

Isolation and potential use of hibiscus rosasinesis gum as a suspending agent

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ABSTRACT

The aim of present study was to isolate Hibiscus rosasinensis linn gum from Hibiscus rosasinensis linn shade dried leaves 6 formulations are made by using hibiscus gum & xanthun gum as a suspending agents and all six formulations were evaluated by sedimentation parameters, i.e Degree of flocculation and Rate of sedimentation, Rheological parameters i.e: viscosity and redispersibility, particle size analysis compare to marketed xanthum gum hibiscus gum is also shown good physicochemical parameter with good stability.

Keywords: Xanthun gum, Hibiscus gum

INTRODUCTION

Suspensions are the biphasic heterogeneous system containing insoluble solid and liquid continuous phase.

Heterogeneous system consist of two phases

1. Continuous/external phase
2. Dispersed /internal phase

Dispersed /internal phase made up of particulate matter. That is essentially insoluble but dispersed through the continuous phase. Insoluble matter intended for physiological absorption. It consist of discrete particles forms a network of particles resulting from particle particle interaction.

Suspending agents are the excipients helps active pharmaceutical ingredients stay suspended in the formulation and prevent caking at the bottom of the container. Well formulated suspension is that it can be easily resuspended by use of moderate agitation.

Classification of suspending agents

1. Natural agents
 - a. Animal source: Ex:Gelatine
 - b. Plant source: Ex:Acacia,Tragacanth,Starch
 - c. Mineral source:Ex:Bentonite,kaoline
2. Semisynthetic Agents:Hydroxy ethyl cellulose,Sodium carboxy methyl cellulose,methyl cellulose
3. Synthetic Agents:Carboxy poly methylene, poly vinyl alcohol,poly vinyl pyrrolidoneIodine complex

EVALUATION OF SUSPENSION

1. Sedimentation method.
2. Rheological method.
3. Electrokinetic method.
4. Micrometric method.

Sedimentation methods

Two parameters are studied for determination of sedimentation

- Sedimentation volume
- Degree of flocculation

Sedimentation volume

The suspension formulation of 50ml was poured separately in to 100ml measuring cylinder and sedimentation volume was read after 1,2,3,4,5,6,7 days, triplicate results were obtained for each formulation, sedimentation volume was calculated according to the equation.

$$F = V_u / V_o$$

F-Sedimentation volume

V_u-Ultimate height of sediment

V_o-Initial height of total suspension

Degree of flocculation

It is the ratio of the sedimentation volume of the flocculated suspension (f) to the sedimentation of volume of the deflocculated suspension (f_α)

$$\beta = F / F_{\alpha}$$

$$\beta = (V_u / V_o)_{\text{flocculated}} / (V_u / V_o)_{\text{deflocculated}}$$

Value of β=1. When flocculated suspension sedimentation volume is equal to the sedimentation volume of deflocculated suspension.

Rheological method

It provides information about setting behaviors. Brookfield viscometer is used to study the viscosity of the suspension. It is mounted on helipath stand by using T- Spindle. T-bar spindle is made to descend slowly into the suspension and the dial recording on the viscometer is then a measure of the resistance the spindle meets at various levels. The dial reading is plotted against the number of turns of the spindle.

Electrokinetic method

The determination of surface electric charge or zeta potential of suspension is helpful to find out the stability of suspension. Certain zeta potentials produce more stable suspensions because of controlled flocculation. Zeta potential can be calculated from the migration velocities of the particles measured by the electrophoresis method.

Micrometric method

The stability of suspension depends on the particle size of the disperse phase. The size of the particle in a suspension may grow and may

ultimately lead to the formation of lumps or caking. So any change in particle size with reference to time will provide useful information regarding the stability of suspension. A change in particle size distribution and crystal habit may be studied by microscopic coulter counter method. [1-3]

ALUMINIUM HYDROXIDE GEL

Aluminum hydroxide is a mineral with the molecular formula Al (OH) ₃. It is naturally ore called **gibbsite** found as white color solid substance.

Mechanism of action

Aluminum hydroxide is used as an antacid. The hydroxide reacts with excess acid in the stomach, reducing its acidity. This decrease of activity of the contents of the stomach may in turn help to relieve the symptoms of ulcers heartburn or dyspepsia.

Uses

Stomach upset, heartburn, acid indigestion. Aluminum hydroxide is an antacid that works quickly to lower the acid in the stomach. Liquid antacids usually work faster/better than tablets or capsules.

This medication works only on existing acid in the stomach. It does not prevent acid production. It may be used alone or with other medications that lower acid production (e.g., H₂ blockers such as cimetidine/ranitidine and proton pump inhibitors such as omeprazole).

Side effects

The following is a list of possible side-effects that may occur in medicines that contain Aluminum Hydroxide Gel., Constipation, Black stools, Mood changes, Pain during urination, Stomach or abdominal pain, Vomiting

Aluminum Hydroxide Gel - Precautions & How to Use

Before using Aluminum Hydroxide Gel, inform your doctor about your current list of medications, over the counter products (e.g. vitamins, herbal supplements, etc.), allergies, pre-existing diseases, and current health conditions (e.g. pregnancy, upcoming surgery, etc.). Some health conditions may make you more susceptible to the side-effects of the drug. Take as directed by your doctor or follow the direction printed on the product insert. Dosage is based on your condition. Tell your doctor if your

condition persists or worsens. Important counseling points are listed below.

- Do not take this medicine for more than 2 weeks
- Drink plenty of water
- Pregnant, planning to get pregnant or breastfeeding

Aluminum hydroxide gel - contraindications

Hypersensitivity to Aluminum Hydroxide Gel is a contraindication. In addition, Aluminum Hydroxide Gel should not be used if you have the following conditions:

- Alcohol
- Dehydration
- Hypersensitivity
- Kidney disease
- to get pregnant or breastfeeding
- Take this medicine with a full glass of water [4]

Peptic ulcer

A peptic ulcer is a sore in the lining of your stomach or your duodenum, the first part of your small intestine. A burning stomach pain is the most common symptom. The pain

- Starts between meals or during the night
- Briefly stops if you eat or take antacids
- Lasts for minutes to hours

- Comes and goes for several days or weeks
- Peptic ulcers happen when the acids that help you digest food damage the walls of the stomach or duodenum. [5]

MATERIALS AND METHODS

The leaves of *Hibiscus rosasinensis* Linn were collected from the local area. The plants were authenticated at the Department of Botany of Calicut University in Calicut, India.

Isolation of the mucilage

The fresh leaves of *Hibiscus rosasinensis* Linn were collected, washed with water to remove dirt and debris and then dried. The powdered leaves were soaked in water for 5-6 h, boiled for 30 min and kept aside for 1 h for complete release of the mucilage in to the water. The material was squeezed from an eight fold muslin cloth bag to remove the marc from the solution. Acetone was added to the filtrate to precipitate the mucilage in a quantity of three times the volume of the total filtrate. The mucilage was separated, dried in an oven at a temperature < 50 collected, dried, powdered and passed through a sieve no: 80 and stored for further use in the desiccators. [5]

Table no1: Formulation of suspension

s.no	Ingredients (mg)	F1	F2	F3	F4	F5	F6
1.	Dried aluminium hydroxide gel	200	200	200	200	200	200
2.	Dimethicone oil	4.20	4.20	4.20	4.20	4.20	4.20
3.	Sodium methyl paraben	5	5	5	5	5	5
4.	Sodium propyl paraben	5	5	5	5	5	5
5.	Sorbitol	3	3	3	3	3	3
6.	Sodium alginate	3	3	3	3	3	3
7.	Xanthan gum	10	20	30	-	-	-
8.	Hibiscus gum	-	-	-	10	20	30
9.	Propylene glycol	10	10	10	10	10	10
10.	Flavor pippement water	3	3	3	3	3	3
11.	Color ponceau 4R	0.03	0.03	0.03	0.03	0.03	0.03

Method of preparation of Suspension

Dissolve Sodium methyl paraben and Sodium propyl paraben in purified water with continuous stirring to get a clear solution. Pass aluminum hydroxide through mesh no #40 and soak into half quantity of paraben solution for one hour with continuous stirring. Soak gum into hot purified

water with continuous stirring to get smooth. Soak Sodium alginate into hot purified water with continuous stirring to get smooth. Add sodium alginate into gum with continuous stirring. Add half quantity of gum mixture into paraben solution with continuous stirring. Add this mixture into aluminum solution with continuous stirring. Dissolve Menthol into Propylene glycol with continuous stirring to get

a clear solution. Add Sorbitol into paraben solution with continuous stirring and add flavor with continuous stirring to this add aluminum hydroxide mixture, into purified. Dissolve Color water and add into paraben solution with constant stirring. Check the pH (7.5-8.5), Volume was making with purified water up to the mark. [7]

Evaluation of Antacid Suspension

General tests

All the developed batches of suspension were evaluated for organoleptic properties such as color, odour and taste. All batches are good in appearance.

Ph

pH of the suspension was determined by the use of pH meter and results were shown in table no2

Viscosity

The viscosity of suspension was determined at ambient condition using DV III+, Brookfield Programmable Rheometer. In adapter 15ml of suspension was taken and the adapter is set over the viscometer by a stand such a way that spindle is completely immersed in the suspension. Spindle no.50 was used to measure the viscosity of suspension, and results were shown in table no2

Sedimentation volume

Fifty ml each of suspension was taken in 50 ml stoppered graduated measuring cylinder. The

suspension was dispersed thoroughly by moving upside down for three times. Later, the suspension was allowed to settle for 24 hours and the volume of sediment was noted. This is the original volume of sediment (H₀). The cylinder was kept undisturbed for 7 days. The volume of sediment read at every 24 hr for 7 days was considered as final volume of sediment (H_u).

Sedimentation Volume (F) = H_u / H_0

The ultimate height of the solid phase after settling depends on the concentration of solid, sedimentation volume results were shown in table no2.

Redispersibility

Fixed volume of each suspension (50 ml) was kept in stopper cylinder which was stored at room temperature for 7 days. At regular interval, one stopper cylinder was removed and moved upside down until there was no sediment at the bottom of the cylinder. And Redispersibility results were shown in table no2 [7-8]

RESULTS

Evaluation of Antacid suspension

Evaluation of Antacid was carried out for various parameters like confirmation of formation of complex, PH, odour and taste, viscosity, sedimentation volume, Redispersibility.

Table no2 : Evaluation of Antacid Suspension

S.NO	parameters	F1	F2	F3	F4	F5	F6
1.	Colour	Light pink	Light pink	Light pink	Light pink	Light pink	Light pink
2.	Odour	peppermint	peppermint	peppermint	peppermint	peppermint	peppermint
3.	Taste	Sweet	sweet	sweet	sweet	sweet	sweet
4.	pH	7.5	7.6	7.6	7.5	7.6	7.6
5.	viscosity	3.2cp	4.38cp	5.01cp	2.89	4.42cp	4.76
6.	Sedimentation on volume	+++	+++	+++	+++	+++	+++
7.	Redispersibility	0.65	0.7	0.77	0.7	0.81	0.89

CONCLUSION

The antacid of Hibiscus gum, Sodium Alginate showed the satisfactory results in every aspect of

evaluation parameters and stability criteria in comparison with other formulation.

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