

Biochemical Evaluation of Two Endangered Medicinal Taxa of Marathwada Region

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Abstract

The seasonal variation of protein and amino acid content have been investigated from leaves, wood and bark of *Madhuca indica* and *Mimusops elengi*. *Madhuca indica* and *Mimusops elengi* are the medicinally important plant of Marathwada region. Comparative account of protein contents of leaves, wood and bark of *Madhuca indica* showed higher level (range 5.57 to 7.74mg/g dry wt.) than *Mimusops elengi* (range 2.66to 4.93 mg/g dry/wt.).The leaves of *Madhuca indica* showed high level of amino acid content (range 0.42 to 0.94 mg/g/dry wt.) and wood of *Mimusops elengi* was lower amino acid content (range 0.41 to 0.88mg/g dry wt.).

1. Introduction

Almost all the parts of the plant are being used since decades in medicine and for other purposes. These days herbal medicines are more popular than modern medicine because of their effectiveness, easy availability, low cost and for being comparatively devoid of side effects. Nature always stands a golden mark to exemplify the outstanding phenomenon of symbiosis and it has provided the storehouse of remedies to cure all ailments of mankind, only the thing is that there is a need to evaluate them scientifically.

Madhuca indica 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 (Henry *et al.*, 1987). 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. *Madhuca indica* flowers are known as energy rich material and used as animal as well as human feed (Jain, 1996). Flowers are very effective in increasing the flow of milk in nursing mothers. The seeds also have similar property. Flowers are used for making local wine. The distillation product of flowers gives a spirit which has healing, astringent, tonic, and appetizer properties. Oil of *Madhuca* sp. has anti-insecticidal activity against *Callosobruchus cinensis* (Chander and Ahmed, 1986; Katole *et al.*, 1996) the fleshy petals are eaten as raw or cooked and country spirit is made from flowers which are a

favorite drink of tribal people in India. A decoction of bark can be given internally in rheumatic pains. The oil extracted from seeds can also be applied externally on the affected areas. The oil extracted from seeds is used in cooking, soap making and manufacture of margarine. Flowers are used as sweet, some ethnic food like chapati are prepared by tribal women. Mahua cake is used as manure; it has pesticidal properties.

Earlier report reveals that the fruits of *Mimusops elengi* are used in chronic dysentery, constipations; 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 disease called Ahwa in which strong fever, headache, ulcers and pain in the neck, shoulders and other parts of body (Mali *et al.*, 2007). . Ripened fruits facilitates in burning urination. The ripe fruit pounded and mixed with water is given to promote delivery in childbirth. Fruits are used as astringent, coolant and anthelmintic. The tender stems are used as tooth brushes, and in cystorrhoea, diarrhea and dysentery. The seeds are used in constipation .A decoction of the bark of *Mimusops* is given as a gargling agent for diseases of gum and teeth and for infections in bladder and urethra, Barks are used to increase fertility in women and known to have antiulcer activity (Shah *et al.*, 2003). They are rich source of tannin, saponin, alkaloids, glucoside, and ursolic acid (Anonymous, 1969).

2. Materials and Methods

The plant material of *Madhuca indica* and *Mimusops elengi* were collected from Marathwada region for the estimation of protein and amino

acid during different season viz. summer (April), Monsoon (June) and winter (November) continuous for two years . The chemical analysis of protein and amino acids in five replicate have been carried out in leaf, bark and wood .Results were statistically analyzed for ‘t’ test comparison method.

The protein was quantitatively estimated by the Lowry *et.al* (1951).

1gm plant material was homogenized with 10ml 80% ethanol. The extract was centrifuged at 5000rpm for 5 min and the supernatant was discarded. 5% 10 ml trichoroacetic acid (TCA) or perchloric acid (PCA) was add to residue and incubated at 80c for 20 minutes. The pallette was recentrifuged and the supernatant was discarded. Residue was washed with 10 ml distilled water and again recentrifuged. The supernatant was discarded. 2% 10 ml Na₂co₃ in 0.1 N NaoH was add to the residue and incubated for an hour at 30 c. Again centrifuged and residue was discarded. The final volume of supernatant was measured and it was used as a sample for protein. 1ml of aliquot of sample was taken and 5ml reagent C was added to it and mixed thoroughly. The sample was incubated for 10 minutes and 1ml of reagent D was added to it. The color intensity was read at 660nm using spectrophotometer.

The estimation of total amino acid was adapted by Krishnamurthy *et al* (1989) method

500mg plant material was grounded in mortar and paste with few drops of cold 80% ethanol. Then 2.5 ml of distilled water and 10ml of boiling 80% ethanol were added to it. The extract was centrifuged for 15 minutes at 10,000 rpm. Residue was discarded. The supernatant was collected and total volume was made 15ml with distil water.1ml of sample was taken in a test tube and 3ml

alcoholic ninhydrin was added to it. Test tube was kept at 60c for 20 minutes. The test tubes were cooled and 1ml 50% ethanol was added. Read at 420nm in spectrophotometer. Glycine was used as standard.

3. Results and Discussion

Madhuca indica

The protein content of leaves was higher (7.744 mg/gm) in summer, (7.726 mg/gm) in winter and (7.313 mg/gm) in monsoon. The range of protein content of bark was from 6.642 to 7.135 mg/gm higher levels during summer (7.135 mg/gm). The stem has low percentage of protein content as compare to leaves and bark. protein range of stem from 5.57 to 5.903mg/g and show higher in monsoon (5.903 mg/g) The percentage of protein content were increasing in order stem <bark<leaves . (Table 1 and Graph 1).

The amino acids content of leaves of *Madhuca indica* ranged from 0.64 to 0.94mg/gm .The monsoon show higher 0.94mg/gm as compared to winter 0.64mg/gm and summer 0.849mg/gm. The amino acids content of bark of *Madhuca indica* ranges from 0.42mg/gm to 0.64mg/gm. The summer show higher 0.64mg/gm than winter 0.562mg/gm and monsoon 0.42mg/gm respectively. The stem shows low amino acid content compared to leaves and bark. It ranges from 0.45mg/gm to 0.54mg/gm. The stem of *Madhuca indica* show higher amino acid in summer 0.54mg/gm than winter 0.53mg/gm and monsoon 0.45mg/gm.The percentage of amino acids content was found to be in increasing order wood < bark < leaves (Table 1 and Graph.1).

Graph:-1: Protein and amino acid of *Madhuca indica* and *Mimusops elengi*

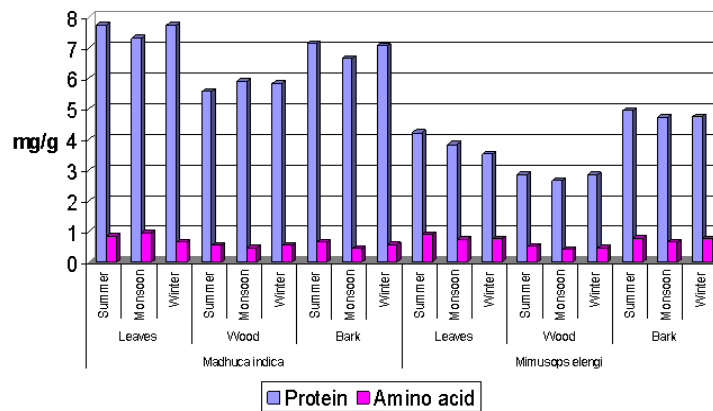


Table. 1 – Estimation of Proteins and Amino Acids of different plant parts of *Madhuca indica* and *Mimusops elengi*

Name of the plant	Plant parts	Season	Protein (mg/g dry wt)			Amino acid (mg/g dry wt)		
			1 year	2year	mean	1 year	2year	Mean
<i>Madhuca indica</i>	Leaves	Summer	7.82	7.669	7.744	0.852	0.846	0.849
		Monsoon	7.416	7.211	7.313	0.944	0.936	0.94
		Winter	7.723	7.729	7.726	0.614	0.666	0.64
	Wood	Summer	5.982	5.158	5.57	0.526	0.566	0.546
		Monsoon	5.811	5.995	5.903	0.47	0.432	0.451
		Winter	5.962	5.679	5.820	0.536	0.526	0.531
	Bark	Summer	7.002	7.268	7.135	0.626	0.66	0.643
		Monsoon	6.829	6.455	6.642	0.417	0.432	0.424
		Winter	6.971	7.13	7.050	0.588	0.536	0.562
<i>Mimusops elengi</i>	Leaves	Summer	4.152	4.285	4.2185	0.888	0.88	0.884
		Monsoon	3.797	3.877	3.837	0.77	0.714	0.742
		Winter	3.494	3.555	3.524	0.76	0.766	0.763
	Wood	Summer	2.872	2.802	2.837	0.506	0.518	0.512
		Monsoon	2.66	2.70	2.66	0.402	0.424	0.413
		Winter	2.801	2.89	2.845	0.491	0.44	0.465
	Bark	Summer	5.101	4.777	4.939	0.796	0.75	0.773
		Monsoon	4.852	4.607	4.729	0.616	0.666	0.641
		Winter	4.851	4.644	4.747	0.74	0.758	0.749

Mimusops elengi

The range of protein content of leaves was from 3.524mg/gm to 4.21mg/gm. Highest was being observed in summer (4.21mg/gm). The bark had higher level in summer 4.93mg/gm as comparatively winter 4.74mg/gm and monsoon 4.729mg/gm. The protein content of wood was comparatively low (from 2.66 to 2.84mg/gm) if show higher in winter (2.84mg/gm) than summer (2.83mg/gm) and monsoon (2.66mg/gm). The percentage of protein content is in increasing Stem < bark < stem. (Table1 and Graph 1).

The amino acid content of leaves of *Mimusops elengi* ranged from 0.74mg/gm to 0.88mg/gm. The summer show 0.88mg/gm it higher as compared to winter 0.76mg/gm and monsoon 0.74mg/gm. The range of amino acids in bark of *Mimusops elengi* from 0.64mg/gm to 0.77mg/gm Higher during summer 0.77mg/gm than winter 0.74mg/gm and monsoon 0.64mg/gm the range of amino acids content stem was from 0.41mg/gm to 0.51mg/gm. The summer show higher amino acid content 0.51mg/gm as compared to winter 0.46mg/gm and monsoon 0.41mg/gm. (Table 1 and Graph.1).

References

- Anonymous. 1969. The Wealth of India. Vol III. Publications and information Directorate, CSIR, New Delhi, India.
- Chander, A and Ahmed, S.M., 1986. Efficacy of oils from medicinal plants as protectants of green gram against the pulse beetle *Callosobruchus chinensis*. Entomology, 11 (11): 121-126.
- Henry, AN., Kumar G.R and Chithra, V., 1987. Flora of Tamilnadu, India, Series 1, Vol. II. BSI Southern Circle, Coimbatore, India
- Katole, SR, Mahajan, RK and Satpute, U.S., 1996. Efficacy of some non-edible oils and insecticides against citrus black fly nymphs. P.K V. Research Journal, 20(1): 25-27
- Krishnamoorthy, R., Ambazhagan, Mand Bhagwat, K.A 1989. Testing salt tolerant variability in the nutritional quality of seeds produced by rice cultivars subjected to salinity. Seed Science and Technology. 17: 269-275.
- Lowry, O.H., Rosebrough, N.J Farr, A.L and Randall, R.J.1951. Protein measurement with the Folin-phenol reagent. J.Biol.Chem. 193:265-275
- Mali R.G., Mahajan S.G and Mehta A.A. 2007. PHCOG MAG.: Research Article In-vitro anthelmintic activity of stem bark of *Mimusops elengi* Linn. Pharmacognosy Magazine ISSN: 0973-1296
- Shah, P.J., Gandhi, M.S., Shah, M.B., Goswami, S.S. and Santani, D. 2003. Study of *Mimusops elengi* bark in experimental gastric ulcers. Journal of Ethnopharmacol 89:305-3.