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# Diploma in Pharmacy 1<sup>st</sup> Year

## Pharmacognosy

### Experiment

To perform the physical and chemical tests of Acacia.

### Aim:

To perform the physical and chemical tests of Acacia.

### Reference :

Dr. Gupta G.D , Dr. Sharma Shailesh , Kaur Navjit , “Practical Manual of Pharmacognosy” Published by Nirali Prakashan , Pg.No 135 - 139

### Biological Source :

Acacia is the dried gummy exudation obtained from the stems and branches of *Acacia senegal* (L.) Willd or other African species of *Acacia*. It is also found in the stems and branches of *Acacia arabica*, Willd. It belongs to family Leguminosae.

### Materials and Apparatus Required

Test tube, conical flask, beaker, burner, petroleum ether and alcohol, borax, lead sub acetate, hydrogen peroxide solution, conc. HCl, NaOH, water, Fehling's solution A and B, Ruthenium red solution, dil HCl, Barium chloride solution, hydrogen peroxide (10%), benzidine, alcohol, and lead acetate solution.

### Theory

*Acacia* is a genus of plant (figure 35) including different types of trees and shrubs. Some plants of genus *acacia* contain toxic chemicals that can potentially cause hair loss, affect GIT's ability to intake nutrients, and cause stunt growth.

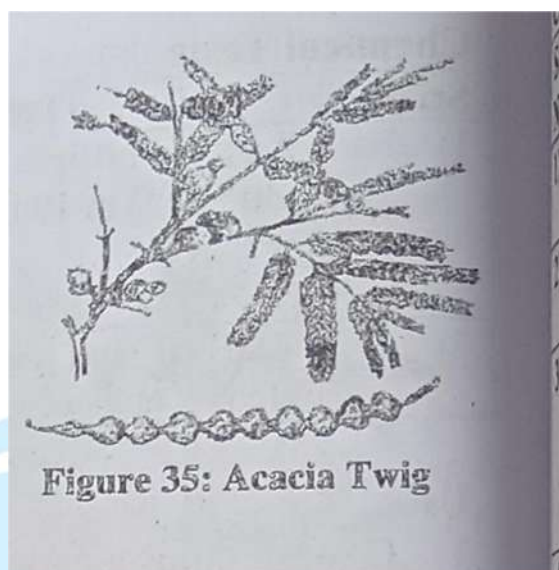


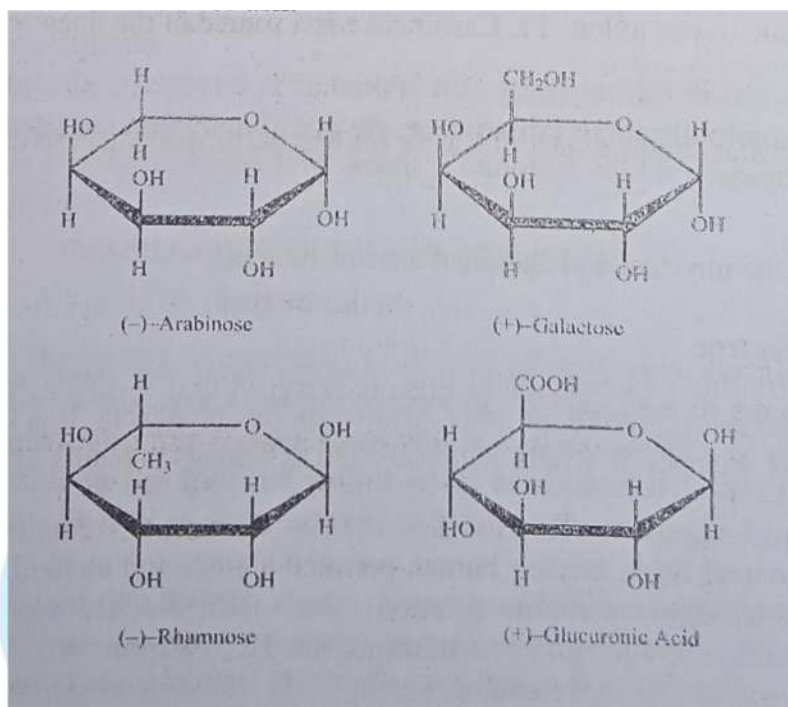
Figure 35: Acacia Twig

## Physical Tests

- 1) **Colour:** Tears are white, pale yellow, or creamish brown to red coloured, powder is off white, pale yellow, or light brown coloured.
- 2) **Odour:** Odourless.
- 3) **Taste:** Bland and mucilaginous
- 4) **Shape:** Tears are mostly spheroidal or ovoidal.
- 5) **Size:** Tears have a diameter of about 2.5-3.0cm.
- 6) **Solubility:** Soluble in water resulting in a viscous and acidic solution, insoluble in alcohol.
- 7) **Appearance:** Tears are invariably opaque either due to the presence of cracks or fissures produced on the outer surface during the process of ripening, the exposed surface is glossy.
- 8) **Fracture:** Usually very brittle.

## Chemical Constituents

Arabin, a complex mixture of calcium, magnesium, and potassium salts of Arabic acid, is the chief constituent of acacia. Arabic acid hydrolyses into L-arabinose, L-rhamnose, D-galactose, and D-glucuronic acid. It also contains oxidase and peroxidase enzymes. Since it contains diastase, it readily converts into powdered guaiacum resin. On drying at 100°C, its moisture content decreases by about 12.14% and it yields 2.7-4.0% of ash.



### Chemical Tests

Sr. No.	Tests	Observations	Inferences
1)	<b>Borax Test:</b> Add 50 mg of borax to 2ml solution, then boil and cool.	Stiff translucent mass is produced.	Presence of gum acacia.
2)	<b>Lead Acetate Test:</b> Add few drops of dilute lead acetate to the aqueous solution.	White precipitate is formed.	Presence of gum acacia.
3)	<b>Differentiating Test from Guar Gum:</b> Add gum acacia solution to 0.5ml hydrogen peroxide solution and then shake it vigorously.	Blue colour is produced.	Presence of oxidase enzyme in acacia.
4)	<b>Reducing Sugars Test:</b> Add 4ml water and few drops of conc. HCl to 1ml of solution. Allow it to boil over water bath for few minutes and then cool it. Add Fehling's solution A and B (Mixed together before adding) in equal quantities and warm.	Formation of brick red precipitate.	Presence of reducing sugars.
5)	<b>Differentiating Test from Agar and Isapgol:</b> Add Ruthenium red solution to Gum acacia.	No pink colour is obtained.	Presence of gum acacia.
6)	Add gum acacia solution to dil Hcl and boil for few minutes. Then add few drops of Barium chloride solution to this solution.	No white precipitate of barium sulphate is formed.	Presence of gum acacia.
7)	Add 0.5ml of hydrogen peroxide (10%) to 5ml aqueous solution of acacia. Add 0.5ml of 1% solution of benzidine in 90% alcohol then shake it and allow it to stand.	Blue colour is formed.	Presence of peroxidase enzyme in acacia.

### Test for Purity

Sr. No.	Tests	Observations	Inferences
1)	Add 10ml of gum to 10ml of water on standing for few hours.	No sedimentation of particles occurs.	Presence of pure acacia.
2)	Add 4ml of water to 1ml of gum. Then add lead acetate to this solution.	No precipitate is formed.	Presence of pure acacia.

## Uses

- 1) Its mucilage is a demulcent.
- 2) It is an essential pharmaceutical aid for emulsification and to be used as a thickening agent.
- 3) It is used as a binding agent in tablet formulations.
- 4) It is used in the granulation process of tablet manufacturing due to its compatibility with other plant hydrocolloids, starches, carbohydrates, and proteins.
- 5) It is combined with gelatin to form coacervates for drug microencapsulation.
- 6) It is a colloidal stabiliser.

## Result :

The physical and chemical test of Acacia was performed successfully.