The Phytochemical Analysis Of Gum Samples From Gadchiroli District, Maharashtra, India.

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Abstract: The phytochemical analysis of three gum samples, *acacia nilotica*, *butea monosperma* and *sterculia urens* were done in three solvents (hot water, ammonia (aerial) and benzene). These gum samples collected from six tahasils of Gadchiroli district of Maharashtra. All these samples were subjected to detection of alkaloids, saponins, tannins and phenols, carbohydrates, glycosides, proteins and amino acids, steroids and flavonoids analysis. The analysis result concluded that, tannins and phenols, saponins, carbohydrates and glycosides were present in most of the solvents which were used in the present analysis.

Keywords: phytochemical, analysis, gum, gadchiroli.

Introduction:

Gadchiroli is one of the district of Maharashtra, which is situated at the north-east side with the north latitude 19-21 degree and east longitude 80-81 degree. The geographical area of Gadchiroli district is 14412 sq. km., where 78.40% is reserve forest.1

The population of Gadchiroli district is 10,71,795, stands with ranking of 424th in India out of 640 districts. The population density of district is 74 inhabitants per sq.km.2 The tribal (S.T) population that resides in the district is 38.3 percent, thus it is categorized as ‘Tribal District’. Similarly, it is also categorized as non-industrial and undeveloped district of Maharashtra. The ministry of Panchayat Raj, India named Gadchiroli district among 250 most backward district of country. The economy of the people from Gadchiroli district depends on only forest product and agriculture.

The use of medicinal plants is the oldest system in the world. The first recorded plant residue of about 60,000 year old was found in Iraq at Nen derth human burial site in 1960. Recently comprehensive floristic accounts have been reported various districts of India, but the Gadchiroli district lagging behind in the study of medicinal plants and herbal medicines.

*Acacia nilotica* is a category of shrubs and trees belonging to a family ‘Fabaceae’, commonly known as ‘Babul’. It is a pantropical and subtropical genus with abundant in India. It occurs naturally, is imperative in tradicional and agro-pattoral system.

*Butea monosperma* belongs to ‘Fabaceae’ family, its common name is Palash. It grows throughout the Indian sub continent. It is considered that the palash tree is a form of Agnidev, ‘God of Fire’. The tree grows up to 50 ft high with cluster of flowers. A tree loses its leaves, when the flowers are developed in the month of January to March. The tree also recognized as ‘Flame of forest’.

*Sterculia urens* is a plant species in the family ‘Steculiaceae’. It is native to India and commonly known as the gum karaya. The word urens means the stinging hairs present on the flowers. It is a medium sized deciduous tree, where the branches spreads horizontally to grow up to 15 meters high. The bark of tree is greenish-grey and the surface layer peeling off in large flakes.

The gum is exuded by the tree when a bark is damaged with an axe to make the deep gashes at a base of a trunks. The plants protect disease and damage of phytochemical, that contributes to the plants aroma, flavour and colour. The plant chemicals protect plant cells from environmental hazards are known as phytochemicals.10,11 Phytochemicals play an important role .Tannins are act as an anstringent12 and quinones are used as antimicrobial agent.13 Similarly, some secondary metabolites are used as a pharmacological tool for studying various biochemical processes.14

Materials and Methods:

i) Study Area: Gadchiroli district is subdivided into twelve tahasils. The gum samples are collected from six following tahasils.
Table 1: Gum collected from this Tahasils

<table>
<thead>
<tr>
<th>Sr.No</th>
<th>Gum Sample</th>
<th>Name of Tahasils</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Acacia nilotica (Babul)</td>
<td>Gadchiroli and Dhanora</td>
</tr>
<tr>
<td>2</td>
<td>Butea monosperma (palash)</td>
<td>Chamorshi and Mulchera</td>
</tr>
<tr>
<td>3</td>
<td>Sterculia urens (karaya)</td>
<td>Kurkheda and Korchi</td>
</tr>
</tbody>
</table>

Gum of Acacia nilotica    Gum of Butea monosperma    Gum of Sterculia urens

**ii) Collection of samples**: The crude gum samples containing mixture of nodules, bark and organic debris are separated by ‘Handpicked select gum method’ to get quality gum.

**iii) Preparation of samples**: The dried samples were grind into fine power and passed through 0.4 mm mesh screen. 1g gum powder dissolved in 100 ml hot water, kept overnight and filtered. The filtered used as gum solution.

**iv) Phytochemical Investigation**: The phytochemical investigation was carried out for all samples as per the standard methods.
Detection of Alkaloids:
Hager’s Test: In 2 ml of gum solution few drops of dil. HCl was added and mixture was filtered. The filtrate was treated with Hager’s reagent (saturated solution of picric acid). Formation of yellow coloured precipitate indicated presence of alkaloids.

Detection of saponins:
Foam test: In 2 ml of gum solution 3-4 ml distilled water was added and mixture was shaken for 10 minutes. If foam produced, indicated presence of saponins.

Detection of Tannins and Phenols:
Ferric chloride solution Test: 2 ml gum solution was mixed with few drops of 5% ferric chloride solution. Appearance of deep blue colour indicated presence of tannins and phenols.

Detection of carbohydrates:
Molisch’s Test: 2 ml gum solution was treated with 3-4 drops of α-naphthol solution in a test tube. 2 ml conc. H$_2$SO$_4$ was added from sides of the test tube. Violet ring is observed at a junction of two liquids indicated presence of carbohydrates.

Detection of Glycosides:
Keller-Killiani Test: 2 ml gum solution was dissolved in a mixture of 1% ferric chloride solution in (5%) glacial acetic acid. Two drops of concentrated sulphuric acid added in the mixture of acidic ferric chloride and observed disappearance of reddish brown colour at a junction of two layers with bluish green upper layer indicated presence of cardiac glycosides.

Detection of Proteins and amino acids:
Biuret Test: 2 ml gum solution was treated with 4% sodium hydroxide and few drops of 1% copper sulphate solution. Appearance of violet or pink colour indicated presence of proteins and amino acids.

Detection of Sterioids:
Salkowski Test: In 2 ml gum solution 2 ml chloroform and 2 ml conc. sulphuric acids was added. Shaken a mixture well and allow to stand for 10 minutes. The chloroform layer appeared red where as an acidic layer showed greenish yellow fluorescence, indicated presence of steroids.

Detection of Flavonoids:
Alkaline reagent Test: 2 ml gum solution was treated with few drops of sodium hydroxide solution. Formation of intense yellow colour, on addition of dil. Sulphuric acid became colourless indicated presence of flavonoids.

Results and Discussion:
Table 2: Preliminary phytochemical investigation of Acacia nilotica

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Chemical Constituents</th>
<th>Test</th>
<th>Hot Water</th>
<th>Ammonia (Aqueous)</th>
<th>Benzene</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Alkaloids</td>
<td>Hager’s Test</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Saponins</td>
<td>Foam Test</td>
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<td>+</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Tannins and phenols</td>
<td>Ferric chloride solution test</td>
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<tr>
<td></td>
<td></td>
<td>Lead Acetate</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Carbohydrates</td>
<td>Molish’s Test</td>
<td>+</td>
<td>+</td>
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<tr>
<td></td>
<td></td>
<td>Fehling’s Test</td>
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<tr>
<td>5</td>
<td>Glycosides</td>
<td>Keller-Killiani Test</td>
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The phytochemical assessment of three gum samples from Gadchiroli district (Acacia nilotica, Butea monosperma and Sterculia urens) concluded that, alkaloids, proteins, aminoacids, steroids and flavonoids are absent in all gum samples. Tannins and phenols, saponins, carbohydrates and glycosides are present in most of the solvents.

Phytochemical studies helpful in a screening of bioactive compounds and help the detect and development of new drugs. Saponins show antidiabetic property. Saponins utilize in various pharmacological activities like anti inflammatory, hypocholesterotemic, immunomodulatory, antifungal, antiparalinic etc. Tannin compounds are act as principal anti oxidants or free radical scavengers. Tannins are reported to have an anti inflammatory cardio- protective, anti carcinogenic, anti muta-genic and antidiabetic properties. Carbohydrates are the

### Table 3: Preliminary phytochemical investigation of Buteamonosperma

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Chemical Constituents</th>
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<th>Ammonia (Aqueous)</th>
<th>Benzene</th>
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<tr>
<td>1</td>
<td>Alkaloids</td>
<td>Hager’s Test</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Saponins</td>
<td>Foam Test</td>
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<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Tannins and phenols</td>
<td>Ferric chloride solution test</td>
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<tr>
<td></td>
<td></td>
<td>Lead Acetate</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>4</td>
<td>Carbohydrates</td>
<td>Molish’s Test</td>
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<td>+</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Glycosides</td>
<td>Keller-Killiani Test</td>
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<tr>
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<td>Proteins and amino acids</td>
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<td>7</td>
<td>Steroids</td>
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<tr>
<td>8</td>
<td>Flavonoids</td>
<td>Alkaline reagent</td>
<td>-</td>
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</tr>
</tbody>
</table>
important source of an energy which ingested by a human body. Glycosides act as an anticancer agent in human.

Bibliography

2. Gadchiroli District Census, 2011
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