

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

Ashwini M .Kadu¹ Suresh B. Rewatkar²

1. Bhiwapur Mahavidyalaya, Bhiwapur Dist. Nagpur, Maharashtra.

2. Gondwana University, Gadchiroli, Maharashtra.

Abstract : The phytochemical analysis of three gum samples, *acacia nilotica*, *butea monosperma* and *sterculia urens* were done in three solvents (hot water, ammonia (aqueous) 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'.³ 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 Neanderthal human burial site in 1960.⁴ Recently comprehensive floristic accounts have been reported various districts of India,⁵ 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'⁶, commonly known as 'Babul'. It is a pantropical and subtropical genus with abundant in India. It occurs naturally, is imperative in traditional and agro-pastoral system⁷.

Butea monosperma belongs to 'Fabaceae' family, its common name is Palash⁸. 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 upto 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 'Sterculiaceae'. It is native to India and commonly known as the gum karaya. The word urens means the stinging hairs present on the flowers.⁹ It is a medium sized deciduous tree, where the branches spreads horizontally to grow upto 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 trunk. 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 act as an astringent¹² 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.

Map of Gadchiroli district

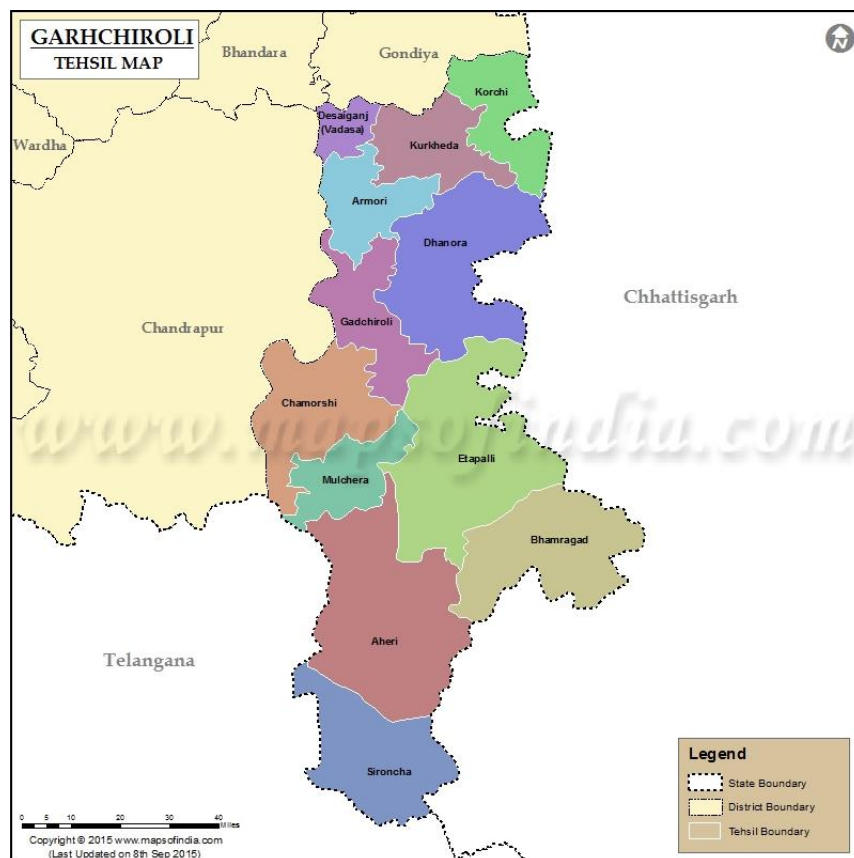
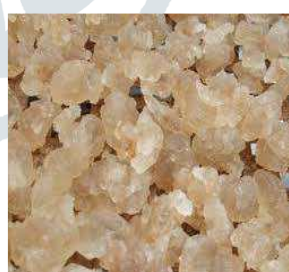
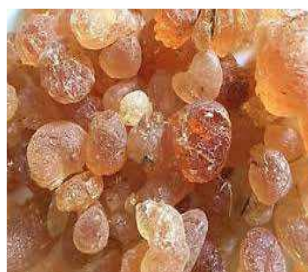


Table 1: Gum collected from this Tahasils

Sr.No	Gum Sample	Name of Tahasils
1	Acacia nilotica (Babul)	Gadchiroli and Dhanora
2	Buteamonosperma (palash)	Chamorshi and Mulchera
3	Steculiaurens (karaya)	Kurkheda and Korchi



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'¹⁵ 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.^{16,17,18}

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_2SO_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-Killani 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 Steroids:

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 whereas 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***

Sr. No.	Chemical Constituents	Test	Hot Water	Ammonia (Aqueous)	Benzene
1	Alkaloids	Hager's Test	-	-	-
2	Saponins	Foam Test	+	+	+
3	Tannins and phenols	Ferric chloride solution test	+	+	+
		Lead Acetate	+	+	-
4	Carbohydrates	Molish's Test	+++	+	-
		Fehling's Test	+	+	+
5	Glycosides	Keller-Killiani Test	+++	-	+

6	Proteins and amino acids	Biuret Test	-	-	-
7	Steroids	Salkowski Test	-	-	-
8	Flavonoids	Alkaline reagent	-	-	-

Table 3 :Preliminary phytochemical investigation of Buteamonosperma

Sr. No.	Chemical Constituents	Test	Hot Water	Ammonia (Aqueous)	Benzene
1	Alkaloids	Hager's Test	-	-	-
2	Saponins	Foam Test	+	+	+
3	Tannins and phenols	Ferric chloride solution test	+	+	+
		Lead Acetate	+	+	+
4	Carbohydrates	Molish's Test	+	+	-
		Fehling's Test			
5	Glycosides	Keller-Killiani Test	+	+	-
6	Proteins and amino acids	Biuret Test	-	-	-
7	Steroids	Salkowski Test	-	-	-
8	Flavonoids	Alkaline reagent	-	-	-

Table 4: Preliminary phytochemical investigation of Sterculia urens

Sr. No.	Chemical Constituents	Test	Hot Water	Ammonia (Aqueous)	Benzene
1	Alkaloids	Hager's Test	-	-	-
2	Saponins	Foam Test	-	+	-
3	Tannins and phenols	Ferric chloride solution test	+	+	+
		Lead Acetate	+	+	+
4	Carbohydrates	Molish's Test	+	-	-
		Fehling's Test	+	+	+
5	Glycosides	Keller-Killiani Test	+	-	+
6	Proteins and amino acids	Biuret Test	-	-	-
7	Steroids	Salkowski Test	-	-	-
8	Flavonoids	Alkaline reagent	-	-	-

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 a bioactive compounds and help the detect and development of new drugs.¹⁹ Saponins show antidiabetic property.²⁰ Saponins utilize in various pharmacological activities like anti inflammatory, hypocholesterotemic, immunomodulatory, antifungal, antiparalitic etc.²¹ Tannin compounds are act as principal anti oxidants or free radical scavengers.²² Tannins are reported to have an anti inflammatory cardio- protective, anti carcinogenic, anti muta-genic and antidiabetic properties.^{23,24} Carbohydrates are the

important source of an energy which ingested by a human body²⁵. Glycosides act as an anticancer agent in human.²⁶

Bibliography

1. Chavhan P.R. (2014) : Diversity of Medicinal Plants in and around Etapalli forest range in Gadchiroli District. The Journal of Agriculture and Natural Resources Sciences, 1(2): 114-117.
2. Gadchiroli District Census, 2011
3. www. webcitation. org
4. Solecki R.S. and Shanidar I.V.(1975) : A Nendertal Flower burial in northern Iraq. Science, 190(4217) : 880-881.
5. Kumar P, Jalal J.S. and Rawat G.S. (2007) :Orchidaceae, Chota Nagpur, State of Jharkhand, India. Check list 3(4) : 297-304.
6. Nadkarni K.M. (2005): The Indian Plants and Drugs, New Delhi: Shrishti Book Distributors, 2005 : 4-5.
7. Shittu G.A. (2010) : In vitro antimicrobial and phytochemical activities of Acacia nilotica leaf extract. J. Med. Plants Res. 4(12) : 1232-1234.
8. Patil M.V; Pawar S., Patil D.A. (2006): Monosperma (Lam) Kuntze in North Rad. 5(4): 323-325.
9. www. flowers of 25.L.2015.
10. Gibson E.L. Waedle J. and Watts C.J., (1998) : Fruit and vegetable consumption and nutritional knowledge and beliefs in mothers and children appetite, 31(2): 205-228.
11. Mathai K. (2000) : Nutrition in adult years in Krause's Food,nutrition and diet therapy,10th ed.,ed. I.K. Mahan and S. Escott - Stump American cancer society, 271:274-275.
12. Ashok P.K. Upadhyaya K. (2012) : Tannins are Astringent. J. Pharm. Phyto, 1-3.
13. Tiwari P, Kumar B., Kaur M., Kaur G., Kaur H., (2011): phyto chemical screening and extraction: A Review Int. Pharma. Sci, 1:1
14. Balandrin M.F., Klocke J.A., Wurtele E.S. Bollinger W.H. (1985): Natural Plant Chemicals :sources of industrial and medicinal materials. Sci; 228: 1154-1160.
15. Hasler C.M., Blumerg J.B. (1999): symposium on phytochemicals : Bio-chemistry and physiology JN 129:7565-7575
16. Khandelwal K.R. (2001): Preliminary phytochemical screening in practical pharmacognosy Techniques and Experiments, 8th Edn. Nirali publication Pune: 149-156.
17. Evans W.C. (2009) :Trease and Evans pharmacognosy, British Library cataloguing in Publication Data. Elsevier Limited.
18. Kokate C., Purohit A., Gokhale S. (1994) : Practical pharmacognosy, Edn. 10, New Delhi, India Vallabh Prakashan:112-120.
19. Bandary S.K., Kumary N.S, Bhat V.S., Sharmila K.P., Bekal M.P. (2012) : Preliminary Phytochemical Screening of various extracts of punica granatum peel, whole fruit and seeds. Nitte university Journal of health science 2(4): 34-38.
20. Zheng T., Shu G., Yang Z., MO.S., Zuo Y., Mei Z., (2012): Antidiabetic effect of total sponins from Entada phaseoloides (L) Merr. in type 2 diabetic rats J. Ethnopharmacol 139(3) : 814-821.
21. Sahu N.P. Banerjee S., Mondal N.B.Mandal D.(2008): Steroidal saponins. In: Forischnitte der chemie organischer Naturstoffe/Progress in the chemistry of organic natural products, fortschritte der chemie organischer naturstoffe/progress in chemistry of organic natural products, Vol. 89, Springer Vienna: 45-141.
22. Olaleye M.T. (2007): Cytotoxicity and antibacterial activity of methanolic extract of Hibiscus sabdariffa Journal of Medicinal Plant Research, 1:9-13.

23. Sahoo S.S. Shukla S. Nandy S. Sahoo H.B. (2012) : Synthesis of Novel Coumarin derivatives and its biological evaluations. Euro. J. Exp. Bio. 2(4) : 899-908.
24. Kumari M. Jain S. (2012): Tannins : An Antinutrient with positive effect to Manage Diabetes. Res. J. Recent Sci. 1(12): 70-73.
25. Cafall K.H. Mohnen D. (2009) : The structure, function and biosynthesis of plant cell wall pectic-Polysaccharids carbohydrate Res. 344(14) : 1879-1900.
26. Perne A; Muelner M.K., Sreinrueck M, Craig - Mueller N; Mayerhofer J. Schwarzinger I. (2009): Cardiac Glycosides Induce cell Death In Human Cells by Inhibiting General Protein Ssynthesis PLOS ONE 4(12): e 8292.

