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Preliminary Evaluation of *Dendropthoe falcata* Mucilage as Tablet Binder

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Abstract: The objective of present investigation was to evaluate mucilage of *Dendropthoe falcata* 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 *Dendropthoe falcata* mucilage to use it as a tablet binder. Tablets were prepared with *Dendropthoe falcata* mucilage and evaluated for tablet characteristics. Wet granulation technique was used for the preparation paracetamol granules. The tablet binder concentrations used in formulations were 2, 4, 6 & 8 % w/w. The evaluation of granules showed 0.78 to 0.95 mm granule size, 32.05 to 34.15^0 angle of repose and 18.3 to 7.2 % fines. Tablets were compressed to hardness at about 6.6 to 6.9 kg/cm^2.The evaluation of tablet showed 0.98 to 0.53 % friability, 10 to 17 min disintegration time and more than 90 % dissolution in 70 min. Tablets at 6 % w/w binder concentration showed more optimum results as tablet binder. The *Dendropthoe falcata* mucilage was found to be useful for preparation of uncoated tablet dosage form.

Key words: *Dendropthoe falcata* mucilage, Binder, Paracetamol and Dissolution.

Introduction

Dendrophthoe falcata (Loranthaceae) commonly known as 'Vanda' in Marathi is dried as well as fresh stem parasitic on Magnifera indica. It is an evergreen shrub with bark smooth grey, leaves opposite unequal, thick 1.6-25.4 cm long, flowers single, orange-red or scarlet softly pubescent, berries soft ovoid-oblong, 1.3 cm diameter and indigenous to India, Sri lanka, Thailand, Indo-china and Australia. The aerial parts are used in wounds, menstrual troubles, asthma, psychic disorders, pulmonary tuberculosis, consumption and mania by the tribal of India. Leaf paste is used in skin diseases.[1, 2] Its paste is applied on boils, setting dislocated bones and extracting pus. The plant has been scientifically proved to have antilithiatic, diuretic, cytotoxic and immunomodulatory activities.[3, 4]

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.[5]

Materials and Methods

Microcrystalline Cellulose (Loba Chemie), *Dendropthoe falcata* mucilage, all other materials used in this study was of A. R. grade.

Purification of *Dendrophthoe falcata* Mucilage:

The mucilage was collected from the *Dendropthoe falcata* Tree in Nashik (Chandwad) region. The mucilage was well dried. The dried mucilage was powdered in mortar and pass through sieve number 100. The *Dendropthoe falcata* mucilage was solubilized in distilled water. The concentrated solution was precipitated in ethanol. The precipitate was separated and dried at 60^{o}C. The dried mucilage was powdered and stored in tightly closed container.

Standardization of *Dendrophthoe falcata* Mucilage:

The gum was standardized for following properties;

Loss on drying: The 5gm mucilage was dried at 100 ± 5°C 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 105°C, for 1 hour and ignited in muffle furnace at 600 ± 25 °C. percentage ash content was found to be less than 8.5%w/w.

pH: *Dendropthoe falcata* mucilage was analyzed for 2-8%w/w mucilage solutions with pH found to be in the range of 6.5 to 5.5.

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, 8% 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 reseived 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 single punch tablet machine fitted with flat faced punches. The batch size prepared was of 100 tablets. The prepared tablets were stored in closed container for 15 days. 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 0.1 N HCL 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 a replacement for sampling after each interval. Absorbance was measured at 243 nm using UV spectrophotometer (Jasco).

Results and Discussion

The binder mucilage is natural and has pH between 6.5 - 5.5. The prepared granules were evaluated for percentage of fines, particle size and flow properties. The results are shown in Table No. 2. It was observed that the percentage of fines was reduced as the concentration of binder was increased. The flow property of granules was determined by angle of repose and it was found that values were between 32.05 to 34.15^0. 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 0.78 to 0.95 mm. Three batches of tablets of each binder concentration were prepared. The prepared tablets were evaluated for content uniformity, hardness, friability and 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 6- 8% w/w. Increase in binder concentration therefore resulted in a corresponding decrease in friability and increase in disintegration time.

In-vitro dissolution profile is given in Fig. No. 1. Dissolution study showed that the drug release from the tablets containing 2- 8% w/w binder was more than 90% in 70 min. Tablets at 6% w/w concentration shows more optimum results as tablet binder. The drug released from tablets decreased with increased with binder concentration.

Conclusion

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

Table 1 Formulation containing 6% w/w *Dendropthoe falcata* mucilage

Ingredients	Quantity (% w/w)
Paracetamol	80
Microcrystalline Cellulose	11
Binder (*Dendropthoe falcata* mucilage)	6
Talc	3

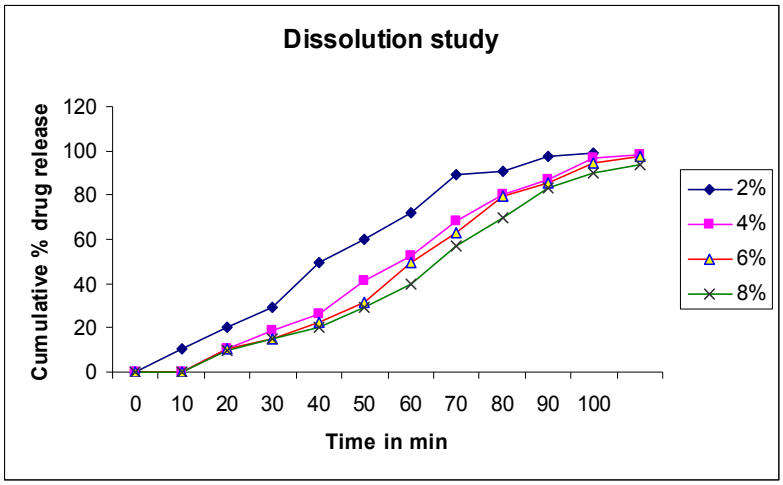
Table 2 Evaluation Granules prepared from *Dendropthoe falcata* mucilage

Characteristic	Binder Concentration (% w/w)			
	2	4	6	8
Percentage of fines	18.3	14.52	11.81	7.2
Particle size	0.78	0.80	0.85	0.95
Angle of repose	32.05	32.35	33.07	34.15

Table 3 Evaluation of tablets

Characteristic	Binder Concentration (% w/w)			
	2	4	6	8
Content Uniformity (%)	98.06	96.52	98.8	97.96
Hardness Kg/cm^2	6.6	6.7	6.6	6.8
Friability (%)	0.98	0.72	0.68	0.53
Disintegration time	10 min 20 sec	14 min 25 sec	15 min	17 min

Figure 1: Dissolution study



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