DISCUSSION

The present work deals with the pharmacognostic and germination studies of *Butea monosperma* (Lamk) Taub, *Madhuca longifolia* (Koen) Macbr (Syn. *Madhuca indica*), *Syzygium cumini* (Linn) Skeel and *Mimusops elengi*. Their medicinal properties are detailed out in the following text.

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

*Butea monosperma*: In the literature, *Butea monosperma* is ascribed to have many medicinal properties. It has been used as tonic, astringent, aphrodisiac and diuretic. Its flowers are widely used in the treatment of hepatic disorders and viral hepatitis, diarrhoea and possess anti-implantation activity (Chopra RN, Nayar SL, Chopra IC., 1956). The bark is reported to possess antitumor and antiulcer activities. The root bark is used as an aphrodisiac, analgesic and antihelminthic whereas the leaves possess antimicrobial property. Roots of *Butea monosperma* are reported to be useful in the treatment of filariasis, night blindness, helminthiasis, piles, ulcers and tumors.

*Madhuca longifolia*: The plant parts like wood bark, corolla lobes, seeds and seed oil are used in diabetes, burns, scalds, bronchitis, rheumatism, cough, piles, galactagogue skin diseases, tonsillitis, stomach-ache, aphrodisiac and respiratory diseases and have laxative, insecticidal and pesticidal properties (Mukerji, 1953; Chopra et.al., 1956; Anonymous, 1962; Kurup et.al., 1979; Kirtikar and Basu 1980; Anonymous, 1986; Murugesamudaliar, 1988; Warrier et al., 1994; Jain, 1996 and Hill, 1996). Madhuca flowers are useful in bronchitis and coughs. A decoction of the bark can be given internally in rheumatic diseases. The oil extracted from the seeds can also be applied locally on the affected area. A decoction of the bark can also be taken in diabetes mellitus with beneficial results. The oil extracted from the Madhuca seeds has laxative properties. It helps cure piles by relieving chronic constipation. The leaves of the tree are useful in the treatment of eczema. The leaves, smeared with sesame oil, warmed over a fire and bandaged on the affected parts provide relief. The ash of the leaves, mixed with ghee, is often used as a dressing for burns and scalds in the indigenous system of medicine. For the cure of itching, a paste of the bark is
applied locally. The oil extracted from the seeds can also be applied locally in skin diseases. Flowers and seeds of the Madhuca are effective in increasing the flow of milk in nursing mothers.

Syzygium cumini: It has been valued in Ayurveda and Unani system of medicine for possessing variety of therapeutic properties. Most of the plant parts are used in traditional system of medicine in India. According to Ayurveda, its bark is acrid, sweet, digestive and astringent to the bowels, anthelmintic and in good for sore throat, ronchitis, asthma, thirst, biliousness, dysentery, blood impurities and to cure ulcers, hypoglycemic, antibacterial, anti-HIV activity and anti-diarrhea effects. The leaves, stems, flowerbuds, opened blossoms, and bark has some antibiotic activity. A decoction of the bark is taken internally for dyspepsia, dysentery, and diarrhea and also serves as an enema. The root bark is similarly employed. Bark decoctions are taken in cases of asthma and bronchitis and are gargled or used as mouthwash for the astringent effect on mouth ulcerations, spongy gums, and stomatitis. Ashes of the bark, mixed with water, are spread over local inflammations, or, blended with oil, applied to burns. (Bhuiyan et al., 1996; Kusumoto et al., 1995; Indira and Mohan, 1993; Ravi et al., 2004). Slowing et al. (1994) and Muruganandan et al. (2001)

Mimusops elengi: The bark, flowers, fruits and seeds are astringent, cooling, anthelmintic, tonic, and febrifuge. It is mainly used in dental ailments like bleeding gum's, pyorrhea, dental caries and loose teeth. Extract of flowers used against heart diseases, leucorrhoea, menorrhagia and act as antidiuretic in polyuria and antitoxin. The snuff made from the dried and powdered flowers used in a which strong fever, headache and pain in the neck, shoulders and other parts of the body occurs. Several therapeutic uses as cardiotonic, alexipharmic, stomachic, anthelmintic and astringent have been ascribed to the bark the fruits are used in chronic dysentery, constipations; flowers are used as snuff to relive headache, lotion for wounds and ulcers. Barks are used to increase fertility in women and known to have antiulcer activity. Ripened fruits facilitates in burning urination. The ripe fruit pounded and mixed with water is given to promote delivery in childbirth. Powder of dried flowers is a brain tonic and useful as a snuff to relieve cephalalgia. Decoration of bark is used to wash the wounds. Fruits are used as astringent, coolant and anthelmintic. (Shah et al., 2003).
**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 *Butea monosperma* accumulation of chemical like starch, protein, fat, 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 six chemicals found in the parenchymatous cells of both the organ of *Madhuca indica* except the glucoside are absent in leaves of *Madhuca indica*.

Table -4c shows that the entire chemical accumulated in both the organ i.e. in leaves and wood of *Syzygium cumini* except the glucoside are absent in leaves and wood and fat absent in leaves, accumulation occurs in parenchymatous cells of leaves and wood.

Table-4d shows that all the six chemical present in leaves and wood of *Mimusops elengi* in cells of mesophyll and epidermis cells in leaves and in wood accumulation occurred in parenchymatous cells cortex region.

**Extractive:**


They are listed below

1) Swara - 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 - Candided-sweed pickled.
13) Ghirt - Butter oil extract decocted.
15) Tail - oil extract decocted.
16) Fant - Powder infused with cold or warm water for at least 2 hrs.
17) Put pak - Pulp cooked under direct fire when covered in sticky mud ball.
18) Raskriya Ghan - Dehydrated extract or decoction.
19) Sirko - Vinegar
20) Manth - Powder stirred vigorously with water and filtrate used as medicine.
21) Kshar - Pot-ash-water extract evaporated after filtration to get residual salts.
22) 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 bark which have limited short duration association with plant, after which they are shaded off by plant. Wood has comparatively lower extractive value in Butea monosperma. 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 Madhuca indica too. Leaves show higher values in alcohol at summer season (3.25 – 4.85% and 1.85 – 2.15%) and in water (3.25 to 4.6% and 2.2 to 2.7 %). (Table- 5b)

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

In Syzygium cumini (Table- 5c) and Mimusops elengi (Table-5d) alcohol at summer season proves to be slightly better than water.
Ash:

Table-6a, 6b, 6c, and 6d show that ash content general is higher in leaves and bark 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 as compare to water at summer season as compared to other seasons Table – 7a, 7b, 7c and 7d.

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 id 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 four taxa under investigation revealed that leaves contain higher amount of carbohydrate in Butea monosperma. Whereas it is higher in the wood in Madhuca indica, Syzygium cumini, and Mimusops elengi (Table- 8a, b, c and d)

The protein and amino acid estimation for leaves, bark and wood in the four taxa under investigation, in Butea monosperma and Madhuca indica highest amount of protein and amino acid observed in leaves as compared to wood and bark. While in Syzygium cumini and Mimusops elengi protein accumulated in high in bark as compare to leaves and wood but amino acid accumulated in high in leaves (Table -10a,b,c and d).

Comparative pigment estimation for three figment 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:

As mentioned before, all the three plants selected for study germination of seeds by various growth hormones treatment. (Table 12a, b, and c)

3 growth hormones Auxin i.e Indol Acetic Acid (IAA), Gibberellins(GA) and 2,4-Dichlorophenoxyaceticacid(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 Butea monosperma, Madhuca indica, Syzygium cumini and Mimusops elengi.

In each treatment ten seeds were set for germination of Butea monosperma. In IAA all seeds are germinated in 2 days at 10, 20 and 30 ppm. The percentage of seed germination was 100%... While in GA at 10 ppm 6 seeds and at 20ppm and 30 ppm 10 seeds each are germinated in two days. The percentage of seed germination was 60 % at 10 ppm and 100% at 20 and 30 ppm. In 2-4-D after three days, two seeds germinated in 10 ppm six seed each germinated in 20 and 30. The percentage of seed germination was 20 % at 10 ppm, 60 % at 20 ppm and 30 ppm. In IAA (30ppm) treated seedling induced in enlargement in shoot and leaves, while in GA treated seedling induced in only stem elongation. In 2,4-D 10, 20 and 30 ppm ,the seed are germinated but root and shoot are not developed.In 2.4D cell formation and elongation take place but cell differentiation not proceed.

Madhuca indica 4 seeds are germinated in 10 days at 10 and 20 ppm concentration while 3 seeds are germinated in 10 days at 30 ppm concentration in IAA. The percentage of seed germination in 10 ppm (40 %) and in 20 ppm (30 %). In GA 4 seeds are germinated at 10 ppm, 8 seeds are germinated at 20 ppm and 10 seeds are germinated at 30 ppm within 10 days .The percentage of seed germinated was 40, 80 and 100% at 10, 20 and 30 ppm concentration respectively. In 2-4D at 10 ppm concentration seed germination is totally inhibited but at 20 ppm, 2 seeds are germinated in 12 days and in 30 ppm 6 seeds are germinated in 12 days. The percentage of seed germination was 0, 20 and 40 % at 10, 20 30 ppm respectively. In seedling of Madhuca indica of IAA treated only root elongation take place in 10 and 20 ppm, while in GA 10 and 20 ppm seeds are germinated and shoot and root are well developed but in 30 ppm only short root formation take place. In10 ppm seedling shows large leaf lamina and stem elongation compared to 20ppm. In 2, 4- D are germinated but root and shoot formation not differtiated and after few days whole germinated seeds are death.
The seeds of Syzygium cumin treated with 10, 20, and 30 ppm of IAA and 4, 4 and 3 seeds are germinated in 10 days respectively. Percentage of seeds germination 40, 40 and 30 % at 10, 20, 30 ppm concentration respectively. In G.A at 10 and 20 ppm concentration 4 seeds are germinated and at 30 ppm 8 seed are germinated. The percentage of seed germinated was 40%, 40% and 80 %. In 2,4-D 10 seeds are germinated at 10 ppm, 8 seeds at 20 ppm and 2 seeds at 30 ppm concentration within 7 days. The percentage of seed germination was 100%, 80 % and 20 % respectively at 10, 20 and 30 ppm concentration. In 10 ppm concentration of IAA, the seedling shows enlargement in shoot and root as compared to 20 and 30 ppm, while in 10ppm concentration of GA, the seedling having large leaf lamina as compared with 20 and 30ppm. In 24-D, the leaf lamina is reduced in 10, 20 and 30ppm compared with control.

Soil Type, pH, Electrical conductivity (EC) and Moisture:-

Soil sample collected from different region of Marathwada for the study of pH, EC and Moisture, generally in Marathwada black cotton soil observed and the soil pH ranges from 7.1 to 8.6 and electrical conductivity ranges from 0.40 to 0.83 mmhos/cm. Moisture of soil variable as a season and rainfall but generally it ranges from 2.08 to 28.30cm.
SUMMARY AND CONCLUSION

The traditional health care system of 80% population of the developing countries still depends on their surrounding vegetation. Though at present Indian health care delivery consists of both traditional and modern systems of medicines, both organized traditional systems of medicine like Ayurveda, Siddha and Unani and unorganized systems like folk medicine have been flourishing well. Ayurveda and Siddha are of Indian origin and accounted for about 60% health care delivery in general and 75% of rural Indian population depends on these traditional systems. These two systems of medicine use plants, minerals, metals and animals as source of drugs, plants being the major source. It is estimated that roughly 1500 plant species in Ayurveda and 1200 plant species in Siddha have been used for drug preparation (Jain, 1987). In Indian folk medicine use, about 7500 plant species are recorded as medicinal plants (Anonymous, 1996). Though the Indian traditional systems of medicine are time-tested and practiced successfully from time immemorial, there is lack of standardization with regard to identity of crude drugs, methods of preparation and quality of finished products.

Four taxa of medicinal importance Viz Butea monosperma (Lamk) Taub-(Palas), Madhuca longifolia (Koen) Macbr – (Mahua), Syzygium cumini (Linn) Skeel (Jambul), Minusops elengi Linn. (Bakul). In the present review we have congregated information pertaining to botanical, phytochemical, nutritional, traditional claims and resent studies. The trees have immense potential and appears to have a broad spectrum of activity on several ailment. Various parts of the plants have been used for antioxidant, antidiarrhoeal, dermal, wound healing, Antidiabetic, Antistress, anticonvulsive, antihepatotoxic, antiestrogenic and anthelmintic activities. Fresh plant samples were collected from different forest in Marathwada region during different season viz. summer, monsoon, and winter.

Detail morphological and studies of different organs of the four species were carried out. The histochemical test was performed to ascertain the presence of starch, tannin, fat, glucoside, saponins and alkaloids in fresh material. The results are tabulated.
The present work describe the comparative biochemical studies in terms of extractive percentage, ash, lipid, alkaloids, carbohydrates, protein and amino acid of selected medicinal plants i.e. Butea monosperma, Madhuca indica, Syzygium cumini and Mimusops elengi, summarized as follows:

1) Percentage determination of water soluble ash, and acid insoluble ash, solubility in water, alcohol, extractive percentage in water, alcohol and ether was carried out in different plant parts. During the determination of ash value experiment all the plant show solubility of ash is high in acid as compared to water at summer season in Butea monosperma wood shows highest value at summer, but in Madhuca indica, Syzygium cumini and Mimusops elengi bark shows highest value at summer season according to Table 7a,b,c,d and Graph 2a,b,c,d.

In Butea monosperma highest extractive percentage observed at in alcohol at summer season than in water at summer season than ether. In Madhuca indica same as Butea monosperma summer season is dominant over than in alcohol, in water and in ether, while in Syzygium cumini and Mimusops elengi also having same result at the summer season in alcohol as a solvent highest value than water and ether. According to Table 5a, 5b, 5c and 5d and graph 1a, 1b, 1c, 1d.

2) Treatment of and growth hormones IAA, G.A and 2, 4-D to promote germination rate are attempted. During this experiment in Butea monosperma IAA (30ppm) treated seedling induced in enlargement in shoot and leaves, while in GA treated seedling induced in only stem elongation. In 2,4-D 10, 20 and 30 ppm seedling growth inhibited, in Butea monosperma, Madhuca indica but in Syzygium cumini seedling growth occurred but reduced in lamina.

3) Quantitative estimation of carbohydrates, proteins, amino acids, lipid and total alkaloids in various plant parts.

During the analysis of total sugar and total carbohydrates summer season is dominate over the other season as like above result leaves having highest accumulation of total carbohydrates in Butea monosperma, But in Madhuca indica, Syzygium cumini and Mimusops elengi wood having highest accumulation of carbohydrates according to table 9a,b,c and d and graph 5 a, b, c and d.
4) During analysis of protein and amino acid in Butea monosperma and Madhuca indica Plant shows that leaves having high amount protein and amino acid and in Syzygium cumini and Mimusops elengi bark having higher accumulation of protein and amino acids from table 10 a, b, c and d and graph 6a,b,c and d.

5) During the estimation of secondary metabolites i.e. Lipid and alkaloids shows highest accumulation in Leaves at summer season than the other parts and other season as reference to table 8a,b,c,d and graph 4a,b,c and d.

6) Determination of total chlorophyll in the leaves of above four species during various seasons has been estimated as table (11) and graph (7) summer season are favorable for high amount of chlorophyll pigment accumulation i.e. Chlorophyll a, Chlorophyll b and carotenoids.

7) Moisture content ; pH and electrical conductivity (EC). Of soil sample of Marathwada region from different areas are black cotton soil observed that the soil pH ranges from 7.1 to 8.6 and electrical conductivity ranges from 0.40 to 0.83 mmhos/cm. Moisture of soil variable as a season and rainfall, but generally it ranges from 2.08 to 28.30cm.

**CONCLUSION**

Thus the present experiment concluded that changes in extractive percentage, ash value ,carbohydrates ,lipid, alkaloids, protein and amino acid at the different season .During the summer ,after the period of maximum growth had occurred and with high solar radiation during time , make for optimal photosynthesis condition .This process may well lead to an increases a primary and secondary metabolites in plants. It could be that the annual change content are dependent on the different environmental condition obtain.
The result of our experiment work would be indicative of the seasonal pattern in the concentration of the estimated biochemical constituents, which would turn explain their functional importance in plant growth and metabolism and for the difference in yield and yield quality during different times of the years.

The seasonal environment being variable in both time and space makes difficult to predict responses of plant to the condition of the environment. Physiological plasticity enable plants to with stands such seasonal fluctuation within the limit of tolerance. Biochemical constituents and enzyme activities serves as important indices plant response and behaviour to seasonal variation as evidence by our work.

**Scope and Feature:**

1) Research on agronomy of medicinal plants to lower the cost of production.
2) Phytochemical of indigenous medicinal plants
3) Analysis of medical properties of indigenous medicinal plant.
4) Research on the ex-situ and in-situ conservation of medicinal plant
5) Control the diseases.
6) Plants used in the local Ayurveda system have also been botanically described in well–illustrated.
7) Use of plant parts as a medicine at a particular season
8) Conservation and sustainable use of medicinal plants.
9) Study of quantitative biochemical composition of medicinal plant that locally used for curing diseases.
10) The wealth of tribal knowledge on medicinal plant points to great potential for research and discovery of new drug to fight diseases including diabetes, obtain new foods and other new uses.
11) It is better start investigation the efficiency of the medicinal plant based on the traditional healthcare practices by indigenous people.
12) Proper documentation of medicinal plant and to know their potential for improvement of health and hygiene through an eco friendly system.

However due to population explosion, increasing urbanization and continuous over exploitation of the herbal reserves, the natural resources along with their traditional knowledge are depleting with an alarming rate. Therefore, there is an
urgent need to document the indigenous knowledge of useful plants and their therapeutic uses before they are lost forever from community.