

## 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 lycium* 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 lycium* 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 Babylonian 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 Gaza 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 spend on their imports (Shinwari, 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/documentated 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 tibia dawakhanas (medical centers of indigenous physicians known as hakims). Unfortunately, very little attention has been paid to the pharmacognostic and ethno botanical 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 (Haq, 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., *Acacia nilotica*, *Berberis lycium* 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, microbiologists, 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**

### **ØMATERIAL 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 lycium* 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.



Sulphuric Acid	Dark brown	Sol.	Brownish black	Sol.	Reddish Brown	Insol.	Dark Brown	Insol.	Dark sol.	Brownish black	Sol.	Dark sol.	Dark Brown	sol.
Hydrochl-oric Acid	Greenish	Insol.	Conker	Insol.	Marool	Insol.	Conker	Insol.	Brownish Black	Insol.	Conker	Insol.	Greenish	Insol.
Acetic Acid	Yellow	Insol.	Dark Yellow	Insol.	Light Red	Insol.	Light Red	Insol.	Light Red	Insol.	Copper	Insol.	Light Red	Insol.
Benzene	Yellow	Insol.	Dark Mustard	Insol.	Light Mustard	Insol.	Light Insol. Brown	Insol.	Light Mustard	Insol.	Mustard	Insol.	Mustard	Insol.
Water	Light Yellow	Insol.	Light Yellow	Insol.	Butter Scotch	Insol.	Golden Brown	Insol.	Light Yellow	Insol.	Dark Brown	Insol.	Golden Brown	Insol.

**Table 2.**  
Colour analysis of powdered drug of selected medicinal

plants

in various solvents with known volume by filter paper.

*Acacia modesta*

*Acacia nilotica*

*Berberis lycium*

*Zanthoxylum alatum*

Solvents	volume	Actual colour of powdered drug	Colour in solvents	Colour on filter paper	volume	Actual colour of powdered drug	Colour in solvents	Colour on filter paper	volume	Actual colour of powdered drug	Colour in solvents	Colour on filter paper	volume	Actual colour of powdered drug	Colour in solvents	Colour on filter paper
Sulph-uric Acid	4ml	Dark Brown	Dark Brown	conker	4ml	Light maroon	Reddish Brown	Light brown	4ml	Light brown	Dark brown	Dark copper	4ml	Dark grey	Dark brown	Dark copper
Hydro-chloric Acid	4ml	Dark Brown	Greenish	No. colour	4ml	Light maroon	Maroon	Light copper	4ml	Light brown	Brownish black	No. colour	4ml	Dark grey	Greenish Brown	No. Colour
Acetic Acid	4ml	Dark Brown	Yellow	No. colour	4ml	Light maroon	Light Red	No. Colour	4ml	Light brown	Light red	Off White	4ml	Dark grey	Light Red	Off White
Benzene	4ml	Dark Brown	Yellow	No. colour	4ml	Light maroon	Light mustard	No. colour	4ml	Light brown	Light mustard	No. Colour	4ml	Dark grey	Mustard	No. Colour
Water	4ml	Dark Brown	Light Yellow	No. colour	4ml	Light maroon	Butter scotch	No. colour	4ml	Light brown	Light Yellow	No. Colour	4ml	Dark grey	Golden brown	No. colour

## 2. *Acacia nilotica* Linn.

### Macroscopic and Anatomical Features

*Acacia nilotica* Linn. locally known as kikar belongs to family Mimosaceae. It is a moderately size erect tree. Bark is dark brown, rough and often longitudinally fissured. Flowers in globose heads, golden yellow and scented. Leaves bipinnate, 4-9 pairs and leaflets 20-40 pairs. Its tender branches are used as fodder for goats and sheep. Bark medicinally used in toothache. Seeds useful in treating stomach complaints and skin disorders. Leaves are good for treatment of diarrhoea. Its miswak is approximately 22 cm long with 1.66 cm in diameter. It is curved and tough with sweet but slightly bitter taste.

*Acacia nilotica* wood showed solitary vessels with few multiple of 2-3 cells and with rare occurrence of some unknown irregular clusters and abundant paratracheal parenchyma. Fibres are rounded while rays are two celled wide exclusively uniseriate and few biseriate rays. Pith consisted of rounded cells without intercellular spaces.

### Chemical Analysis

The powdered miswak of *Acacia nilotica* was partially soluble in sulphuric acid only. It did not retain its original light maroon colour in various solvents by cold and hot tests and on dry filter paper (Table 1,2 ).

## 3. *Berberis lycium* Royle Royle.

### Macroscopic and Anatomical Features

*Berberis lycium* Royle locally known as simlu belongs to family Berberidaceae. It is found in the northern areas of Pakistan and also in Murree hills. It is a medium sized tree. Locally its fruit is edible, powdered roots are used in throat inflammations. Medicinally its extract is used in ophthalmia. The roots are febrifuge. They are used in chronic diarrhoea and piles (Zaman, 1970). The juice is applied over the eyelid as useful household remedy in

acute conjunctivitis and chronic ophthalmia. Washing unhealthy ulcers with *Rasuant* is considered useful (Khan *et al.*, 1979). The anatomy of the roots and rhizomes plays an important role in pharmacognostic studies. The cork was 5-10 celled thick, cortex several layered 2-3 layered, cambium, xylem with spiral, pitted and reticulate tracheae.

### **Chemical Analysis**

The powdered miswak of *Berberis lycium* Royle was soluble only in sulphuric acid. It did not retain its original light brown colour in various solvents by cold and hot tests and on dry filter paper (Table 1,2).

## **4. *Zanthoxylum alatum* D. C. Prod Roxb.**

### **Macroscopic and Anatomical Features**

*Zanthoxylum alatum* D. C. Prod locally known as Timur belongs to family Rutaceae. It is a aromatic, prickly dioecious or rarely monoecious evergreen tree, or shrub with dense foliage mainly pantropical, though also distributed in the subtropics. It grows widely in the hilly tracts of Murre, Galliyat etc. The plant,s bark, fruits and seeds are extensively used in indigenous system of medicine as carminative, stomachic and anthelmintic. The bark is pungent and is used to clean the teeth. The fruit and seeds are employed as aromatic tonic in fever and dyspepsia. The extract of the fruit is reported to be effective for expelling round worms. The fragrant twigs are chewed for cleaning teeth.

It ranges from a shrub to a small-sized tree, yet sometimes attaining a height of 45 feet. The bark is beset with verrucose prickles. The leaves are odd-pinnate; the leaflets from 5 to17 in number, ovate-lanceolate, unequilateral, the terminal one only being equilateral, shining and smooth on the upper surface. The flowers are plentiful, of a greenish hue, appear before the leaves, and have but 3 pistils.

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.

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