INTRODUCTION

The use of medicinal plants can be traced back over five millenia during early civilization in China, India and Near East. From the era of Charak, Sushruta and Banbhatta of India to the modern decades, plants have been used as the major sources of drug for mankind. The use of such herbal products exhibits therapeutic value without any toxic effects.

Among the different plant families showing therapeutic importance, the family Leguminosae can be named as one, for having rich sources of varied pharmacological potentialities from its different members. Lectins isolated from leguminous plants have been immensely utilized for the cure of many diseases. Lectin collected from Phaseolus vulgaris are used as insect resistant (Gatehouse et al., 1989). Lectin from Bauhinia acuminata and Cassia tomentosa are recognised for tissue specific activity (Haseena Beevi et al., 1989). Anti-insect properties of lectin from Bauhinia purpurea was reported by Czapla et al., 1990. Legume lectin also showed defence mechanism (Arason et al., 1996). Positive erythrocyte agglutination activity was reported by Chung et al., 1996. Furthermore, antibacterial, antifungal, antiprotozoal, antiviral, antirespiratory trouble, antialimentary canal trouble, anti nervous system trouble and antidiuretic activities of leguminous plants were also reported from Acacia dealbata, Acacia hohenackeri and Caesalpinia sepiaria by Bhakuni.
et al., 1988. Some members of the subfamily Caesalpinoïdæ, under the family leguminosae, are used as tonic and astringent; they also show mucilaginous properties, pectoral and laxative or, cathartic action; some have anthelmintic, antiseptic, antipyretic and styptic properties (Kirtikar & Basu, 1975).

Bauhinia (a member of sub family Caesalpinoïdæ or, family Caesalpiniaceae according to Hutchinson), a genus of 250 species of trees, shrubs and climbers, is distributed throughout the tropical region with nearly 40 species occurring in India (Hooker, 1879) and has gained a position for medicinal and other economic values.

The bark of Bauhinia vahl ii is used as ropes, stem as soft cream, coloured leather, leaves for thatching. The seeds possess tonic properties (Kirtikar & Basu, 1975) and the plant is also used as fodder (Pal et al., 1979).

The leaves of Bauhinia variegata are used as fodder (Manjunath, 1948); its bark acts as an astringent in diarrhoea, its decoction is recommended as an useful wash in ulcers, the bark, root and the flowers are used as maturants of boils and abscesses (Kirtikar & Basu, 1975); Antiprotozoal and antiviral activities of this plant were also reported by Aswal et al., 1984. The bark and buds of the plants are given to control bleeding in haematuria and as astringent in diarrhoea (Oliver-Bever, 1986) and its root was prescribed by Charak and Sushruta, in combination with other drugs, for treatment of snake bite.
The bark of *Bauhinia purpurea* also acts as an astringent in diarrhoea; its decoction is recommended as a useful wash in ulcers; the bark, root and flowers are used as maturants of boils and abscesses (Kirtikar & Basu, 1975). The plant was also reported as an useful plant for differential diagnosis of papillary and folicular carcinoma (Sarkar et al., 1994).

*Bauhinia scandens* is used in skin lesions (Kirtikar & Basu, 1975).

Antimitotic activity of *Bauhinia rufescens* was assessed in unicellular green alga *Micrasterias denticulata* by Maillard et al., 1990.

*Bauhinia forficata* reduced glucose level of blood (Donato & Maria, 1995).

Hence, the genus *Bauhinia* demands an economically important status and the present study was taken up to add some more information about its bioactive potentialities. The investigator collected five species distributed in the plains and in the hilly regions of India and assayed their antifungal, antibacterial, insect repellent, antitumour and piscicidal activities. The author surely keeps in mind to survey the rest species which are in progress in his laboratory.
General description of the five species incorporated in the present study

1. *Bauhinia acuminata* Linn.

An erect shrub with obscurely downy angular branches. Leaves slightly cordate, flexible, 3-6 inches long, 9-11 nerved, the lobes are acute or, subobtuse not reaching half way down; raceme axillary, short peduncled with linear subulate bract and bracteoles; calyx narrowed into long point; petal oblong, whitish; style $\frac{1}{2}$ inches; pod 4-5 inches long, broad, firm, glabrous.

*Bauhinia acuminata* is distributed in North West Provinces of India to Ceylon and Malacca, China and Malay isles.

2. *Bauhinia purpurea* Linn.

A middle sized erect tree with moderately stout glabrescent branchlets. Leaves rigidly subcoriaceous, glabrous, shallowly cordate, the lobe obtuse and subacute; corymbs, bracts minute, deltoid; calyx tube $\frac{1}{4}-\frac{1}{2}$ inches; petals oblanceolate, reddish; fertile stamen 3-4; ovary downy with long stalk and style with moderately large oblique stigma; pod $\frac{1}{2}$-1 feet by $\frac{3}{4}$-1 inches, firm, flat, glabrous.

*Bauhinia purpurea* is distributed in foot of Western Himalayas (altitude 4000 feet); also in Assam, Khasi hills, Chittagang, China etc.
Photo 1: Habitat of plant specimens

Photo 1.1: Bauhinia acuminata

Photo 1.2: Bauhinia purpurea
3. *Bauhinia scandens* Linn (*Bauhinia anguina* Roxb.)

A climber glabrous shrub, with copious circinate tendrils. Leaves thin deeply cordate, 5-7 nerved, deep deltoid sinus and the point acuminate; Raceme, Cylindrical, 2-6 inches long, arranged in ample axillary and terminal panicles, bracts minute; calyx \(\frac{1}{2}\) inches long, broadly campanulate; petals white, oblanceolate; pod thin, flat oblong and glabrous.

*Bauhinia scandens* is distributed from Eastern Bengal and Sikkim to Burma and Eastern and Western peninsula and Malay island.

4. *Bauhinia vahlii* W & A

A gigantic climber with densely pubescent branchlets and abundant circinate tendrils. Leaves rigidly subcoriaceous, rather broader than long (\(\frac{1}{4} - 1\frac{1}{2}\) feet), deeply cordate, 11-13 nerved; Raceme, long peduncled, terminal, dense with linear bracteoles; calyx tube slender, splitting into two lobes; petals long obovate with short claw; ovary with short stalk, long style and minute stigma; pod sublingnose.

*Bauhinia vahlii* is distributed in the foot of Central and Eastern Himalayas ascending to 2500 feet in Kumaon, Bihar etc.
Photo 2: Habitat of plant specimens

Photo 2.1: Bauhinia scandens

Photo 2.2: Bauhinia vahlii
5. *Bauhinia variegata* Linn.

A medium sized tree; leaves rather broader than deep, middle sized, rigidly subcoriaceous, deeply cordate; corymb, few flowered, lateral sessile, bract minute, deltoid; calyx tube ¾-1 inches, limb cordate-ovate; petal 1½-2 inches, white, beautifully variegated with red and yellow; stamens 3-5 inches; ovary with long stalk and style with a minute stigma.

*Bauhinia variegata* is distributed in the foot of Western Himalayas and Sikkim (altitude 4000 feet), in dry forest over Eastern, Central and South India, Burma and China.
Photo 3: Habitat of plant specimens

Photo 3.1: Bauhinia variegata
A comparative account of the different types of bioactive potentialities exhibited by the crude extracts of different Bauhinia species.

<table>
<thead>
<tr>
<th>Plat extract</th>
<th>Anti bact.</th>
<th>Antifung.</th>
<th>Brine shrimp</th>
<th>Insect rep.</th>
<th>Piscidical</th>
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<tbody>
<tr>
<td>E. coli</td>
<td>S.A.</td>
<td>R. oryzae</td>
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<td>4. B. vahlii</td>
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<td>5. B. variegata</td>
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'+' indicates biological activity
E. coli = Escherichia coli,
S. A. = Staphylococcus aureus
R. oryzae = Rhizoctonia oryzae

The crude extracts of the different species were assayed for antifungal, antibacterial, antitumour, insecticidal and piscidical activities and the comparative activities were studied (vide Table No.1). It was revealed that antifungal and antibacterial activities were shown by Bauhinia scandens, Bauhinia variegata, Bauhinia vahlii and Bauhinia purpurea. Antibacterial and insect repellent activities were found in Bauhinia acuminata. All of them showed piscidical activities. But among the above species, only Bauhinia scandens showed the positive Brine shrimp toxicity test (Meyer et al., 1982). This test is used as a preliminary screening for antitumour activity by Ratnayake et al., 1992. Finally, the comparative assessment showed that Bauhinia scandens was the most active, among the five screened species (vide Table No.1).
Such findings automatically led the present author to choose *Bauhinia scandens* as the experimental plant. The antitumour activities of this particular species were studied in details against Dalton's Lymphoma and Sarcoma-180 cells in *Mus musculus* and the antitumour active part was isolated and identified as 1-0-alkyl glycerol by GLC.

Similar types of compounds such as, ether linked phospholipid (viz. 1-0-alkyl and 1-0-alkyl enyl phospholipid) have been reported to have antitumour activities by Berdel et al., 1986. Other ether-lipid compounds with antitumour activity have also been reported by Snyder & Wood, 1968; Okamato et al., 1987; Andreesen, 1988; Bishop et al., 1992 and Daniel, 1993. The antitumour activity of 1-0-(2-methoxy hexadecyl) glycerols, isolated from Shark liver oil was reported by Hallgren & Stallberg, 1967 and Boeryd et al., 1974. 1-0-(2 methoxy alkyl) glycerol and 1-0-phytanyl glycerol, isolated from marine animals were also reported as antitumour agent by Hallgren et al., 1974.