The Himalaya ranges run in an unbroken line for nearly 3000 km from west to east and occupy more than 100km latitude from north to south i.e. $27^\circ$N to $38^\circ$N and have a terrain where the altitudes rise in a very short distance from the highest summits of the world. The great biosphere of Himalaya embraces economically and medicinally important species of the plants. Many life saving drugs have been derived from the plants either endemic or native to Himalayas. Bioresources derived from plants form an integral part in the economic status development of the people of certain regions of the world.

Uttarakhand is one of the frontier states of the country. In the north of this state is Himachal Pradesh and China, in the east of Nepal, in the south of Uttar Pradesh and in the west are Haryana and Himachal Pradesh. The state of Uttarakhand is situated in the valley of Himalayas. It is situated in the middle Himalayas at $29^\circ$5´ north latitudes to $31^\circ$25´north latitudes and $77^\circ$45´ east longitudes to $81^\circ$ north longitudes. The size of this state is rectangular. Natural resources and medicinal herbs that form a form an integral parts of Himalayas, whose testimony is still available in Vedas. Himalayas a great segment of world in floristic point of view has been divided into three important regions on the basis of geomorphologic and botanical point of view. These regions are: Eastern Himalayan, Western Himalayan and Central Himalayan. The Central Himalayas comprises of Kumaun and Garhwal regions of Uttarakhand State. Central Himalayan region, a great botanical zone of Indian Himalayan region (IHR), is well known for its fascinating Flora, enormous glaciers, bypasses, medicinally important flowering plants bearing alpine pastures, and originating places of important holy rivers such as Ganga, Saryu and Yamuna.

Traditional herbal medicines used by various ethnic groups and tribal inhabitants of various parts of world for curing a number of ailments have provided a great opportunities in the identification of potential values of medicinal plants as well as in the isolation and characterisation of new biologically active natural products. Literature survey revealed that there exist sufficient information’s about the traditional knowledge on tribal plants medicines (AICRPE report, 1982; Baker, 1985; Liu-Bao-Yan, 1996). For example, of the 119 drugs using 90 plants species owed their lead to the traditional use of the plants (Baker,
1985). After citing a wide literature on the chemical investigation of herbs of traditional tribal folk medicinal use, it has been established that a number of modern life saving drugs are the prominent constituents of these herbs. A number of life saving drugs such as reserpine, pilocarpine, ephedrine, theophylline, vincamine, atropine, aconite and colchicines have been derived from traditional folk medicinal herbs (Ved Prakash, 2001).

Kumaun Himalaya, a part of Central Himalaya of Indian Himalayan Region (IHR) is a major habitat of glacial and non-glacial originating herbs (Valdiya and Bhatia, 1980; Singh and Singh, 1987). This region has widely been explored for various traditional medicinal herbs used by Himalayan natives for curing various ailments like fever, bronchitis, asthma, constipation, mental ailments, bleeding, diarrhoea, jaundice, diabetes, cuts, wounds, ulcers and digestive disorders (Chopra et al., 1956; Chopra et al., 1958; Anonymous, 1948-76; Sah and Joshi, 1991; Jain, 1991).

Uttarakhand has been divided into three natural divisions:-

1. Greater Himalayas
2. Middle Himalayas
3. Hills of Shivalik and Doon

1. Greater Himalayas:

This natural sub-division is known as Himadri. The hilly part is extended 50 km in width whose most of the mountain ranges are 4,800 to 6,000 meter in height. Many glaciers are found in this part. As a result, the sources of Bhagirathi, Alaknanda and Yamuna etc are situated here. The famous mountain ranges of this region are Nanda Devi (7,817 m), Kamet (7,756), Bander punch (6,315m), Mora (7,273m) Nanda Devi eastern (7,434m), Chaukhambha (7,138m), Trishul (7,120m), Doonagiri (7,066m), Panchachuli (6,904m), Nandakot (6,861m), Badrinath (7,138m) etc. Beside these Kedarnath, Gangotri and Yamunotri etc are glaciers whose heights are more than 6,000m. River the Ganga and the Yamuna get water whole year from the glaciers present on the ranges of Greater Himalayas.

2. Middle Himalayas:

The district of Almora, Uttarkashi, Garhwal, Tehri, Nainital etc. come in this area. The mountain rangers in this area are generally 3000 to 4000m high which are parallel to the
chief ranges extended from east to west. The trees of chir, fir, deodar etc. are mostly found in this area, which are very useful according to economical point of view.

3. **Hills of Shivalik and Doon:**

This part of Himalaya is also known as ‘*root of a mountain ranges*’. South Almora, middle of Nainital and Dehradun districts come under Shivalik area which are situated at the height of 750m to 1500m. There are less high hills in the south of Shivalik hills and many flat valleys are situated in the middle of small Himalaya. These valleys are called ‘Doon’. Natural florae are found in abundance in this region because trees of Shisham, Alma, Saal, Chir, Deodar, Bamboo, Oak, Birch etc are found in abundance which is very important in economical point of view.

The Kumaun region of Uttarakhand includes Nainital, Almora and Pithoragarh districts. In which Nainital is one of the most important hill station of Kumaun region. It is situated at 29° 24′ north latitudes and 69° 28′ east longitudes in a valley of Gagar region. The foothill of Nainital is Ranibagh and its highest peak is Naina peak. The altitudinal range between Ranibagh and Naina peak is 600m-2400m. The Nainital is located 2100-2300m altitude.

The Kumaun region has nearly forty smaller and larger glaciers and many high altitude lakes. Pindari, Sunderdhunga, Millam are some of the important glaciers. Pindari, Gori, Kali, Dhauli and Ramganga are few rivers of glacial origin of this region. The region harbours the most beautiful and fascinating flora, which are quite different from the flora of other hills and plants of India.

On the basis of altitude and vegetation, it can be divided into four (broad eco-climatological) zones-

1. **Sub tropical zone** *(Tarai and Bhabar region)*:- This zone ranges between 300-1200m in height. The forest species of common occurrence are *Adina cordifolia*, *Calotropis procera*, *Aegle marmelos*, *Acacia catechu*, *Cassia fistula*, *Dalbergia sissoo*, *Mallotus philippinensis*, *Bassia latifolia*, *Terminalia tomentora*, *Semicarpus anacardium* and *Lantana camara*. The rainfall in this region varies from 70-200cm between June- July.

2. **Temperate zone** *(Sub-mountain region)*:- The zone covers an altitude approx. 1200-2000m with an average annual temperature of 19°C. This is the zone of maximum
precipitation both in summers and winters. Nainital is located in a temperate environment, although altitudinally it comes within tropical belt. Except a portion of Nainital district, the major area of Kumaun region is a vast stretch of mountains, terrains of varying altitudes. The altitude, temperature, rainfall and soil have perhaps attributed to the abundance and colourful plant life including medicinal and useful plants. The main plants of this region are *Pinus roxburghii*, *Ouginia dalbergioides*, *Bauhinia variegate*, *Lannea arandis*, *Sapium insigne*, *Engelhardtia colebrokians*, *Glochidion velatinum*, *Indigofera pulchella*, *Rhus parviflora* and *Carissa apaca* etc.

3. **Mountain region**: - This region ranges up at altitude of 1000–3300m. The dominant plants of this region are *Quercus leucotricophora*, *Quercus floribunda*, *Quercus semicarpifolia*, *Rhododendron arboretum*, *Asculus indica*, *Corylus jacquemonti*, *Viburnum spp.*, *Berberis asiatica*, *Arundonella jaunsarensis*, *Betula alnoides*, *Betula utilis*, *Juglans regia* and *Celtis australis* etc.

The general vegetation of Kumaun region is given below –

a. **Tree layer**: The sequence of trees in this region is as follows; *Cupressus torulosa*, *Quercus leucotricophora*, *Quercus dilatata*, *Cedrus deodara*, *Asculus indica*, *Ilex dipryrena*, *Abies pindrow*, *Pinus wallichiana*, *Picae smithiana*, *Cryptomeria japonica*, *Lyonia ovalifolia*, *Pinus roxburghii*, *Taxus buccata*, *Fraxinus micrantha* and *Cunninghamia lanceolata*.

b. **Shrub layer**: The shrubs are *Arundunaria falcata*, *Myrsine Africana*, *Berberis asiatica*, *Daphne cannabina*, *Rubus ellipticus*, *Smilax aspera*, *Rosa moschata*, *Gerardiana angustifolia*, *Sarcocca pruniformis*, *Viburnum continifolium*, *Hypericum oblongifolium* and *Myrcine semi serrata*.

c. **Herb layer**: The following plants are the main constituents of the herb layer: *Carex nubigena*, *Carex muricata*, *Ainslea aptera*, *Viola canescens*, *Goldfusia dalhosiana*, *Stellaria monosperma*, *Bupleurum lanceolatum*, *Valeriana jatamansi*, *Scutelaria angulosa*, *Justicia simplex*, *Oxalis cospiculata*, *Rubia cordifolia*, *Anaphalis contorta*, *Anemone rivularis*, *Swertia spp.*, *Eupatorium spp.* and *Dipterocarpus spp*.

d. **Maple tree**: In Kumaun different species of *Acer* are found as maple trees i.e, *A. oblongum*, *A. villosum*, *A. laenigatum*, *A. acuminatum* and *A. pictum*. 


e. **Fodder trees of Kumaun**: The important fodder trees of Kumaun are: *Anogeissus latifolia, Bauhinia variegata, Bauhinia vahlii, Celtis Australia, Ficus memoralis, Ficus nerifolia, Gravia elastaica and Diplonkema butyracea*.

f. **Nector producing plants**: The nectar producing plants are widely distributed in India from north to south and east to west. Few plants of the genus viz. *Acacia, Amaranthus, Bidens, Cucumis, Eucalyptus, Gossypium, Rosa, Oxalis, Solanum, Morus, Luffa, Impatiens, Melilotus, Cyperus, Leucas, Rungia, Brassica, Pism, Sida, Allium and Madhuca* are known as nector producing plants of Kumaun hills. Two species of Madhuca genus, family Sapotaceae are widely distributed in the plains and hills of Kumaun region up to an altitude of 5000m. Eight genera and forty five species of the family Gentianaceae have been reported from Kumaun Himalaya.

4. **Glacial and perpetually frozen zone**: This zone is limited to an altitude of 4000 m and above. In this zone the temperature remains below 0°C for 10 months and between 2.2°C to 14°C for two months of the season. Due to snow for ten months only a few specialized vegetation like *Corydalis bowerii, Draba alpine, Cremanthodium nanum, Sassurea gossiphera, Thylacospermium rubifragnum* etc. The alpine zone of Kumaun Himalaya is the most beautiful and has richest vegetation. It is a rich treasure of medicinally important plants. *Swertia petiolata, Rheum emodi* (Dolu), *Aconitum balfourii* (bish), *Viola canercans* (Bafara), *Pleurospermum angelicoides* (Chhipi) are the important medicinal plants of high altitude.

Most of the plants of this region are medicinal, toxic or used for edible purposes. Plants like *Swertia petiolata, Swertia speciosa, Pleurospermum angelicoides, Rheum emodi, Angelica glauca, Aconitum heterophyllum* etc. are used to cure a no. of ailments while a few species of *Cicer, Chenopodium and Megacarpa* etc. are used as vegetable by local inhabitants. The *Allium carolianum* and *Allium stratcheyi* are used in reasoning food stuffs. Houses and huts are thatched by *Chrysopogon gryllus* (Salam) and *Dauthonia cachemeriana* (fizi) supported by Himalayan bamboos, which are also used in making baskets. A few plants like *Nardostachys jatamansi* (mansi), *Skimmia laureola, Rhododendron anthropogenon* and *Pleurospermum densifolium* etc are used as dhoop. Plants like *Aconitum* etc. are deadly poisonous.
Flavonoids are widely distributed plants pigments. They occur either in Free state of as glycosides or associated with tannins. They also occur as colourless glycosides in the white corollas of several flowers, which on treatment with Ammonia vapours turn yellow. The glycosides on hydrolysis yield a sugar free aglycone and sugar. The basic structure of flavonoid is a Benzopyrone ring (Flavone).

The flavonoids are polyphenolic compounds found as integral compounds of the human diet. They are universally present as constituents of flowering plants particularly of food plants. The flavonoids are phenyl substituted chromones (Benzopyron derivatives) consisting of a 15-carbon basic skeleton (C₆-C₃-C₆), composed of a chroman (C₆-C₃) nucleus (the benzo ring A and the heterocyclic ring C) also shared by the tocopherols, with a phenyl (The aromatic ring B) substitution usually at the 2-position. Different substitutions can typically occur in the rings A & B.

Flavonoids have existed in nature for over one billion years. Over four thousand structurally unique flavonoids have been identified in plant sources, primarily recognized as pigments in many shadows of yellow, orange and red in flowers and food. The flavonoids are found in fruits, vegetables, nuts, seeds, herbs, spices, stems, flowers as well as tea and red wine. The flavonoids consumed most is quercetin, and the riches sources of flavonoids consumed in general were tea (48% of total consumed), onions (21%) and apples. The other rich sources of quercetin include extract from grape seed, bilberry, Ginkgo biloba, green tea, broccoli, shallots, summer squash, parsley, green vegetables and beans. Its consumption was significantly universally related to mortality from coronary artery diseases.

Most health practitioners recommend 100-250mg of quercetin daily as general supplement, although it is indicated mainly as a general supplement, but other clinical indications include: (a) for lowered histamine levels and allergy symptoms 250-600mg daily. (b) for treatment of gout 200-400mg of quercetin taken daily with bromelain between meals. (c) for treatment of chronic hives 200-400mg of quercetin taken daily approximately 20 minutes before each meal.

At present flavonoids are considered secondary, non-essential dietary factors without any documented relevance to human health and/or disease but the flavonoids have been recognized as to possess anti-inflammatory, anti-oxidant, anti-allergic, anti-viral and anti-carcinogenic activities.
Quercetin exhibits human herpes simplex virus Type-I and sued (a) herpes virus Type- I (Pseudo- rabies virus). In cell culture monolayers using the technique of viral plaque reduction it was observed that quercetin caused a concentration dependent reduction in the infectivity of herpes simplex virus (HSV -1), polio, virus Type – I Para-influenza virus type -3 and respiratory syncytial virus.

There is possibility of synergistic anti-viral effects when quercetin is combined with other antiviral agents, Quercetin in combinations with 5-ethyle-2´-dexoyuridine had anti-viral activity on HSV-1 or pseudo-rabies infection in-vitro, quercetin together with murine α/β- interferon was also effective for the treatment of mice infected with Mengo virus. Enhanced anti-viral activity against herpes viruses in cell culture could be achieved by combining acyclovir with quercetin. The anti-viral activity of TNF was greatly augmented by quercetin with vesicular stomatitis virus, encephalomycarditis virus and HSV- 1 in WISH cells. TNF/quercetin included antiviral state was mediated by induction 2´-5´-oligoadenylate synthetase that appears to be mediated is TNF induced IFN-β. Flavonoidal compounds isolated from plants form a major family of natural products and are biogenetically derived from phenylpropanoids. Flavonoids, the important constituents of colouring materials of plant cellular tissues, have widely been used in the field of plant systematic, phylogeny and medicines (Harborne and Mabry, 1982; Cody, 1986). A number of Flavonoidal compounds have been identified as an anti-microbial agent (Harborne and Williams, 2000). For example, 3- hydroxy-8, 9-methylendoxy pterocarpan, isolated from the heart wood of legumes; 2´,4´-dihydroxy-6´- methoxy-3,5-dimethyl and 2´,4´-dihydroxy-6´-methoxy 3´,5´-dimethyl chalcone, isolated from the leaves of Myrica cerrata; (25)-4´-hydroxy-5,7,3´-trimethoxy flavan and 4´,5 dihydroxy-3´, 7-dimethoxy flavan, isolated from the seeds of Mariscus psilostachys and flavone glycoside, luteolin-7-(2” sulphatoglucoside) isolated from Thalassia testfoldnum have been identified as an anti- fungal agents (Gafner et al., 1996; Garo et al., 1996; Jensen et al., 1998; Stevenson and Haware, 1999). Flavonoids, 5,7-dihydroxy-3, 8-dimethoxy flavone and 5,7,2´,6´– tetrahydroxy-6-prenyl-8-lavanduly-4-methoxy flavonone have been identified as an anti-bacterial agents (Haraguchi et al., 1990; Iinuma et al., 1994). The flavonoidal compounds have also been reported as anti-viral agents. Recently the flavonoids, 5,6,7-trihydroxy flavone-7-glucuronide, two biflavone, robustaflavone and hinokiflavone and Querceten-3-(2-galloyl-arabinopyranoside) have been
identified as an active agents against AIDS virus (Li et al., 1997; Kim et al., 1998) A prenylated flavonoid compound, moralbanone, isolated from root bark of Morus alba showed potential anti-viral activity against herpes simplex type I virus, HSV-1 (Jiang Du, 2002).

**Literature Review**

For the present work on the “FLAVONOIDAL GLYCOSIDES FROM ANTIMICROBIAL ACTIVE BUTANOL EXTRACTS OF SOME MEDICINAL PLANTS OF KUMAUN” following plants are under investigation:-

**A. Eugenia jambolana (Syzygium cumini)**

A tall evergreen tree, leaves are leathery, smooth, shining 20 cm long. Flowers are small, dull white, appear in large bunches. Fruits are upto 4 cm long, ovoid, black when ripe, juicy and edible. It is found in throughout moist deciduous forest of India. It is propagated by seeds. Fresh bark juice mixed with milk is used in diarrhea. The seed powder about 15gm is administered orally thrice a day for 3-4 months in diabetes. The bark is used in sore throats, bronchitis, asthma, ulcers and dysentery.

Stem, leaves and fruits contain essential oil having alpha and beta pinene, limonene, cis-ocimene, trans-ocimene, alpha- humulene and bornyl acetate as major constituents.

Fruits contain the anthocyanins, delphinidin-3-gentiobioside, Malvidin-3-laminaribioside and petunidin-3-gentiobioside. Fruits yielded citric, mallic and gallic acids. Stems gave beta- sitosterol. Extract of leaves and seeds of Eugenia jambolana was tested for the antibacterial activity against six clinically important bacteria. Which are Escherichia coli, Klebsiella, Staphylococcus aureus, Bacillus, Salmonella typhi and S. paratyphi.

*Eugenia*, a genus of phanerogamic family Myrtaceae, comprises 800 species, distributed throughout the tropical regions of the world. Myrtaceae family comprises 80 genera and 3000 species (Hutchinson, 1960; Lawrence, 1967). Economically the family is of considerable importance throughout the world. Genus *Eugenia* was reported to be used as anti-inflammatory, analgesic, antipyretic, anti-fungal and peptic ulcer treatment (Tu, 1979; Karla et al., 1994; Rahhal, 1997). *Eugenia jambolana* Linn., a food and fodder plant of Kumaun hills, distributed throughout the foothills and *Tarai* regions of Kumaun Himalaya.
Its fruits are eaten and known as blue rose apple (Bhargava, 1959). Bark of the plant is used in preparation of astrin, decoctions, gargles and washes (Chopra et al., 1956). Fruits and seeds of Eugenia jambolana used as anti-diabetes (Kelkar and Kaklij, 1997; Dhaliwal, 1999). Looking on the importance of Eugenia spp. in the field of medicines, Bhakuni et al. (1971), Dhar et al. (1973 & 1974), Atal et al., (1978) and Dhawan et al., (1980) have screened various species of Eugenia, E. balsmea, E. malacensis, E. bracteata, E. diosprefolia, E. wallichi, E. bracteata, E. cloeziana and E. praecox for biological activities. Although, Eugenia spp. have thoroughly been investigated for polyphenols like gallic acid, ellagic acid derivatives and tannins (Tanaka et al., 1996; Park et al., 1997; Lee et al., 1997; Son et al., 1998), but leaves, roots, fruits and seeds of the plant, E. jambolana still are not thoroughly been investigated for anti-microbial active BuOH fraction for flavonoid glycosides (Lee et al., 1997; Nair et al., 1999). Different parts of several Eugenia species were proved to provide extracts which are used in traditional medicine as anti-microbial and anti-inflammatory agents (Slowing et al. 1994; Djipa et al. 2000). E. jambolana, a traditional folk medicinal plant of Tarai regions of Kumaun Himalaya, is still awaited for chemical investigation (Jain, 1981). Two flavonol glycosides have been isolated and characterized from leaves of Syzygium samarangense. One is the rare mearnsitrin (1) while the second, 2'-C-methyl-5'-O-galloylmyricetin-3-O-α-L-rhamnopyranoside (2), is new (Nair et al., 1999)

**B. Aconitum balfourii** Stapf

*Aconitum*, a genus of phanerogamic family Ranunculaceae, comprises 90 species distributed throughout the temperate and sub-temperate regions of the world. Family Ranunculaceae comprises about 20 genera and 300 species (Lawrence, 1969). Four species of the genus *Aconitum* have been reported from alpine micro-environments of Kumaun Himalayas. These are *A. laeve*, *A. balfourii*, *A. heterophillum* and *A. violaceum* (Rawat, 1984). All these herbs bear yellow, blue and violet coloured flowers. Various ethnic communities have used the roots of *A. heterophillum*, *A. balfourii* and *A. laeve* for curing stomach ailments, febrifuge, diarrhoea, hysteria, throat infections, dyspepsia, abdominal pain and diabetes (Bhatnagar *et al.*, 1948; Satyavati *et al.*, 1976; Rawat, 1984). The genus *Aconitum* is mainly characterized by the presence of C<sub>19</sub> and C<sub>20</sub> diterpene alkaloids (Bajaj, 1991). These diterpene alkaloids are mainly classified into strongly toxic group consisting of
aconitine type and weakly toxic group consisting of astisine type cardiac alkaloids namely hygenamine (Kosuge and Yokata, 1976; Konno et al., 1984).

Aconite, a diterpene alkaloid and a toxic principle of various alpine herbs of the genus *Aconitum* is a life saving drug and used in Ayurvedic and Unani system of medicines (Bajaj, 1991). In the last years the study of *Aconitum* genus was directed to the other secondary metabolites such as other flavonoids. The flavonoid composition of the aerial parts of *A. jaluense, A. pseudolaeve, A. chiisanense* and *A. paniculatum* have been reported (Wang et al., 1994; Kim et al., 1996; Jeong et al., 1997; Fico et al., 2000).

*Aconitum balfourii* Stapf., a folk medicinal herb of Kumaun Himalayan is 1-2m in height, palmately leaved and bearing blue flowers. The herb is an important constituent of the vegetation of alpine pastures of Kumaun Himalaya. The herb is still never been investigated for flavonoidal compounds. This is a biennial herb with tuberous roots, 1-2 m in height, palmately leaved and bearing blue flowers. The flowers hooded and foliage delphinium-like and blooming in the month of July to continue up to September. It occurs in shady slopes and forest edged of Uttarakhand Himalaya between 3,000-4,200m altitudes. It is propagated by divisions of root stocks. Roots are used against neuralgia and rheumatism. Tubers said to be toxic and narcotic used for medicinal purposes in fever and bone complain.

**C. Aconitum violaceum Jacq.**

*Aconitum violaceum* Jacq., is also an important constituent of alpine vegetation of Kumaun Himalaya. It is a small herb of 10-40cm height bearing blue-violet flowers. Literature survey revealed that the herb is still awaited for flavonoidal investigation. A perennial herb with tuberous and cylindrical roots having grayish colour stem sub-erect to procumbent, flowers are deep blue in terminal racemes and blooming in the month of July-September. It is common, occasionally found in the open slopes of sub-alpine and alpine meadows of cold arid region of Kashmir to Uttarakhand Himalaya at altitudes between 3,400-4,500m. It is propagated by divisions of root-stocks. It is used as a pleasant tonic. The roots are poisonous in nature and fresh root powder is taken with hot water is acre of fever due to bad cold in Kumaun Himalaya. Dried root pieces are fitted in tooth cavities against tooth ache. Locally it is given to infants in the cold, cough and stomach ache by mixing root powder with mother’s milk.
The alkaloidal compounds, aconitine, pseudoaconitine, palmatisine, atisine, dihydroatisine, bikhaconitine, heteratisine and hetisine, most of them are life saving drugs, have widely been isolated from the Aconitum herbs of Himalayan origin such as A. leave, A. laciniatum, A. moschatum Stapf., A. palmatum, A. soongaricum Stapf. and A. spicatum (Pelletier and Keith, 1969), but A. violaceum and A. balfourii still neither been investigated for alkaloidal compounds nor for flavonoidal composition.

Zhapova et al., 1992 reported Two known flavonoids, the 7-o-α-L-rhamnopyranosides of kaempferol and of quercetin, and also the new acylated glycoside quercetin-3-O-[O-(6-caffeoyl-β-D-glucopyranosyl)-(1→2)-β-D-glucopyranoside-7-O-α-L-rhamnopyranoside (czekanoside A) have been isolated from the epigeal part of Aconitum baicalense Turcz, ex Rapaics. Three new flavonoid glycosides, 3-O- [β-D-glucopyranosyl-1 - (1→3) - (4-O-trans-p-coumarmoyl)-α-L-rhamnopyranosyl-(1→6)-β-D-glucopyranosyl]-7-O-[β-D-glucopyranosyl-(1→3) - α-L-rhamnopyranosyl]kaempferol, 3-O- [β-D-glucopyranosyl -(1→3)- (4-O-trans-p-coumaroyl)-α-L-rhamnopyranosyl -(1→6)- β-D-glucopyranosyl]-7-O- [β - D-glucopyranosyl-(1→3)-α-L-rhamnopyranosyl]quercetin and 7-O-[β-D-glucopyranosyl-(1→3)-α-L-rhamnopyranosyl]quercetin were isolated from the aqueous extract of the aerial parts of Aconitum naviculare (Shrestha et al., 2006).

Luis et al., 2006 reported the two flavonol glycosides obtained from ethanolic extracts of Aconitum napellus sp. lusitanicum, the results showed a high DPPH antiradical activity of compound 1 (quercetin-3-O-(6-trans-caffeoyl)-β-glucopyranosyl-(1→2)-β-glucopyranosyl-7-O-α-rhamnopyranoside) when compared with compound 2 (quercetin-3-sophoroside-7-rhamnopyranoside), rutin and ascorbic acid. The relationship between the caffeoyl and rhamnopyranoside groups in the flavonol glycosides structures and the DPPH antiradical activity was also discussed.

European species of Aconitum have widely been used as oriental folk medicines against gout, neuralgia, articular rheumatism and cardiac failure (Bisset, 1981; Schauenberg and Paris, 1977). Aconite species native to high reaches of Himalayas are poisonous. The toxicity of the plant is due to the presence of diterpenoid alkaloids particularly C_{19} and C_{20}, biogenetically synthesized polyketide alkaloids (Fuente et al., 1988; Liu and Katz, 1996).
These toxic alkaloid constituents are the derivatives of veatchine, kaurane, atisine, atisane, lycoctonine, aconane and heteratisine bearing skeletons (Pelletier and Keith, 1969).

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\begin{align*}
& \text{R=Et and R’=B2 (Aconite)} \\
& \text{A number of diterpenoid alkaloids aconite, jasaconitine, pseudoaconitine, indaconitine, bikhaconitine, hycacitnine and isotalatizidine have been isolated and identified (Pelletier and Keith, 1969).}
\end{align*}
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**C. Bauhinia retusa**

*Bauhinia retusa* Roxb., a member of angiospermic family Leguminosae, is widely distributed in Kumaun hills from 2,000 ft to 4,000 ft. It is a medium sized evergreen tree and bears pinkish flowers, brown-yellow coloured pods and black seeds. Its flowers appear from September to December and pods ripen from January to May. Leguminosae, one of the largest families of flowering plants and phylogenetically less evolved compared to the highly evolved family of flowering plants Asteraceae, represented by 550 genera and 13,000 species with cosmopolitan in distribution. It is divided into three sub-families, Papilionaceae (375 genera), Caesalpinioideae (133 genera) and Mimosoideae (40 genera) (Lawrence, 1969). *Bauhinia*, a genus of sub-family Caesalpinioideae comprises of 110 species worldwide in distribution. Of these, 35 species of *Bauhinia* have been reported from Indian sub-continent. Economically, the Leguminosae is one of the most important families of flowering plants. They provide many articles of food, fodder, dyes, gums, resins and oils (Lawrence, 1969). In Kumaun hills, four species of genus *Bauhinia*, *B. purpurea* Linn., *B. racemosa* Linn. , *B. variegata* Linn. and *B. retusa* are of common occurrence. The leaves of *Bauhinia retusa* have widely been used as fodder and fruits, flowers, gums and resins have find various uses in the field of medicines (Chopra et al. , 1956).

*Bauhinia retusa* flowers appear from September to December and pods ripen from January to May. This is an evergreen tree bears pinkish flowers, brown yellow coloured pods and black seeds. Fresh bark of this plant mixed with shunthi (dry *Gingiber officinale*),
pounded with sour gruel was prescribed in enlarged cervical glands as well as in goiter. In folk medicine, the root is used as a carminative in dyspepsia and flatulence. The bark is used as an anthelmintic, as an astringent and antiseptic agent in skin diseases, ulcers and leprosy. A decoction of the buds is given in diarrhea, dysentery, cough, haematuria, piles and menorrhagia.

Quercetol glycosides are the dominant flavonoids of the plant. Myricetin glycosides are present in the seeds. Other flavonoid glycosides identified are Quercitroside and a toxifolin rhamnoside. The petroleum ether, benzene, chloroform and alcohol extracts of the herb did not show any toxicity either orally or intra-peritonally.

*Bauhinia purpurea* leaves yield two new dimeric flavonoids namely bis [3´, 4´-dihydroxy – 6 - methoxy -7 ,8 – Furano - 5´, 6´ – monomethylallyloxy ] -5- C-5- biflavonyl (1) and [ 4´- hydroxy- 7- methyl 3-C-α-L- rhamnopyranosyl] -5-C-5- [4´ –hydroxy -7-methyl -3- C- α- D- glucopyranosyl] biflavonoid (2) with protein precipitating capacity 214.4 and 199.24 µg BSA/g, respectively. Their identity has been established on the basis of spectroscopic data and chemical reactions.

Bhakuni *et al.*, (1969), Dhar *et al.*, (1968) and Atal *et al.*, (1978) screened the aqueous-EtOH extracts of *B. racemosa, B. variegata* and *B. retusa* for various biological activities. Many oleanane glycosides and flavonol glycosides have been reported from leguminous plants (Ding, Tian, Kinjo, Nohara and Kitagawa, 1992; Cui, Kinjo and Nohara, 1993; Yahara *et al.*, 2000). Various species of *Bauhinia* have previously been screened for various flavonoidal constituents and their effect on blood glucose (Wahab *et al.*, 1987). *Bauhinia variegata*, an allies subspecies of *Bauhinia retusa* has widely been extracted for identification of flavonoidal compounds and the flavonoids, 5-hydroxy-7,3,4,5-tetramrthoxy flavone – 5 – O – B – D - xylopyranosyl (1→2) - α- α-rhamnophranosile, (25) –5,7-dimethoxy – 3´,4´- methylenedioxy flavanone, 5,6- dihydro-1,7- dihydroxy- 3,4–dimethoxy–2 methylidibenz oxepin and dihydrodibenzxepin have been identified from its leaves, flowers and root-bark (Rahman and Begum, 1966; Gupta *et al.*, 1979; 1980; Gupta and Chauhan, 1984; Yadava and Reddy, 2001; Mopura *et al.*, 2003).