



## Documentation, collection and organoleptic studies of some plant based gums and resins found in Ranchi district

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**Abstract:** For time immemorial, various parts of the plants such as stems, leaves, seeds, roots, fruits, flowers, etc. have been used for treating various human and veterinary ailments. Excretory products of plants such as oils, latex and gums are known for their therapeutic potential. Such plants are also widely found in Jharkhand. The present study has been undertaken for collection and documenting these excretory products secreted from such plants as *Prunus persica* (L.) Batsch, *Mangifera indica* L., *Anacardium occidentale* L., *Pinus roxburghii* Sarg., *Moringa oleifera* Lam., *Dalbergia sissoo* Roxb., (found in Ranchi district) as also their organoleptic characters and medicinal uses.

**Keywords:** Ethnomedicine, Gums, Resins, Therapeutic potential.

### INTRODUCTION

Increased use of chemicals for controlling various microbial infections has undesirable consequences for the environment. This has caused exploration of naturally occurring therapeutic potential compounds. In the recent years, there has been growing interest in the development of safer anti-microbial agents from plant products to control pathogenic infections. Stems, leaves, seeds, root, fruits, flowers, etc. are being used for treating various plant diseases. Different parts of the various plants are used for curing many diseases. Excretory products of plants such as oils, latex and gums have also been reported to be used in ethno-medicine to treat several human and veterinary ailments.<sup>1</sup> Gums-resins such as *Ferula foetida regel* (asafoetida), *Commiphora molmol* (myrrh), *Boswellia serrata* (salai), *Commiphora wightii* (guggul), etc. have been reported to be used as medicines.<sup>2-4</sup> Natural gums or resins derived from plant sources have also been reported for treating plant pathogens.<sup>5</sup>

There are three categories of natural resins and gums (NRGs) derived from the plants, namely natural resins, natural gums, and gums-resins.<sup>6</sup> Natural resins and gums are metabolic by-products of tissues either in normal course

or often as a result of either injury in the bark or wood or disease by insects. The natural gums and resins are polymeric, biodegradable and non-topologically originated, they have wide variations in their characteristics and properties.<sup>7</sup>

**Natural Resins:** Resins are amorphous mixtures of essential oils, oxygenated products of terpenes and carboxylic acids and are separated as exudates from specialized structures in a wide range of plants which are insoluble in water but soluble in certain organic solvents. They probably function as plant defenses.<sup>5</sup> Resins are widely distributed across the plant kingdom although a few families are notable in accounting for a large proportion of the resins of commerce (e.g., Leguminosae, Burseraceae and Pinaceae).

**Natural Gums:** Gums are a group of plant products formed primarily due to the disintegration of plant cellulose and this process is known as gummosis. Gums are produced by members of a large number of families. The important gum yielding trees are *Acacia nilotica* (babul), *Acacia catechu* (khair), *Sterculiaceae urens* (kullu), *Anogeissus latifolia* (dhawra), *Butea monosperma* (palas),

*Bauhinia retusa* (semal), *Lannea coromandelica* (lendia) and *Azadirachta indica* (neem). Gums are also extracted from seeds of certain plants like *Cyamopsistetra gonoloba* (guar), *Tamarindus indica* L. (tamarind), *Cassia tora* L., etc. *Cyamopsistetra gonoloba* (Guar gum) is the prominent seed-based natural gum.

**Gum-resins:** Gum-resins are a mixture of both gums and resins and possess the properties of both the groups. They contain traces of essential oils. These are usually dried from the plant growing in dry and arid regions. Some of the commonly used gums-resins are *Ferula foetida regel* (asafoetida), *Commiphora molmol* (myrrh), *Boswellia serrata* (salai), *Commiphora wightii* (guggul), etc.

Gums and resins are low volume, high value product. India is one of the biggest producers of gums and resins in the world. India is a rich centre of plant biodiversity having more than 45,000 plant species including about 120 gum and resin yielding plants. In India, resins and gums are sold to earn a living by the tribes. In the present day, the use of natural gums are numerous and they are employed by a large number of manufacturing industries including food and pharmaceutical industries.<sup>8</sup> The use of gums and resins in India as medicine can be traced back to the ancient days of Acharya Charak who wrote Charak Samhita Granth.<sup>9</sup>

Several studies have been carried out on various plant secreting gums and resins but majority of the work has been done on *Boswellia serrata*, *Commiphora mukul*, *Gardenia resinifera* and *Shorea robusta* against some plant pathogenic fungi.<sup>2,4,5,10,11</sup>

Various screening has been done for antimicrobial activity of plant secreting gums and resins, but most of the studies are being done on gram-positive and gram-negative bacteria.<sup>3,12-14</sup>

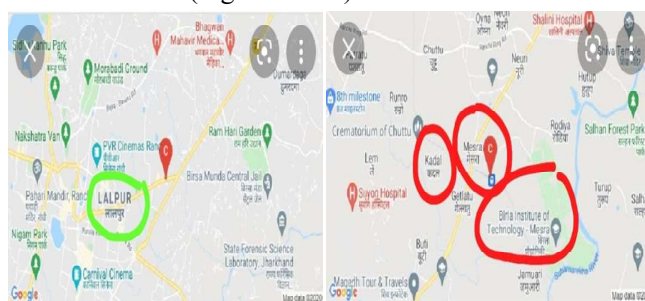
Similarly, various compounds have been isolated from plant secreting gums and resins in which they found that maximum of them possessed alkaloids, flavonoids,

terpenoids, tannins, saponins and glycosides and many phenolic compounds but concluded that sesquiterpenes is present as a major constituents for the inhibition of bacterial growth.<sup>13,15-17</sup>

The present study deals with the collection of different plant based gums and resins in different areas of Ranchi district. On the basis of their therapeutic uses, this study also deals with the documentation of these excretory products.

**Study Area: Ranchi District of Jharkhand**

Plant samples were collected from different areas of Ranchi district. (Figure 1 & 2)



**Figures (1&2): Map of the different areas of Ranchi district from where plant samples were collected.**

**MATERIALS & METHODS**

**Collection of Plant materials**













Plant based gums and resins were collected from different areas of Ranchi district in different seasons on the basis of their availability. Plant twigs were also collected and brought to the laboratory for identification by using ‘The Botany of Bihar and Orissa’, H. H. Haines (1922). Collected plant twigs were also authenticated by the taxonomists of the University Department of Botany, Ranchi University, Ranchi and herbarium was prepared. Fully dried collected samples were stored in air tight container.

The list of collected plant materials are as follows (Table 1):

**Table 1. List of plant based gums and resins collected from different field of Ranchi district.**

Sl. No.	Scientific Name	Common Name	Date of Collection	Place of Collection
1.	<i>Prunus persica</i> (L.) Batsch	Satalu	10 <sup>th</sup> Sept.,2020	Kedal, Ranchi
2.	<i>Mangifera indica</i> L.	Aam	24 <sup>th</sup> Dec., 2020	Kedal, Ranchi
3.	<i>Moringa oleifera</i> Lam.	Sahjan	15 <sup>th</sup> Sept., 2021	Lalpur, Ranchi
4.	<i>Dalbergia sissoo</i> Roxb.	Shisham	15 <sup>th</sup> Sept., 2021	Lalpur, Ranchi
5.	<i>Pinus roxburghii</i> Sarg.	Chir pine	15 <sup>th</sup> Oct., 2021	BIT Mesra, Ranchi
6.	<i>Anacardium occidentale</i> L.	Kaju	20 <sup>th</sup> Nov., 2021	Chandwe, Ranchi

**Table 2: Images of plants in natural condition and their collected samples.**

Sl. No.	Scientific Name	Plant in Natural Condition	Collected Gums and Resins	4.	<i>Dalbergia sissoo</i> Roxb.		
1.	<i>Prunus persica</i> (L.) Batsch			5.	<i>Pinus roxburghii</i> Sarg.		
2.	<i>Mangifera indica</i> L.			6.	<i>Anacardium occidentale</i> L.		
3.	<i>Moringa oleifera</i> Lam.						

**Table 3: Organoleptic characteristics of plant-based gums and resins.**

Scientific Name	Family	Habitat	Types of Products	Colour	Texture, Taste & Odour	Solubility	Reference No.
<i>Prunus persica</i> (L.) Batsch	Rosaceae	Deciduous Tree	Gum	semi-translucent with yellowish or orangish colour.	Gummy crystalline/irregular shapes;	Soluble in water.	18-22
<i>Mangifera indica</i> L.	Anacardiaceae	Tree	Gum	Brown colour	Tasteless; characteristic odour	Slightly soluble in water, practically insoluble in ethanol and acetone.	23-25
<i>Moringa oleifera</i> Lam.	Moringaceae	Tree	Gum	Brownish black	Characteristics odour, mucilaginous in taste.	Sparingly soluble in water forming a viscous solution, practically insoluble in acetone, alcohol and ether.	26-31
<i>Dalbergia sissoo</i> Roxb.	Fabaceae	Deciduous perennial tree	Gum	Reddish brown colour	Characteristics odour, gummy crystalline, tasteless	Soluble in organic solvents.	32-36
<i>Pinus roxburghii</i> Sarg.	Pinaceae	Large Tree	Oleo-resin	Colour varies from light yellow to red, brown, blue or black.	irregular and hard to touch	Soluble in organic solvents.	37
<i>Anacardium occidentale</i> L.	Anacardiaceae	Evergreen shrub or small tree	Resin	Brown resin	Hard to touch, irregular shape, odourless, tasteless.	Soluble in water	38,39

**Table 4: List of some plant based gums and resins which exhibit their medicinal potential**

Scientific Name	Medicinal uses / Economic importance
<i>Prunus persica</i> (L.) Batsch	used medicinally, improves skin elasticity, diminish the signs of aging, reduce wrinkles and dry skin appearance, boost metabolism and muscle growth, nourish joints and bones, improves cardiovascular health, relieve stress and enhance sleep quality, improves eyesight. <sup>18-22</sup>
<i>Mangifera indica</i> L.	used to treat laxative and antioxidant, for treatment of illness and infections. The pharmaceutical and other industrial applications of the gum gauged as stabilizers, binders, muco-adhesive, disintegrates, sustained and controlled release matrix, also used in dressings for cracked feet and for scabies. <sup>23-25</sup>
<i>Moringa oleifera</i> Lam.	gelling agent, binder, release retardant in tablet formulations, used in herbal medicine, diuretic, astringent, fever, dysentery, asthma, intestinal cancer. <sup>26,29-31, 40-43</sup>
<i>Dalbergia sissoo</i> Roxb.	used for the preparation of AgNPs (Silver nano particles), acts as reducing agents, modified and hydrolyzed gum can be used for pharmaceutical and food industry. <sup>32-36,44</sup>
<i>Pinus roxburghii</i> Sarg.	prevents bad breath, clean tooth, stomach ache, ulcer, anti- diabetic, appetizing, wounds, heel cracks, cuts, to reduce eye swelling. <sup>37</sup>
<i>Anacardium occidentale</i> L.	Used as suspending agent, as a gelling agent in canned food, binder in the production of conventional release tablets. <sup>38,39,45-48</sup>

## RESULTS & DISCUSSION

Exploration, collection and documentation of the various plant species secreting gums and resins which exhibit medicinal properties will be helpful for the tribes/people of Ranchi district. This could help them in getting access to home-based, easily available and cheap medicines. This study will be helpful for compiling the commercial use of the various gums and resins secreting plants such as *Prunus persica* (L.) Batsch, *Mangifera indica* L., *Moringa oleifera* Lam., *Dalbergia sissoo* Roxb., *Pinus roxburghii* Sarg, *Anacardium occidentale* L. with their phytochemical analysis such as alkaloids, flavonoids, glycosides, terpenoids, steroids, tannin and reducing sugars for selected plants.

Name of some plants which secretes gums and resins along with their images in natural habitat and their collected samples are listed in table 2 & 3.

## CONCLUSION

Based on the availability in different seasons, the above documented plant-based gums and resins samples were collected, identified and their organoleptic characteristics were studied along with their medicinal values. The present study indicates that various excretory products of the plants are used for their economic importance as well as their medicinal values. This documentation would be beneficial for the local people of Jharkhand residing nearby Ranchi district.

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