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Research Article

Moringa *oleifera* gum : A review

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Abstract: Gums are hydrophilic polysaccharide containing chains of monomers which has good binding and gelling properties at low concentration. Moringa oleifera gum, exudate gum are plant sources which oozes out sticky gummy substance in hot climate as a result of mechanical injury in defence mechanism. Research states that there are some sort of similarities in between gum acacia and moringa oleifera gum. Gum acacia is mostly acceptable additive as an emulsifier, thickening agent, binding agent, gelling agent in various industrial sectors. In the present paper, moringa oleifera gum properties, composition, application in various sectors are discussed. Recent literature review revealed about potential of moringa oleifera gum as a promising hydrocolloid which can challenge other prominent hydrocolloids such as gum acacia, gum tracanth, gum karaya etc. with its unique properties

Key Words: Moringa oleifera gum, gum acacia, physicochemical parameters, applications.

1. INTRODUCTION :

India is home to the small genus of quickly growing trees known as Moringa oleifera. Moringa *oleifera* belongs to the family *Moringaceae* and commonly called as Sainjna plant. The Indian native plant Moringa oleifera, often known as "Moringa, horseradish tree, or drumstick tree," flourishes in tropical and subtropical climes all over the world. Due to the tree's great nutritional value, every part of it is good for dietary or economic purposes (Kumari *et. al.*, 2021). The stem oozes a gum that starts out white and eventually turns reddish brown or brownish and on exposure is black. It is capable of defending the active medication from the small intestine and stomach, allowing it to be utilised in Moringa oleifera Lam. Gum's characteristics are used to identify it as a Medicinal Ingredient targeted medication delivery in the colon. According to reports, it has binding, release-retarder, and gelling properties result. It can be a fascinating excipient in this sense as Considering the pharmacy industry and food industry. Moringa *oleifera* comes under exudate gum category (Panda et. al., 2014) (Dekker, 2022).

Moringa *oleifera* gum is having identical properties with gum acacia such as gelling properties, thickening properties, emulsification properties, surface-active property with such properties moringa *oleifera* can be better option as hydrocolloid in various sectors. This hydrocolloid can add value in pharmaceutical industries, waste water management and food industries due to its good binding property, gelling property, thickening property, muco-adhesion property and water retention property. Polysaccharides are common active components present in Moringa *oleifera* gum. Natural polysaccharides are mostly useful in preparation novel value added products in research based sector. Moringa *oleifera* gum has caught interest as encapsulating agent in encapsulation of functional food and pharmaceutical material (Barak *et. al.*, 2020).

2. Chemistry of Moringa *oleifera* gum :

The exudate gum extracted from moringa tree is originally white in appearance, but after chronic exposure to sunlight, it turns reddish brown or brownish black. The monosaccharide composition of arabinose, galactose, glucouronic acid, rhamnose, mannose, and xylose in the purified moringa oleifera gum was determined so much relatable to gum acacia. The composition of moringa gum is Arabinofuranose, Arabicofuranose, Galactopyranosyl, Galactopyranose, Galactopyranose (Sharma *et. al.*, 2022; Badwaik *et. al.*, 2020).



3. Chemistry of Gum acacia :

Acacia gums are polysaccharides made up of arabinose, galactose, rhamnose, and glucuronic acid, with a roughly 3:3:1:1 molar ratio. This was demonstrated by chemical and polarimetric analysis of the gum arabic and arabic acid from Acacia senegal (L) Wild. In the sugar fraction of the hydrolyzed product, rhamnose, galactose, and arabinose were detected. It was discovered that the gum's acidic nucleus was an aldobiuronic acid, which was made up of D-glucuronic acids (Rabeea, 2018; Saha *et. al.*, 2010).

4. Physicochemical properties of moringa *oleifera* gum and gum acacia :

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Parameters	Moringa gum	Gum acacia
Solubility	Slightly soluble in water,	Slightly soluble in water,
	practically insoluble in ethanol,	practically insoluble in ethanol,
	acetone and chloroform	acetone and chloroform
Swelling index (%)	3.6	5.6
Loss on drying (%)	0.47	0.61
Ash (%)	3.4	5.1
acid insoluble ash (%)	1.2	2.41
Bulk density (gm/ml)	0.75	0.41
Tapped density (gm/ml)	0.95	0.53
Compressibility ratio (%)	20.36	28.71
Hausners ratio	1.25	1.287
Angle of repose	38.9°	35.2°
Ph	6.21±0.02	4.51
Viscosity (cp)	10 cp	9 cp

 Table 1: Physicochemical properties of moringa gum and gum acacia

(Jarald et. al., 2007; Bhushette & Annapure, 2017; Panda et. al., 2014)

4. Advantages and applications of Moringa oleifera gum :

Moringa gum is less expoited natural gum which comes under category of exudate gums. Literature reviewed stated that moringa oleifera gum is easily accessible, cost effective, biodegradable in nature, biocompatible in nature, eco-friendly.

There are vast applications of moringa gum in various sector. In pharmaceutical, moringa gum can be used in tablet formation, matrix formation. It can improve oral bioavailability of drug. This gum is having major contribution in therapeutic uses, it is beneficial as hypoglycemic, antioxidant, anti-inflammatory, and anticancer activity. A variety antioxidant enzymes and biomarkers isolated from the *Moringa* gum have shown, antiulcer effect on immune response and antibacterial effect. *Moringa oleifera* gum is also used in various treatments like to cure dental problems. Gum is used as pain reliever in many treatments. *Moringa* gum has a number of therapeutic properties, including antipyretic, antioxidant, anti- asthmatic astringent (Sharma *et. al.*, 2022). In food industry, to fulfil the specific requirement of product such as gelling, thickening, stabilizing, emulsification etc. carob gums, gum acacia, guar gum such that moringa gum also can be helpful to achieve product requirement (Shivalingam *et. al.*, 2010)

5. CONCLUSION :

Exudated *Moringa oleifera* gum is brownish coloured excreted matter from moringa tree. This is having unique properties such as stabilization, emulsification, antioxidant activity etc. which can be beneficial to various proceesing sectors to achieve their product demand. After comparing physicochemical properties of moringa oleifera gum and gum acacia, there are similarities can be identified. Moringa oleifera also can be gain popularity like gum acacia in recent years.



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