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# DETERMINATION OF LIPID AND ALKALOID CONTENT IN SOME MEDICINAL PLANTS OF MARATHWADA REGION IN MAHARASHTRA

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## Abstract

The seasonal variation of alkaloids have been investigated in leaf, bark and wood of Butea monosperma, Madhuca indica, Syzygium cumini and Mimusops elengi which are medicinally important plants in Marathwada region .The leaves of Mimusops elengi showed high level of lipid (range 29.75 to 32.70 mg/g dry wt.) than Butea monosperma (range 22.5 to 25.95 mg/g dry wt.), Madhuca indica (range 12.55 to 15.8 mg/g dry wt.) and Syzygium cumini (24.45 to 27.47 mg/g dry wt.). The leaves of Butea monosperma showed high level of (1.55 to 2.15 mg/g dry wt.) alkaloid than Madhuca indica (1.45 to 1.85 mg/g dry wt.), Syzygium cumini (1.25 to 1.75 mg/g dry wt.) and Mimusops elengi (0.8 to 2.0 mg/g dry wt.).

## INTRODUCTION

All human beings require a number of complex organic/inorganic compounds in diet to meet the need for their activities. The important constituents of diet are carbohydrates, fats, proteins, vitamins, minerals and water (Indrayan et al., 2005). Every constituent plays an important role and deficiency of any one constituent may lead to abnormal developments in the body. Plants are the rich source of all the elements essential for human beings. There is a relationship between the element content of the plant and its nutritional status. Some elements are essential for growth, for structure formation, reproduction or as components of biologically active molecules while others have some other beneficial affect (New Wall et.al., 1996). Medicinal plants have been used as traditional treatments for numerous human diseases for thousands of years. Medicinal plants continue to be an important therapeutic aid for the ailments of humankind. The search for eternal health and longevity and for remedies to relieve pain and discomfort drove early man to explore his immediate natural surroundings and led to the use of many plants, animal product and minerals, etc. and the development of variety of therapeutic agents.

Today is a renewed interest in traditional medicine and an increasing demand for more drugs from plant sources. This revival interest in plant derived drugs is mainly due to the current widespread belief the green medicine is safe and more dependable than the costly synthetic drugs, many of which have adverse side effects. Nature has bestowed upon us a very rich botanical wealth and a large number of diverse type of plants grow wild in different parts of our country. In India, the use of different parts of several medicinal plants to cure specific ailments has been vogue from ancient times. Lipids are organic compounds that include fats, waxes, phospholipids, glycolipids and sterols. All of them are present in almost every living cell. Lipids are insoluble in water but soluble in organic solvents like alcohol and chloroform. Alkaloids represent group of secondary metabolites produced in plants. About 2500

alkaloids contain nitrogen in heterocyclic ring and these are basic in nature. They are usually found in plants as salts of organic acid and exhibit important pharmacological properties.

Butea monosperma (Lam.) plant is used in Ayurvedic, Unani and Siddha medicine for various ailments. Almost all the parts of the plant namely root, leaves, fruit, stem bark, flowers, gum young branches are used as medicine, food, fiber and for other miscellaneous purposes such as fish poison, dye, fodder, utensils, etc. (Burli and Khade, 2007) Roots of B. monosperma are reported to be useful in the treatment of filariasis, night blindness, helminthiasis, piles, ulcers and tumors (Agrawal et. al .1997) .The bark is reported to possess antitumor and antiulcer activities. The root bark is used as an aphrodisiac, analgesic and anthelmintic whereas the leaves possess antimicrobial properties. (Kasture, et.al. 2000). Gum is astringent to bowel, good in stomatitis, cough, pterygium, corneal opacities and cures excessive perspiration (D.A. Patil, 2006).

Madhuca is useful in arresting secretions or bleeding because of its tannin content. The bark of the tree is an astringent and tonic. The flowers of the tree help the removal of catarrhal matter and phlegm from the bronchial tubes. They also exercise the soothing effect of the skin. A decoction of the bark can be given internally in rheumatic diseases. It is also being taken in diabetes mellitus with beneficial results. Madhuca oil extracted from the seeds has laxative properties. It helps cure piles by relieving chronic constipation. The leaves of Madhuca are effective in the treatment of eczema.

Syzygium cumini is a medicinal plant, whose parts were pharmacologically proved to possess hypoglycemic, antibacterial, anti-HIV activity and anti-diarrhea effects. (Bhuiyan et al., 1996). The leaves, stems, flower buds, 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 leaves, steeped in alcohol, are prescribed in diabetes. The leaf juice is effective in the treatment of dysentery, either alone or in combination with the juice of mango leaves. Jambolan leaves may be helpful as poultices on skin diseases. Fruit color is therefore an important

indicator of possible polyphenolic compounds.

Mimusops elengi were screened for their antibacterial and antifungal activities against some pathogenic bacteria and fungi. It has been used in the indigenous system of medicine for the treatment of various ailments. 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 (Shah et al., 2003).

## *MATERIALS & METHODS*

The plant material of Butea monosperma, Madhuca indica, Syzygium cumini and Mimusops elengi from different Marathwada region during different season viz. summer, monsoon and winter .The leaves, bark, and wood sample are collected and kept separately. Dried in sun light and make a powder with grinder.

**Determination of lipid (oil)**

Agrawal et al., (1987) method was followed for the estimation of lipid. The material was dried for 12-17 hours at 60-70 0C and ground to a coarse powder. 5 gm of weighed sample was taken in a cellulose thimble (The quantity of material would depend on oil content). The thimble was fixed in the soxhlet funnel and about 150 - 200ml of petroleum ether was taken in the flat bottom flask (FBF) .The funnel over the flask was fixed and attached to the water condenser. Refluxed for at least 4 hours and the heater were switched off to let the apparatus cool (maintaining the water flow as such). Condenser and funnel were detached, petroleum ether was evaporated in FBF over hot plat at 80 0C .When a small quantity (about 10ml) of ether was left in the flask, transferred it in weighed beaker (W1 ) of 50 or 100 ml. Rinsed the FBF twice with small quantities of ether and transferred the washing in the beaker. The beaker was transferred in an oven at 70±10 0C till ether evaporated (presence of ether can be detected by its smell). The beaker was cooled in a desiccators and weight (W2). Difference of (W1-W2) would give the oil content. The oil percentage was

calculated on the basis of the weight of plant material.

**Total Alkaloids**

Quantitative estimations of alkaloids were carried out following method of Sairam and Khanna 1971. Each sample was ground to fine powder. To each one gram powder 0.75ml 25%ammonium hydroxide, 1ml 95% ethyl alcohol and ml ethyl ether were added. The material was allowed to macerate for 12 hours and dried. The dried material was extracted with chloroform for 24 hours in a soxhlet apparatus and the extract obtained was evaporated to dryness and the residue was mixed with 2.5 ml 0.1 Methanol (90%) HCl. The extract thus obtained was centrifuged to take supernatant and discard pellet. The solution was evaporated and the total alkaloids were weight after drying at 100 0C.

## *RESULTS AND DISCUSSION*

The estimation of lipid and alkaloid content was carried out in different parts like leaves, bark and wood of four taxa during summer, monsoon and winter for two consecutive years.

● **Butea monosperma-Lam.**

The lipid concentration of leaves was higher in summer (25.95 mg/gm) (Significant at 1% and 5% levels based on 't'test) over that of monsoon (22.5 mg/gm) and winter (24.25 mg/gm). The bark of lipid concentration was ranging from 18.35 to 19.85mg/gm and significantly higher in summer (19.85 mg/gm) (Table- 1) the lipid content of wood was comparatively low (9.7 to 10.45 mg/gm).

The alkaloids content of leaves was ranging from 1.55mg/gm to 2.15 mg/gm and attained its peak concentration (2.15 mg/gm) during summer season. Alkaloids range content was from 1 mg/gm to 1.5 mg/gm in bark and from 1.25 to 1.85 mg/gm in wood during the three seasons tested. Highest concentration observed in summer season i.e. 1.5 mg/gm and 1.85 mg/gm in bark and wood respectively. The lipid and alkaloids content were in increasing order from bark<wood<leaves. (Table 1).

● **Madhuca indica Gmel:**

The Madhuca indica had stored more Lipid (12.55 to15.8 mg/gm) in leaves over that of monsoon (12.55 mg/gm) and winter (14.55 mg/gm).In bark highest concentration was

observes in summer (8.3 mg/gm) over than in monsoon and winter respectively. And in Wood show very low concentration range from 1.3 to 2.2 mg/gm.

The alkaloids content of leaves was higher in summer (1.85mg/gm) (significantly at 0.1 and 1 % levels based on 't' test) than the monsoon (1.45 mg/gm) and winter (1.6 mg/gm). Similarly, the alkaloids content of bark was higher (significantly different at 5 %from others based on't' test) in summer (1.4 mg/gm) over that of monsoon (1.05 mg/gm) and winter (1.275 mg/gm). The wood witnessed very low alkaloids contents if ranging from 0.45 to 0.8 mg/gm. The lipid and alkaloids content were in increasing order from wood<bark<leaves (Table 1).

● **Syzygium cumini Linn:**

The lipid content of leaves was higher (significantly different other than 1% level based on 't' test in summer (27.475 mg/gm) over than monsoon (24.45 mg/gm) and winter (26.55 mg/gm) (Table-8c) The range of lipid content of bark was from 13.15 to16.3 mg/gm. Highest level in bark was being observed during summer (16.3 mg/gm). the wood was poor in having lipid content (from 5.65 to 8.05 mg/gm).

Syzygium cumini accumulated highest level of alkaloids in its leaves over than bark and wood, and these trends of observation were similar to Butea monosperma and Madhuca indica – throughout the course if investigation. The lipid and alkaloids content were in increasing order from wood<bark<leaves. (Table 1).

● **Mimusops elengi Linn:**

The lipid concentration of leaves was higher in summer (32.7 mg/gm)over that of monsoon (29.75 mg/gm) and winter (30.7 mg/gm).The bark of lipid concentration was ranging from 13.5 to 16.8 mg/gm) Summer (16.8 mg/gm)show highest content over other season i.e. monsoon (13.5mg/gm) and winter( 14.7 mg/gm).

The alkaloids contents of leaves ranging from 0.8 to 2.0 mg/gm .Highest content of alkaloid observed at summer (2.6 mg/gm) over than monsoon (0.8 mg/gm) and winter (1.8 mg/gm) respectively. (Table8d) Bark range of alkaloids from low concentration than leaves from 1.15 to 1.6 mg/gm). The lipid and alkaloids content were in increasing order from wood<bark<leaves (Table1).

**Table 1.**

**Seasonal variation of some organic constituents levels of different plants parts of *Butea monosperma, Madhuca indica, Syzygium cumini and Mimusops elengi***

| Plant parts | Season | Lipid (mg/g dry wt.) | | | | Alkaloids (mg/g dry wt.) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Plant 1 | Plant 2 | Plant 3 | Plant 4 | Plant 1 | Plant 2 | Plant 3 | Plant 4 |
| Leaves | Summer | 25.95 | 15.8 | 27.47 | 32.7 | 2.15 | 1.85 | 1.75 | 2.0 |
| | Monsoon | 22.5 | 12.55 | 24.45 | 29.75 | 1.55 | 1.45 | 1.25 | 0.8 |
| | Winter | 24.25 | 14.55 | 26.55 | 30.7 | 1.85 | 1.6 | 1.55 | 1.8 |
| Wood | Summer | 10.45 | 2.2 | 8.05 | 16.8 | 1.85 | 0.8 | 0.6 | 1.6 |
| | Monsoon | 9.25 | 1.3 | 5.65 | 13.5 | 1.25 | 0.45 | 0.345 | 1.15 |
| | Winter | 9.7 | 1.85 | 6.45 | 14.7 | 1.5 | 0.65 | 0.465 | 1.3 |
| Bark | Summer | 19.85 | 8.3 | 16.3 | 23.6 | 1.5 | 1.4 | 1.4 | 2.1 |
| | Monsoon | 18.35 | 5.21 | 13.15 | 21.5 | 1 | 1.05 | 1.1 | 1.6 |
| | Winter | 19.4 | 7.1 | 14.8 | 22.9 | 1.25 | 1.275 | 1.25 | 1.9 |

**Plant 1. *Butea monosperma***

**Plant 2. *Madhuca indica***

**Plant 3. *Mimusops elengi***

## *REFERNCES*

1. Agarwal AK, Tripathi DM, Sahai R, Gupta N, Saxena RP, Puri A, Singh M, Mishra RN, Dubey CB and Saxena KC: Management of giardiasis by a herbal drug 'Pippali Rasayana': a clinical study. J Ethnopharmacol. 1997; 56: 233–236.

2. Agrawal PK, Daldlani M and Shraval: Technique in seed science and technology, India Agriculture Research Institute, New Delhi. 1987; 11: 107-112.

3. Burli and Khade AB: A Comprehensive review on *Butea monosperma* (Lam.) Kuntze Pharmaconognosy Reviews. 2007; 1.

4. Bhuiyan MA, Mia MY and Rashid MA: Antibacterial principles of the seed of Eugenia jambolana, Banga J. Botany. 1996; 25: 239-241.

5. Indrayan AK, Sharma S, Durgapal D, Kumar N and Kumar M: Determination of nutritive value and analysis of mineral elements for some medicinally valued plants from Uttaranchal. Current Sci. 2005; 89: 1252-1255.

6. Kasture VS, Deshmukh VK and Chopade CT: Anxiolytic and Anticonvulsive Activity of Sesbania grandiflora leaves in experimental animals, Phytochemical. Res. 2002; 16: 455-460.

7. New Wall CA, Anderson LA and Phillipsan JD: Herbal medicines- A guide for healthcare professionals. The Pharmaceutical Press, London of Clinical Pathology. 1996; 45: 493-496

8. Patil MV, Pawar S and Patil DA: Ethno botany of *Butea monosperma* (Lam.) Kuntze 2006: in North Maharashtra, India. Nat. Prod. Rad. 2006; 5(4): 323-25.

9. Sairam TV and Khanna P: Effect of tyrosine and phenylalanine on growth and production of alkaloids in Datura tubul, Tissue Culture. Lloydia. 1971; 34 :170-171

10. Shah PJ, Gandhi MS, Shah MB, Goswami SS and Santani D: Study of Mimusops elengi bark in experimental gastric ulcers. Journal of Ethnopharmacol. 2003; 89: 305-311.