

Evaluation of *Delonix regia* Raf. Endospermic mucilage as tablet binder

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Abstract

Delonix regia is tropical tree found widely in India. Seeds of the plant contain glucomannose hence attempt to evaluate the seeds for suitability as tablet binder is considered. Seeds collected from dried pods of *D. regia* were used for preparation of mucilage. The mucilage obtained was used for preparation of calcium carbonate tablets (Formulation B). The tablets were evaluated for Hardness test, Friability Test and disintegration time and results were compared with standard calcium carbonate tablets (Formulation A) prepared using 5%w/v starch paste as binding agent. Hardness of test formulation was found to be 6.0 kg/cm³, the friability loss was just 0.26% and the disintegration time was 7 min. The properties were compared with standard formulation A. The results indicate that endospermic mucilage obtained from *D. regia* seeds possesses comparable binding properties.

Key words : *Delonix regia* – glucomannose - seed gum mucilage – tablet binder – calcium carbonate tablets- hardness test – loss on friability – disintegration time.

Introduction

Delonix regia, commonly referred as *Goldmohur* is a widely available tropical tree. The species is found amply in all areas of India.

Seeds of many plants such as acacia, fenugreek are known to contain gums. The seed gums obtained from these plants are proved to be effective as tablet binders¹.

D. regia seeds are known to contain glucomannose and hence an attempt to evaluate the seeds for their suitability as tablet binder is done in the present investigation².

Objectives of work

The present investigation is an effort to study the suitability of endospermic mucilage obtained from *Delonix regia* seeds as tablet binder. The specific objectives of work are-

- To study the method of preparation of *D. regia* mucilage.
- To evaluate the swelling properties of the endosperm.
- To prepare calcium carbonate tablets using endospermic mucilage obtained from *Delonix regia* seeds.
- To evaluate the prepared tablets.
- To compare the prepared tablets with standard tablets prepared using starch as binding agent.
- To evaluate the suitability of endospermic mucilage obtained from *Delonix regia* seeds as tablet binder.

Materials and Method^{3,4}:

D.regia seeds were collected from dried pods of *D.regia* plant. The shade dried seeds were used for further experimental work. Other ingredients used such as Starch, calcium carbonate, talc were LR grade.

The granules were prepared by wet granulation method and subsequently compressed using Cadmach single punch automatic tablet machine (10m.m. die/punch).The tablets prepared using endospermic mucilage were evaluated in laboratory using specified equipment as per IP procedures.

Experimental Work

The present investigation is an effort to evaluate the suitability of a new material obtained from widely available *D. regia* plant as tablet binder. The experimental work involves the following steps -

1. Preparation of Endospermic mucilage^{5,6,7}:

Seeds were collected from dried pods of *D. regia*. The seeds were properly washed and boiled with water for 4–5 hrs. in order to loosen the testa. The endosperm was removed and air dried. The dried endosperm was weighed. About 20g. of the dried endosperm was further used for preparation of mucilage.

20g. dried endosperm was mixed with adequate water and boiled to obtain 100g. mucilage. The mucilage so obtained was used for further studies.

2. Preparation of tablets using The Mucilage⁴:

The endospermic mucilage obtained as per procedure mentioned in step 1 was used for preparation of calcium carbonate granules by wet granulation method. The granules were compressed using Cadmach single punch automatic tablet machine using 10m.m. die / punch. The tablets were evaluated for the following tests and the results were compared with calcium carbonate tablets prepared using starch paste as binder. The formulations are mentioned in Table 1.

3. Evaluation of tablets⁸:

The tablets prepared with endospermic mucilage of *D. regia* were evaluated for the following tests-

1. **General description:** The tablets were white colored, odorless, tasteless solid unit dosage forms.
2. **Tablet Hardness test:** The tablets were evaluated for hardness as per I.P. procedure using Pfizer hardness tester.
3. **Friability Test:** The friable mass was determined as per I.P. procedure using Friability test apparatus.
4. **Disintegration time⁸:** The disintegration time was determined as per I.P. procedure.

The results of above evaluation are summarized in Table 2. and were compared with standard calcium carbonate tablets prepared using 5% w/v starch paste as standard binding agent.

Results and discussion

The tablets prepared as per the formula mentioned in Table.1 were evaluated for general appearance, hardness, and friability and disintegration test. All the above tests indicate the effectiveness of binding agents used in tablets.

The hardness of Formulation B (Test formulation) was found to be 6.0 kg/cm³, the friability loss was just 0.26% and the disintegration time was 7 min. The properties were compared with that of standard formulation A. The results are summarized in Table 2.

Table 1. Formulation of calcium carbonate tablets.

Sr.	Formulation A (Standard)	Formulation B (Test)	Quantity	Use
1	Calcium carbonate	Calcium carbonate	20 g.	Diluent
2	Starch powder	Starch powder	0.5g.	Disintegrating Agent 1
3	Starch paste	D. regia mucilage	q. s.	Binding agent
4	Starch powder	Starch powder	0.9g.	Disintegrating Agent 2
5	Talc	Talc	0.18g.	Gliadant

Table 2. Evaluation of Tablets.

Sr.	Test	Formulation A (Standard)	Formulation B (Test)
1	Hardness	4.41 kg	6.00 kg
2	Friability	1.92 %	0.26 %
3	Disintegration Time	3.0 min	7.0 min

Conclusion

It can be observed from the evaluation of tablets that the properties of tablets prepared using the binder under investigation are comparable with tablets prepared using 5% w/v starch paste as binder (standard). It can therefore be concluded that the endospermic mucilage obtained from *D. regia* seeds possesses comparable binding properties when compared with standard binder (5% w/v starch paste).

Future perspectives

The present investigation is a primary platform to indicate the suitability of *D. regia* seed gum mucilage as a tablet binder. The work can further be extended for evaluation of its suitability as suspending agent, gelling agent and other similar pharmaceutical applications considering the easy and ample availability of the plant. The work can go a long way to evaluate herbal pharmaceutical excipients.

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