant resources of the country. In view of the plentiful occurrence of a number of unexploited drug plants in Pakistan, it is suggested that Industrial Development Corporation of Pakistan may be persuaded to prepare a feasibility report for the establishment of small scale processing units for the preparation of valued products.

REFERENCES


