DISCUSSION

The present work deals with the pharmacognostic and germination studies of *Sesbania grandiflora, Sesbania bispinosa* and *Sesbania cannabina*. Their medicinal properties are details out in the following text.

These three taxa extensively used medicinally for various ailments in Ayurvedic medicine (Shivarajan and Indira Balchandra, 1994). The condition so prevailing promoted us to undertaken the details study of these taxa. Morphologically, all the three taxa under study are trees and shrubs.

*Sesbania grandiflora*

The leaves are used as aperients, diuretic, and tonic in form of poultice and they are applied to bruises. The barks of the plant are used as astringent, febrifuge and tonic and its infusion in small-pox. Besides the root juice along with honey is used as expectorant [Dhiman AK. 2003]. the medicinally and nutritionally important flowers were used for the antioxidant activities so it utilized for medicine in diuretic, emetic, fevers, headaches, small pox, anemia, bronchitis, inflammation, leprosy, gout, rheumatism, anxiolytic, anticonvulsive, hepatoprotective and potent antidote for tobacco and smoking-related diseases. In a number of cultures the root is used in inflammation, rheumatic swelling and fever, bark is used in smallpox, other eruptive fevers and ulcers, the juice of the leaves is used to treat worms, fever, gout, and leprosy, the flowers are used as emollient, bronchitis, gout and pain, fruits are used for anemia, bronchitis, fever, tumors, pain. (http://www.impgc.com/test.php?id=Sesbania%20grandiflora)

*Sesbania bispinosa*

Medicinally, seeds are mixed with flour and applied to ringworm, other skin diseases, and wounds (Duke, 1981a). Ayurvedic regard the root as alexiteric, anthelmintic, collyrium, diuretic, and lactagogue. Kirtikar and Basu (1975) report that around Las Bela it is used for wounds, and powdered roots are administered to snakebite victims, inducing emesis and perhaps a cure. astringent properties, preparations made from it can be used against inflammation, bacterial infections and tumours. In traditional medicine, seed mixed with flour is used to treat ringworm and other skin diseases and worms. Orwa et al.2009)
**Sesbania cannabina**

The plant use as a medicine as like aperients, diuretic, emetic, emmenagogue, febrifuge, laxative, and tonic; agati is a folk remedy for bruises, catarrh, dysentery, eyes, fevers, headaches, smallpox, sores, sore throat, and stomatitis (Duke and Wain, 1981). Bark, leaves, gums, and flowers are considered medicinal. The astringent bark was used in treating smallpox and other eruptive fevers. The juice from the flowers is used to treat headache, head congestion, or stuffy nose. As a snuff, the juice is supposed to clear the nasal sinuses. Fruits to be alexiteric, laxative, and intellectually stimulating, prescribe them for anemia, bronchitis, fever, pain, thirst, and tumors; the flowers, aperitif and refrigerant, for biliousness, bronchitis, gout, nyctalopia, ozoena, and quartan fever; the root for inflammation, the bark as astringent; leaves, alexiteric, anthelmintic, for epilepsy, gout, itch, leprosy, nyctalopia, and ophthalmic. Unani consider the tonic leaves useful in biliousness, fever, and nyctalopia.

**Histochemistry:**

Histochemical localization tests carried out for seven substance Viz. starch, protein, tannin, saponin, fat, glucoside and alkaloids. The organ selected for such test was leaves and wood as they can be procured fresh with ease.

Table -4a shows that leaves and wood of *Sesbania grandiflora* accumulation of chemical like starch, protein, tannin, saponin, fat, glucoside and alkaloids in both wood and leaves cells of epidermis, parenchyma while tannin, saponin, glucoside are absent in leaves but present in wood.

Table -4b shows that by and large all the seven chemicals found in the parenchymatous cells of both the organ of are of *Sesbania bispinosa*.

Table -4c shows that the entire chemical accumulated in both the organ i.e. in leaves and wood of *Sesbania cannabina*.

**Extractive:**

Ayurveda proposes different preparation (Khory and Katrak, 1984: Nayar et al 1979). They are listed below

1) **Swar - Fresh juice.**
2) **Kadha - Quath – decoction.**
3) **Churna - Powder**
4) **Vatika - Pills**
5) Ukalo - Boiled
6) Heem - Cold water overnight extract.
7) Kalk - Pulp
8) Valeh - Marmalade
9) Pak - Jam made with partially dehydrated milk.
10) Asav - Wine of fresh juice or extract.
11) Arishta - Wine of decocted water extract.
12) Murabba - Candied-sweed pickled.
13) Ghirt - Butter oil extract decocted.
14) Tail - oil extract decocted.
15) Fant - Powder infused with cold or warm water for at least 2 hrs.
16) Put pak - Pulp cooked under direct fire when covered in sticky mud ball.
17) Raskriya Ghan - Dehydrated extract or decoction.
18) Sirko - Vinegar
19) Manth - Powder stirred vigorously with water and filtrate used as medicine.
20) Kshar - Pot-ash-water extract evaporated after filtration to get residual salts.
21) Kanji - Over cooked food grains kept with water for 48 hours. Thick colloidal liquid is kanji.

Once can see that ancient methods have included self juice to decoction with water to extraction in presence of mild alcohol and at times mild organic acids.

Asava and Arishta (wine making) preparation, certainly increases the life as well as palatability of a preparation. However, now one also feels that this mild self generates alcohol must be acting as an efficient solvent obtaining best use of the materials used for making medicine. (Khory and Karak, 1984)

It is evident from Table -5a that leaves and bark both show considerably higher extractive content for all the three seasons studied and comparatively alcohol is more efficient than water. Ether is the least efficient of all.

It is also suggested that since more of the extractive steeping out must be ergastic matter, they normally remain deposited in leaves and wood which have limited short duration association with plant, Bark has comparatively lower extractive
value in *Sesbania grandiflora*. If the extractives are to be employed as drug leaves and bark should be preferred condition, when extracted with alcohol. (Table -5a)

The similar generalization holds true even for the leaves and bark of *Sesbania bispinosa* too. Leaves show higher values in alcohol at summer season (6.3 to 6.85%) in than water (5.15 to 5.60%), and in ether (3.3 to 3.95%) (Table- 5b)

In *Sesbania cannabina* (Table- 5c) alcohol at summer season proves to be slightly better than water and ether.

Kampilak is never administered as Asav. It would be worth trying clinically either as Asav or alcohol extracting.

**Ash:**

Table-6a, 6b and 6c,show that ash content general is higher in bark and wood as compared to other organ ash content also exhibit seasonal variations. Solubility of ash in water is apparently merged. Whereas solubility of ash in acid is fairly high in winter as compare to water at summer season as compared to other seasons Table – 7a, 7b and 7c.

Presently, we are not in a position to suggest the names of the acid insoluble salts present in certain organ in certain seasons. Further, work is in progress. It would be interesting to know about the mineral budget of a Taxon and clinical testing of medicinal properties of ash if collected from different organ in different season.

**Lipid and Alkaloids:**

Lipid and Alkaloids constitute one of the major chemical groups to which plants owe their medicinal properties. It is evident from the Table 9-a, b, c and d that the alkaloids content of leaves in higher as to compare to bark and wood at summer season as compared to other seasons.

**Phytochemical evaluation to find out carbohydrate, protein, amino acid and chlorophyll were also carried out:**

The total carbohydrate estimation for leaves, bark and wood in the three taxa under investigation revealed that leaves contain higher amount of carbohydrate in wood at summer as compared to other season and plant parts in *Sesbania grandiflora, Sesbania bispinosa* and *Sesbania cannabina* (Table- 8a, b, and c)
The protein and amino acid estimation for leaves bark and wood in the three taxa under investigation, in *Sesbania grandiflora*, *Sesbania bispinosa* and *Sesbania cannabina* and highest amount of protein and amino acid observed in leaves as compared to wood and bark. (Table -10a.b.c and d).

Comparative pigment estimation for three pigment showed that the chlorophyll a normally remains high than chlorophyll b and carotenoids. Moreover, summer values are higher as compared to two other seasons (Table -11).

**Germination index**

Three growth hormones NAA, KI and 2,4-D of different concentration i.e. 10, 20 and 30 ppm were afforded to study their effects on the germination of seeds of *Sesbania grandiflora*, *Sesbania bispinosa* and *Sesbania cannabina*. In each treatment ten seeds were set for germination of Sesbania grandiflora. In NAA 30%, 50% and 80% are germinated in 4 days at 10, 20 and 30 ppm seeds. While in KI at 10 ppm 6 seeds are germinate 04 days at 20ppm 7 seeds germinated and 30 ppm 10 seeds are germinated respectively. In 2,4-D 2 seeds germinated in 6 days at 10 ppm and Zero seeds germinated at 20 and 30 ppm.

In KI (30ppm) treated seedling induced in enlargement and increased in Plumule, with increasing the concentration. while in NAA treated seedling reduced in length but increase in size of cotyledons as compared to control. In 2,4-D 10, 20 and 30 ppm, the seed germination is retarded. (Table 12, plate 28 and 29)

*Sesbania bispinosa* the dormancy of seed was not break (Plate No.30).

In *Sesbania cannabina* less germination in all hormone treatment but after 10 days seedling in NAA in 30ppm radical is more thicker than control and other concentration. In KI treatment size of plumule and radical thickness increases in 30ppm concentration as compared to other concentration. (Plate 31 and 32)