

Preliminary Evaluation of *Remusatia vivipara* Mucilage as Tablet Binder

Shelke S P*, Aragade P D, Sarode Anupama

Sitabai Thite College of Pharmacy, Shirur, MH, India 412210.

*Corres. author: smitapshelke@yahoo.com

Abstract: The objective of present investigation was to evaluate mucilage of *Remusatia vivipara* as a binder for pharmaceutical dosage forms. Natural gums are economic, easily available and found useful as tablet binder. No significant work has been reported on *Remusatia vivipara* mucilage to use it as a tablet binder. Tablets were prepared with *Remusatia vivipara* mucilage and evaluated for tablet characteristics. Wet granulation technique was used for the preparation granules. The tablet binder concentrations used in formulations were 2, 4, & 6% w/w. The evaluation of granules showed 0.84 to 0.87 mm granule size, 25.34 to 30.23 angle of repose. Tablets were compressed to hardness at about 4.2 to 5.4 kg/cm². The evaluation of tablet showed 0.3 to 0.7 % friability, 11 second disintegration time. Tablets at 6 % w/w binder concentration showed more optimum results as tablet binder. The *Remusatia vivipara* mucilage was found to be useful for preparation of uncoated tablet dosage form.

Key words: *Remusatia vivipara* mucilage, Binder, Paracetamol and Dissolution.

Introduction:

In preparation of a tablet, from a drug as a dosage form, Pharmaceutical ingredients are required. Some Pharmaceutical ingredients require a binder for tablet dosage form. This provides the cohesiveness necessary for binding ingredient together. For a successful formulation binder concentration must be reached to form a tablet and finally disintegrate within specified time period.¹

Binding agents are used to impart the structural strength required during the processing, handling and packing of tablets. A number of plant gums have been used as binding agents in tablet formulations viz. acacia, guar gum, tragacanth etc.²

Mucilage is plant products similar to the gum regarded to be the normal products of plant metabolism. Mucilages are produced inside the cells of

the plant. Mucilage forms slimy masses with water, but not dissolves. Mucilages are esters of sulphuric acid wherein ester group is a polysaccharide complex.³

Remusatia vivipara commonly known as Hitch-hiker or Elephant Ear. Its Biological Source include dried leaflet of *Remusatia vivipara* belonging to family Araceae. Literature survey reveals that, the bark of plant contains a huge amount of mucilage and work is not done on this natural gum. Thus the present work is focused to study binder and disintegrant properties of it. Thus there is a hope for another very good mucilage come in to focus and use.⁴

Materials and Methods⁵

Microcrystalline Cellulose (LobaChemie), *Remusatia vivipara* mucilage, all other materials used in this study was of A. R. grade.

Purification of *Remusatia vivipara* Mucilage:

The mucilage was collected from the *Remusatia vivipara* Tree in Shirur (Pune) region. The mucilage was well dried. The dried mucilage was powdered in mortar and pass through sieve number100. The *Remusatia vivipara* mucilage was solubilized in distilled water. The concentrated solution was precipitated in ethanol. The precipitate was separated and dried at 60°C. The dried mucilage was powdered and stored in tightly closed container.

Standardization of *Remusatia vivipara* Mucilage:

The gum was standardized for following properties;

Loss on drying: The 5gm mucilage was dried at 100 ±5oC till the constant weight of mucilage was obtained. The loss on drying was found to be less than ≤ 10%w/w.

Ash value: 1gm of mucilage was accurately weighed and evenly distributed it in the crucible. It was dried at 105⁰C, for 1 hour and ignited in muffle furnace at 600± 25⁰C. Percentage ash content was found to be less than 8.5%w/w.

pH: *Remusatia vivipara* mucilage was analyzed for 2-6%w/w mucilage solutions with pH found to be in the range of 5.8 to 6.0

Preparation and evaluation of granules:

Wet granulation method was used to prepare granules of drug. The formulation was developed by using Paracetamol IP as model drug. Binder solution of mucilage was prepared by dissolving it in distilled

water. The binder concentrations used were 2, 4, 6%w/w in solution. Binder level was adjusted by lowering the level of MCC in the formula. All ingredients were dry mixed manually in mortar. Binder solution was slowly added into mixture. The wet mass was granulated by passing them manually through a number 12 mesh sieve. Granules were dried at 50 °C in oven and again resieved through number 16 mesh sieve. The granules were evaluated for percentage of fines and particle size. Granules were mixed with 3%talc and evaluated for flow property. The tablet formulation was developed for 600 mg tablet weight as shown in Table No. 1.

Preparation and Evaluation of Tablets:

The tablets were compressed by using Cadmag singlepunch tablet machine fitted with flat faced punches. The batch size prepared was of 100 tablets. The prepared tablets were stored in closed container for 15days. No evidence of chemical change was observed. The tablets were evaluated for content uniformity, hardness, friability, disintegration time and dissolution study. The dissolution study was carried out in 900 ml 0.1NHCL medium using paddle type Dissolution Test Apparatus. The dissolution was carried out at 37 ± 1 °C and 50 rpm paddle speed. The 10 ml samples were withdrawn at 10 min intervals. 10 ml dissolution medium was added into dissolution chamber as are placement for sampling after each interval. Absorbance was measured at 243 nm using UV spectrophotometer (Jasco).

Table 1 Formulation containing 6% w/w *Remusatia vivipara* mucilage

Ingredients	Quantity (% w/w)
Paracetamol	80
Microcrystalline Cellulose	11
Binder (<i>Dendrothoefalcata</i> mucilage)	6
Talc	3

Table 2 Evaluation Granules prepared from *Remusatia vivipara* mucilage

Characteristics	Binder Concentration (% w/w)		
	2	4	6
Particle Size (µm)	0.84	0.86	0.87
Bulk Density (gm/ml)	0.42	0.43	0.43
Angle of repose (θ ⁰)	30.23	29.51	25.34
Carr's index(%)	7	8.5	7.1

Table 3 Evaluation of tablets

Characteristics	Binder Concentration (% w/w)		
	2	4	6
Content Uniformity (%)	98.06	96.52	98.8
Hardness Kg/cm ²	4.2	4.8	5.4
Friability (%)	0.3	0.4	0.7
Disintegration time	40sec.	16 sec.	11 sec

Results and Discussion

The binder mucilage is natural and has pH between 5.8- 6.0. The prepared granules were evaluated for bulk density, particle size, Carr's index and flow properties. The results are shown in Table No. 2. The flow property of granules was determined by angle of repose and it was found that values were between 25.34 to 30.23. The increased percentage of fines reduces particle interlocking and friction, thus decreasing angle of repose. All batches showed good flow property, Granule size distributed between 0.84 to 0.87 mm. Three batches of tablets of each binder concentration were prepared. The prepared tablets were evaluated for content uniformity, hardness, and friability & disintegration time. The results are indicated in Table No. 3. All batches of tablets exhibited a good

uniformity of content. The hardness of tablet was increased with increase in percentage binding agent. The friability values decreased with increase in binder concentration. All the evaluation parameters were found to be within the pharmacopoeial limits at binder concentration 4-6%w/w. Increase in binder concentration therefore resulted in a corresponding decrease in friability and increase in disintegration time.

Conclusion

The *Remusatia vivipara* mucilage was exhibited good binding properties for uncoated tablets. The increased concentration of mucilage showed small retardation in drug release from tablet.

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