

# Extraction and Characterization of *Albizia zygia* Gum as Pharmaceutical Excipient

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**Abstract— Background:** Natural polymers are widely used as excipients in pharmaceutical formulations. Natural based excipients have various advantages such as non-toxicity, less cost, biodegradable and easily available.

**Objective:** Review Article involves the study of extraction and characterization of albiza zygia extracted polymer gum as excipient of pharmaceutical.

**Material and Methods:** Methods which are used for the extraction of Albizia zygia derived polymer was based on water extraction method. The various parameters for the characterization of Albizia zygia are:-test for purity, ash value, behavior for solubility, pH, surface tension, swelling index, viscosity to check flow property, particle size, loss on drying, bulk density, bulkiness, powder flow property, etc.

**Result:** The derived gum which is extracted have a good solubility in water which is warm and poor solubility in different organic solvents. The colour of polymer was reddish brown having a good flow properties with pH,i.e.6

**Conclusions:** It is concluded that the percentage yield of extracted polymer was quite good therefore it is considered that the extracted polymer is used as a good source of mucilage as well as good pharmaceutical excipient in different dosage form.

**Keywords—** *Albizia zygia* gum, characterization, extraction, natural polymer, pharmaceutical excipient

## I. INTRODUCTION

In pharmaceutical preparations, mucilages are a plant-derived adjuvant and are commonly used in the present scenario. These plant derived mucilages have a wide range of pharmaceutical importance and applications due to its presence of polysaccharide contents. The uses of plant derived mucilages are binding, suspending, disintegrating, emulsifying, gelling and stabilizing agents. The other applications of mucilages is to release sustained and controlled release drugs as matrices. The mucilages which are derived as a naturally have a more preference over synthetic materials because of their low cost, non toxic, non irritating etc. There are so many natural gums which are deived from plant mucilages are acacia, tragacanth etc having a good characteristics of swelling and hydration with aqueous media due to this property they are used for preparation of dosage forms. This review article shows the extraction, isolation and phytochemical screening of *Albizia zygia* polymer and also deals with the study of its micromeritic properties as a pharmaceutical adjuvant. The properties which are micromeritic are studied such as particle size analysis, density for tapped and bulk, angle of repose, Carr's compressibility index for compressibility of a powder and bulkiness determination. Surface tension, viscosity and swelling index are other properties which are also studied [1].

**Collection and Extraction of plant material:** Crude plant material (*Albizia zygia* gum) was brought from general store of Chandani Chawk, New Delhi, India. The purification of plant material involves the various steps such as: i) Take the crude material in a beaker and put the warm water for better soaking of crude material into it for 4 hrs. ii) Boiled the soaked crude material for 2 hrs and kept aside for 2hrs for the better release of gum into water. iii) Take the muslin bag for squeezing of the material and for filtration also. iv) In the viscous gum solution, equal volume of ethyl alcohol was added for better isolation of gum. v) The purified and separated gum was put in oven at 45°C for better drying. vi) The powdered gum was passed through sieve no. 80 and then stored in dessicators until further use [2,3].

### Physicochemical Characterization of Isolated Gum

i) **Identification tests for carbohydrates, proteins and tannins:-** according to standard procedure test for carbohydrates, proteins, starch, fats and tannins were performed by using 1 % of aqueous solution of extracted gum for chemical characterization is to be determined [3].

ii) **Solubility:** The solubility of prepared gum was evaluated by taking one part of dry gum powder into different organic solvents like cold water, hot water, methanol etc.

iii) **Organoleptic properties of powdered gum:-**

Colour, Odour, Taste etc are the organoleptic properties for the characterization of gum [4].

iv) **pH of gum:** By using digital pH meter, the pH of 1% w/v solution of gum was determined [5].

v) **Surface tension of gum:** By using the stalagmometer, the surface tension of 1% w/v solution of gum was determined [6].

vi) **Viscosity of gum:** The viscosity of gum was determined by Oswald's viscometer of 1% w/v solution of gum [7].

vii) **Particle size analysis:** Particle size analysis of gum was evaluated by Hicon microscope of powdered gum [8].

viii) **Powder compressibility:** With the help of the determination of Carr's compressibility index of isolated purified gum was evaluated [9].

ix) **IR:** The powdered gum was put in oven at 70-80 °C for 4 hr for better drying and desiccated overnight prior to FTIR analysis. FTIR spectra were recorded from 4000 to 400 cm<sup>-1</sup> at the absorbance mode. The FTIR analysis was done by ATR, Alpha (Bruker) [10].

## II. RESULTS AND DISCUSSION

After the investigation of Phytochemical test of extracted gum showed that the carbohydrates were present while reducing sugar, glucose, tannins, proteins and polysaccharides were absent. Results are discussed in tabular form (1) after phytochemical test.

**Table 1: Identification test of extracted mucilage**

Tests	Present/Absent
Carbohydrates	+
Reducing Sugar	-
Glucose	-
Tannins	-
Proteins	-
Polysaccharides (starch)	-
Fats	-
Volatile oils	-

+ Present; - Absent

Organoleptic properties of isolated gum was found to be acceptable for used as a pharmaceutical excipient. The colour, odour and taste of extracted gum was greyish-brown, characteristic and agreeable.

Solubility determination of isolated gum is shown in table 2.

**Table 2: Solubility profile of gum**

Solvents	Solubility
Cold water	Formation of gel after swelling
Hot water	Good solubility
Methanol	Poor solubility
Ethanol	Poor solubility
Diethyl ether	Poor solubility
Petroleum ether	Poor solubility
Acetone	Poor solubility

Solubility analysis of isolated gum was found to be good solubility in hot water but there is a formation of gel after swelling in cold water and poor soluble in different solvents like methanol, ethanol, diethyl ether, petroleum ether and acetone.

**Table 3: Parameters of gum**

Parameters	Observations
Sorensen pH (1% w/v solution)	6.60 ± .01
Swelling Index (%)	44.45 ± .02
Viscosity (1% w/v solution in N×sec×m <sup>-2</sup> )	6.78 ± .60
Surface tension (1% w/v solution in gm×cm×sec <sup>-2</sup> )	51.64 ± 1.77
Density for bulk (g/cm <sup>3</sup> )	.33 ± .01
Density for tapped (g/cm <sup>3</sup> )	.37 ± .01
Bulkiness (cm <sup>3</sup> /g)	3.03 ± .19
Hausner's ratio	1.12 ± 1
Carr's compressibility index (%)	10.81 ± 1
Angle of repose (°)	27.46 ± .74
Particle size (µm)	41.98 ± 10.75
Total Ash (%)	3.00 ± 0.01

The above tabular form shows the pH, Swelling index, Viscosity, Surface tension, Bulk density for bulk, density for tapped, Bulkiness, Hausner's ratio, Compressibility Carr's index, Angle of repose, Particle size and total ash of isolated mucilage.

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