Biochemical profile of *Boswellia serrata* and *Rhus mysorensis*

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INTRODUCTION

India has one of the oldest, richest and most diverse cultural traditions associated with the use of medicinal plants as medicine like Ayurveda, Siddha, Unani and the Tibetan systems. Indian economy depends greatly on the number of wild plant species. The forest of Maharashtra covers a huge area of 61,939 sq. km. thus covering about 21% of the total land. The forest of Dhule district covers an area of 209 thousand Hectors which is 28.5% of the total state area. In the present study of plant diversity of Laling forest situated in Dhule district. Laling forest area has spread over 4200 hectares. The Laling forest spread around the Laling fort and situated 9.65 kilometers away from Dhule city. The forest area around the Laling fort having rich plant diversity. Many medicinal plants, herbs, shrubs, climbers and evergreen trees spread Laling forest around the Laling fort. Medicinal plants have been used as traditional treatments for numerous human diseases for thousands of years. Since time immemorial, plants and their products have been the primary resource of food, shelter, clothing, flavors, and fragrances as also valuable ingredients for medicines for mankind. In this context, natural resins have played an important role. These have also been used as adhesives, as ingredients for cosmetic preparations, as fragrances in daily rituals and in religious ceremonies, as coating materials and also for their different curative powers.

In ancient times, Hindus, Babylonians, Persians, Romans, Chinese and Greeks as well as the people of old American civilizations used natural resins primarily for embalming and for its incense in cultural functions. They firmly believed that when these materials get in contact with fire, the smoke and the fragrance they produce not only soothe their souls but also please their gods. Burning of these natural resins had become an important component of their cultural life. They burned these resins during sacrificial ceremonies and in their daily rituals to prevent the influence of evil spirits on their souls or to honour the dead or living ones. *Boswellia serrata* (Sala/Sala guggul) (Family: Burseraceae; Genus: *Boswellia*) is a moderate to large sized branching tree that grows in dry mountainous regions of India, Northern Africa and the Middle East. Since ancient times, three of these species have been considered as 'true Frankincense' producing trees.

In addition to its beneficial use for arthritis, this gummy resin is also mentioned in traditional Ayurvedic and Unani texts as an effective remedy for diarrhoea, dysentery, ringworm, boils, fevers (antipyretic), skin and blood diseases, cardiovascular diseases, mouth sores, bad throat, bronchitis, asthma, cough, vaginal discharges, hair-loss, jaundice, hemorrhoids, syphilitic diseases, irregular menses and stimulation of liver. It is also diaphoretic, astringent, and diuretic and acts both as internal and external stimulant. Modern medicine and pharmacology strongly point out to its use as an antiarthritic, antiinflammatory, antihyperlipidemic (controls blood lipids), antiatherosclerotic (anticoronary plaque), analgesic (pain-reliever) and hepatoprotective (protects the liver).

The plant *Rhus mysorensis* is known to possess various active constituents like steroids, alkaloids, flavonoids, glycosides, tannins and Phenols. The plant is screened for...
hepatoprotective, anti-diabetic, hypolipidemic, antimicrobial and anti-oxidant activity. The increasing demand of plant extracts to use in the cosmetic, food and pharmaceutical industries suggests that systematic studies of medicinal plants are very important in order to find active compounds and their use as a medicine for curing various diseases. According to World Health Organization, medicinal plants would be the best source to obtain a variety of drugs. Therefore, such plants should be investigated to better understand their properties, safety and efficacy. Rhus mysorensis is one among such medicinal traditionally used plants. Fruits are used to treat Dysentery; Leaf decoction is given in itching.

The phytochemical constituents and medicinal properties of most of the medicinal plants were recorded in the last few decades by a number of workers. These medicinal plants are subjected to various processes and are then administrated to the patients. The survey and documentation of medicinally important plants in each and every place is very much important for easy identification of local traditional healers, conservation and sustainable utilization. Plants have always played a major role in the treatment of human traumas and diseases worldwide. They have been used as sources of modern drugs, either by providing pure compounds, starting materials for partial documentation of medicinally important plants. Among these, Rhus mysorensis is one among such medicinal traditionally used plants. Fruits are used to treat Dysentery; Leaf decoction is given in itching.

RESULTS AND DISCUSSION

1) Boswellia serrata - The continuous two year investigation showed that the seasonal variation in protein content of leaves are (range from 2.467 to 2.754 mg/g dry wt.), higher level of proteins observed at summer i.e. 2.754 mg/g dry wt. as compared to winter 2.557 and monsoon 2.467 mg/g dry wt. In wood it was observed that at summer 2.292 mg/g dry wt. of protein accumulates and are higher than winter i.e. 2.265 mg/g dry wt. and monsoon 2.186 mg/g dry wt. The protein found in the bark (range from 1.897 mg/g dry wt. to 2.087 mg/g dry wt.), higher level observed in summer 2.087 mg/g dry wt. as compared to winter 1.990 mg/g dry wt. and monsoon 1.897 mg/g dry wt. The percentage of protein were found to be increasing order of leaves < wood < bark.

The amino acids ranges of leaves show from 0.993 mg/g dry wt. to 1.074 mg/g dry wt. highest level observed at summer season i.e. 1.074 mg/g dry wt. as compared to winter i.e. 1.032 mg/g dry wt. and monsoon 0.993 mg/g dry wt. In wood amino acids accumulation observed high at summer 1.013 mg/g dry wt. as compared to winter i.e. 0.954 mg/g dry wt. and monsoon i.e. 0.917 mg/g dry wt. The amino acids accumulation in leaves show higher than wood and bark. Bark show higher accumulation of amino acids at summer, winter and monsoon i.e. 0.943 mg/g dry wt. than leaves 0.923 mg/g dry wt. and monsoon 0.911 mg/g dry wt. The concentration of amino acids were found to be increasing order of leaves < wood < bark (Table No. 1; Graph No. 1).

2) Rhus mysorensis - The protein content of leaves show ranges from 2.166 to 2.312 mg/g dry wt. much more observed in summer 2.312 mg/g dry wt. than in winter 2.235 mg/g dry wt. and in monsoon 2.166 mg/g dry wt. In wood highest level protein observed at summer 2.187 mg/g dry wt. as compared to winter 2.123 mg/g dry wt. and monsoon 2.067 mg/g dry wt. while in bark protein accumulated much more in summer 2.111 mg/g dry wt. than winter 1.964 mg/g dry wt. and monsoon 1.846 mg/g dry wt. The percentage of protein were found to be increasing order of leaves < wood < bark.

The amino acid content of leaves showed higher than wood and bark. In leaves, amino acid ranges from 0.823 mg/g dry wt. to 0.896 mg/g dry wt. higher accumulation of amino acid observed at summer 0.896 mg/g dry wt. than winter 0.865 mg/g dry wt. and monsoon 0.823 mg/g dry wt. The range of amino acid content of wood was between 0.811 mg/g dry wt. than winter 0.854 mg/g dry wt., showed lower than leaves. Higher level observed at summer i.e. 0.854 mg/g dry wt. as compared to winter 0.823 mg/g dry wt. and monsoon 0.811 mg/g dry wt. while in bark, higher accumulation of amino acid observed at summer 0.801 mg/g dry wt. than in winter 0.787 mg/g dry wt. and monsoon 0.745 mg/g dry wt.
Table 1: Seasonal variation of proteins and amino acids levels of different plants parts of *Boswellia serrata* and *Rhus mysorensis*

| PLANT PARTS | SEASON | PROTEINS (Mg/g dry wt.) | AMINO ACIDS (Mg/g dry wt.) |
|-------------|--------|------------------------|--------------------------|
|             | Plant 1 | Plant 2 | Plant 1 | Plant 2 |
| Leaves      |         |          |         |         |
| Summer      | 2.754   | 2.312    | 1.074   | 0.896   |
| Monsoon     | 2.467   | 2.166    | 0.993   | 0.823   |
| Winter      | 2.557   | 2.35     | 1.032   | 0.865   |
| Wood        |         |          |         |         |
| Summer      | 2.292   | 2.187    | 1.013   | 0.854   |
| Monsoon     | 2.186   | 2.067    | 0.917   | 0.811   |
| Winter      | 2.265   | 2.123    | 0.954   | 0.823   |
| Bark        |         |          |         |         |
| Summer      | 2.087   | 2.011    | 0.943   | 0.801   |
| Monsoon     | 1.897   | 1.846    | 0.911   | 0.745   |
| Winter      | 1.990   | 1.964    | 0.923   | 0.787   |

Graph 1: Seasonal variation of proteins and amino acids levels of different plants parts of *Boswellia serrata* and *Rhus mysorensis*

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