

## ESTIMATION OF SUGARS AND MINERALS IN HEALTHY AND INFECTED PARTS OF *MEMECYLON UMBELLATUM* BURM

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### ABSTRACT

Different parts of *Memecylon umbellatum* were found infected during rainy season by fungi. To investigate the effect of these fungi on some of the basic metabolites like minerals and sugars, the present study was undertaken. Here we have collected healthy and infected leaves and bark samples from infected plants in rainy season (July-August). Sugar content was estimated by simple titrimetric method using benedict's quantitative reagent and mineral contents were estimated by atomic absorption using acid hydrolysis method. Both healthy and infected parts showed presence of reducing and non reducing sugars along with minerals such as iron, calcium, magnesium, manganese, lead etc. Total sugar content was found maximum in inflorescence (526.31mg/dl) and minimum in case of root (128.20 mg/dl). The reducing and non reducing sugars were also found maximum (294.11 mg/dl and 232.20 mg/dl) in inflorescences compare to all other parts studied. In case of inflorescence the difference between reducing and non reducing sugar is less (61.91 mg/dl) while in bark it was found more (164.51 mg/dl) compare to other parts tested. Healthy bark (5.898 mg/100g) and leaves (4.980mg/100g) showed maximum content of iron compare to other healthy and infected parts. Infected leaves and bark showed more deposition of calcium and magnesium compare to healthy leaves while all other minerals were decreased with respect to healthy leaves and bark which indicates the utilization of these minerals by pathogenic fungus specially iron content to great extent.

**KEYWORDS:** Sugars, Minerals, *Memecylon umbellatum*, atomic absorption.

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## INTRODUCTION

*Memecylon umbellatum* Burm. (Family: Melastomataceae) is small evergreen shrub or tree having young terete branches and bears numerous umbellate cymes. The plant is known as “Anjani” in Sanskrit and “Ironwood tree” in English. Plants are distributed mostly in coastal regions of the deccan peninsula, the eastern and southern part of India all along Western ghats and in the Andaman islands.<sup>1, 2</sup> The leaves have been reported to possess astringent properties and are given to treat leucorrhoea and gonorrhoea. Lotion prepared from leaves is used to treat eye troubles. The decoction of the root is used in the treatment of excessive menstrual discharge.<sup>3</sup> Leaves are also reported to possess antiviral activity.<sup>4</sup> Bark is used in the treatment of bruises externally as lepa along with coconut kernels (Dymock). The literature survey reveal that leaves and roots of *Memecylon umbellatum* have been investigated for its hypoglycemic activity using alloxan induced hyperglycemic wistar albino rats.<sup>5, 6</sup> Wound healing activity of ethanolic extract of leaves has also been reported.<sup>7</sup> Antipyretic, analgesic, anti-inflammatory, hepatoprotective, nephroprotective, anthelmintic and anti-insect activities of root drug has also been reported.<sup>8-12</sup> Plant contains wide variety of phytoconstituents such as umbellactone,  $\beta$  amyryne, oleanolic acid, ursolic acid, sitosterol and organic acids.<sup>13, 14</sup> Plants were found infected during rainy season by the fungus *Meliosa memecylica* for leaves and *Meliosa memecyliopa* for bark. Hence the present study is designed to check the effect of the fungi on mineral and sugar content in healthy and infected parts of the plant by estimating the total sugar content and individual minerals.

## MATERIALS AND METHODS

Healthy as well as infected leaves and bark of *Memecylon umbellatum* were collected in the month of July-August from Gaganavda region, Maharashtra, India. The plant material was taxonomically identified by Dr. S. R. Yadav, Department of Botany, Shivaji University, Kolhapur, India. The voucher specimen (SGK-1) was deposited in department of Pharmacognosy, Bharati Vidyapeeth College of Pharmacy, Kolhapur. The infected fungi were identified by Dr. T. Nagraj, Dept. of plant pathology, New College Kolhapur (MS). All the chemicals and reagents used were analytical grade (Merck and Loba). Mineral content was determined using atomic absorption spectra (Perkin Elmer A Analyst 200) at Shivaji University, Kolhapur.

### Drying and powdering of plant material

Leaves and bark (healthy and infected) collected during rainy season were dried artificially in tray dryer at 45<sup>0</sup>C for one week with repeated ups and down turning of material. Dried material was powdered using electric blender (Bajaj) and sieved through # 80 for further use.

### Estimation of sugar content in healthy and infected parts

Reducing and non reducing sugar from different parts was estimated by titrimetric method using Benedict's quantitative reagent. The reagent was standardized using glucose stock solution (2mg/ml). Sample stock solutions were prepared by weighing 5g powder and macerated for 24h with 100ml distilled water for reducing sugar while for non reducing sugar samples were boiled for 30min with 5ml of 0.1N HCl on water bath with 25ml of distilled water. After filtration the volume was adjusted to 100ml with distilled water. 5ml of each sample solution was then treated with fresh Benedict's reagent drop wise from burette in warm condition until blue color changes to whitish. From the burette volume amount of sugar was calculated using formula 5ml BR=10mg sugar. By calculation using dilution factor the reducing, non- reducing and total sugar from different healthy and infected parts were determined and values<sup>15</sup> are given in **Table 1**.

### Determination of mineral content in healthy and infected parts

1gm of powder sample of each part was digested with 10ml of equal proportion of strong perchloric, nitric and sulphuric acid for 10 min or till fumes were ceased. The mixture was filtered through whatman filter paper and volume was diluted to 10ml with double glass distilled water. The samples were analyzed for mineral content after sufficient dilutions as required with double glass distilled water using atomic

absorption technique (Shivaji University Kolhapur)<sup>16</sup>. The average of triplicate results for mineral content were reported in **Table 2**.

## RESULT AND DISCUSSION

Among all the tested parts total sugar content was found to be maximum (526.31mg/dl) and minimum (128.20 mg/dl) in air dried samples of inflorescences and healthy roots respectively. The reducing and non reducing sugars were also found maximum (294.11 mg/dl and 232.20 mg/dl) in inflorescences compare to all other parts studied. Also it was observed that reducing, non-reducing and total sugar content decreased in infected leaves and bark compare to healthy parts indicating the utilization of sugars by the fungi. Reducing sugars were found more compare to non reducing sugars in all the tested parts. In case of inflorescence the difference between reducing and non reducing sugar is less (61.91 mg/dl) while in bark it was more (164.51 mg/dl) compare to other parts tested. Similarly Healthy bark (5.898 mg/100g) and leaves (4.980mg/100g) showed maximum content of iron compare to other tested parts. Next to iron, parts showed more amount of calcium, manganese and minimum content of cobalt. Bark contains more zinc content (0.515mg/100g) compare to other parts The results showed that infected leaves shows more deposition of calcium and magnesium compare to healthy leaves while all other minerals were decreased with respect to healthy leaves which indicates the utilization of these minerals by pathogenic fungus specially iron content to great extent. In case of bark there is decrease in all the minerals tested again verified the utilization of these vital elements by parasitic fungus.

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**Table 1: Estimation of Sugar Content in Healthy and Infected Parts**

Sr.no.	Sample	Burette reading in ml		Sugar content* mg/dl		
				Reducing	Non reducing	Total
1.	Leaf healthy	5.3	3.4	188.6	105.51	294.11
2.	Leaf infected	10.5	8.7	95.23	19.71	114.94
3.	Bark healthy	4.6	3.7	217.39	52.88	270.27
4.	Bark infected	8.3	6.4	120.48	35.77	156.25
5.	Root healthy	11.5	7.8	86.95	41.25	128.20
6.	Stem wood healthy	8.5	6.8	117.64	29.41	147.05
7.	Inflorescence healthy	3.4	1.9	294.11	232.20	526.31

\*Average of five determinations

**Table 2: Mineral Content of Healthy and Infected Leaf and Bark**

Sr.no.	Part used	Mineral content mg <sup>-1</sup> 100g						
		Ca	Mg	Fe	Mn	Zn	Pb	Co
1.	Leaf healthy	1.390	0.241	4.980	1.130	0.115	0.108	0.008
2.	Leaf infected	2.732	0.319	1.153	0.620	0.102	0.068	0.002
3.	Bark healthy	2.303	0.252	5.898	0.552	0.515	0.196	0.078
4.	Bark infected	1.594	0.104	1.352	0.405	0.327	0.171	0.045

\* Average of three determinations

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