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EXTRACTION OF GELATIN FROM GOATSKIN: AS BINDER FOR PARACETAMOL TABLET PREPARATION

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Abstract

Gelatin is extracted from goat skin use as a Binder in pharmaceutical dosage form this study important for determination of potency of extracted gelatin from Goat skin as a Binder on paracetamol tablet using the process of wet granulation with 2'3% concentration range the result should that properties of tablet such as weight variation, thickness, Uniformity and hardness value compare to the tablet formulating from bovine gelatin Here paracetamol tablet using goat skin gelatin as excipient Binder had a better value of variability, fast disintegration time and dissolution is easy than the comparison .comparative result of other bovine tablets showed when increasing the concentration of gelatin causes increasing hardness value and this integration time get longer and tablet friability value decreases that best tablet is produced with 4% concentration of good skin with the following result of evaluation

Disintegration time 3.67-minute hardness value 14.98± 0.66 KP and friability value 0.62% ± 0.83 respectively. The goat skin gelatin was very good. Binder using the process of wet granulation

KEYWORDS: Goatskin ,Binder, Gelatin, Paracetamol, Tablet **,**Natural binder, Gelatin extraction**.**

Introduction

Binder is the main ingredient used in formulating tablets to upgrade powder cohesiveness in order to improve the Powder flow ability and compaction properties of tablet .The flow ability properties are very significant to produce physical stability and compaction of tablet. Gelatin was one of the Binders which was generally used in pharmaceutical preparation. Gelatin was used as dry Binder for direct compression of tablet Or using binding solution by wet granulation process for preparation of tablet. Gelatin has good dispersion as a Binder solution. As a result when gelatin is used as a Binder in formulation of Paracetamol tablet it produces the tablet with good mechanical strength and hardness.

Gelatin can be obtained from mammals fish and insects the general gelatin come from mammals bovine and Porcine but porcine gelatin is Forbidden for some consumers consequently any product using like such ingredients are also Forbidden in Muslim consumers. At present halal product (which is allowed to consume for Muslim) are important concern in pharmaceutical industry. The industrialization of producing gelatin help to the religious consumer and economical for the owner

Basically, goat skin gelatin has physical properties that are not much different from bovine gelatin. Present study of an formulation and evaluation of paracetamol tablets using goatskin gelatin as a binder prepared by the process of wet granulation was evaluated as compared to bovine gelatin.

Materials and Methods

Goat skin as a source of gelatin purchased at Aurangabad Municipal slaughterhouse, distilled water, sodium sulfide, calcium hydroxide, and hydrochloric acid issued from yashodeep Institute of Pharmacy Aurangabad The paracetamol tablet was formulated using the following material goat skin gelatin or bovine gelatin(extracted in the laboratory)starch and talc Paracetamol, amylum ,magnesium sterate and lactose monohydrate. (yashodeep institute of pharmacy Aurangabad)

Instruments

Single punch tablet press, Mortar pestle, Hot air oven ,Weighing balance ,Hardness tester machine, Friability tester, Disintegration tester dissolution tester.

Preparation of goat skin gelatin

The preparation to extract gelatin from goat skin referred from the method Rasayan and zilhadia journal from article of extraction of gelatin. The skin where collected from slaughterhouse. To avoid physiological damage the skin sample put into polythene bag placed in the ice box and brought to this laboratory within 1.30 hours. Immediately after arrival the skin wash with running water at 25 to 30°c and cut the 2×3 cm in size. Put into glass Container and hydrolyzed with 4% hydrochloric acid at 4°c for 48 hours .After acid hydrolysis the skin wash again with distilled water.

Gelatin extraction

From previously treated skin was through the first extraction and distilled water at 62-70°c for 5 hours. The extract was filtered by two layers of fabrics or vacuum filtration the resulting filter was heated to 60 °c. Until the volume was obtained a quarter of the initial value of the filtration. The filtrate turn concentrated in the oven at the same temperature to obtain gelatin product for 2 hours. The second and third extraction processes are carried out by the same process. at last, their content was evaluated in water content, ash content gel strength, viscosity, pH the moisture as fat, and crude protein content of gelatin extracted determined according to Indian Pharmacopeia, and the pH value of the gelatin solution were measured using the British Standard method 1975 all measurements were performed in triplicate.

Composition of tablet

Paracetamol tablet were formulated with 4 formulas consisting 2 comparison formulas (CF)and 2 test formula (TF) The formulas to make Paracetamol of 650 mg is presented in table 1.

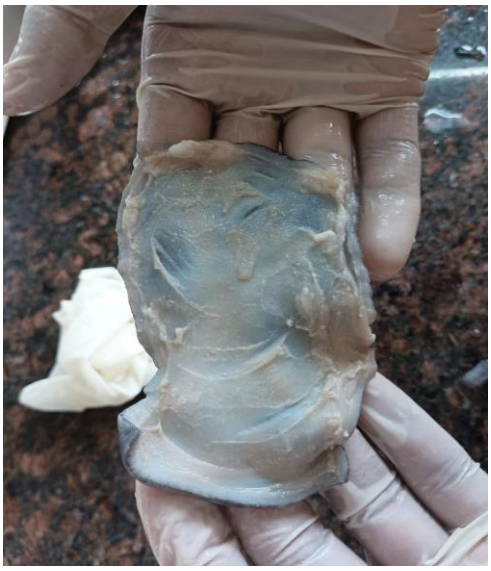

Image No 1: Goatskin

Image No 2: Extraction of Goat skin gelatin

Table No.1

Formulation of Paracetamol Tablets using goat skin gelatin (test formula) and bovine gelatin (comparison formula) as a Binder

Ingredient (mg)	**Comparison formula**		**Test formula**	
	2%	3%	2%	3%
Paracetamol	500	500	500	500
Amylum	60	60	60	60
Lactose monohydrate	35.75	29.50	35.75	29.50
Bovine gelatin	13	19.5	-	-
Goat gelatin			13	19.5
Magnesium sterate	6	6	6	6
Starch	30	30	30	30
Talc	5	5	5	5

Preparation of tablet

Procedure for formulation of Granules

Weigh and pass Paracetamol powder through a 100# sieve. Mix Paracetamol and amylum and lactose monohydrate in a mortar until the Powder was homogeneous. Granulated in gelatin solution with hot water. The granules dried at 60 °c. The dried granules was shifted with a 22 #sieve

Evaluation test for Granules

1. **Bulk density:** The bulk density of granules determined by pouring mixture into the cylinder. the weight of powder (M) bulk density (Vb) were determine. The bulk density calculated using the formula Pb=m/Vb

2. **Tapped density:** The measuring cylinder apparatus containing a known mass of granules was tapped 50 times using a density apparatus. And the weight (M) of the blend, and the minimum values (Vt) occupied in the cylinder were measured. The tapped density of granules was calculated using the formula: Pt = M/Vt

3.**Compressability;** The way measurement of the flow of powder is its compressibility, The requirement of the ease with which a material can be induced to flow given by Compressibility (Carr's) index (I) .Which is calculated as follows: I = Pt– Pb/Pt × 100

4. **Angle of repose:** The angle of repose was determined using the funnel method. The Granules are poured through a funnel that can fall vertically on a flat surface and form a pyramid structure. The radii of the heap and the height of the powder were measured, as was the angle of repose of the granules was calculated using the formula: -1 (h/r)

Sodium starch glycolate, magnesium stearate, and talc were added to the granules and mixed until they were homogeneous. The tablet was at last compressed in a single-punch tablet press.

Instrument used for evaluation of tablet

Paracetamol tablets were evaluated with a suitable method. Weight variation and thickness uniformity were measured with an electronic weighing balance and calipers, respectively. The hardness of the tablets was measured with a hardness tester (Monsanto hardness tester). Friability testing was conducted using a Roche friabilator at 25 rpm.

In vitro drug release study: The dissolution test was conducted according to United state pharmacopeia (USP). A buffer was prepared from potassium phosphate(pH5.8) and placed into a dissolution flask with a temperature maintained at 37 ± 0.5 °C and the paddle stirrer was set throughout the. Experiment the samples were withdrawn after 30 minutes the 5 ml sample was taken and the original amount of fresh buffer solution was directly introduced as a replacement. The samples were filtered and assayed for drug content by measuring the absorbance at (243nm) using a UV- vis spectrophotometer. Phosphate buffer was used as a blank.

Result:

The goat skin gelatin was successfully extracted with a yield point of 10.27 ± 1.08. the clarity of gelatin compared against the clarity of the water at 100% transmittance (T)value. the percentage transmittance of goat skin is 62.66% ± 0.36 The Goat skin is gelatin coarse powder was brownish yellow. Here the physical properties of goat skin were suitable for pharmacopeia the goat skin gelatin content including moisture, fat, and proteins, was evaluated

Table 2.

The result of the ash, protein, moisture, fat content, and ph of goat skin gelatin

Measurement	Result	Requirement
Moisture	8.38±0.75	8-13
Ash content	0.33±0.45	2-5
Fat content	1.05±0.27	Up to5
Protein content	90.15±1.15	Up to85
ph	5.00±0.51	3.8-5.5

Formulation of tablet :

In a previous study, paracetamol tablets using 1% gelatin had a friability value below 1%, therefore the concentration used was between 2% and 3% in both the test and comparison formulas.

Characteristic of granules:

Granulation is the process selected by researcher to prevent segregation of formulation components in powder mixture, improve the flow ability content uniformity compressibility and other properties

Evaluation of tablet:

The result of testing 20 Tablets from all formulas the tablet produced were round ,bitter odorless in gelatin smooth, and Shiny. uniform in color and no defect were detected in the tablet .tablet fulfill all physical specification quality standard hardness, thickness, weight variation, dissolution, and disintegration content uniformity were shown to in

table 3

Evaluation test

Formula	**Weight variation**		**Thickness uniformity**	**Hardness**
	SD(mg)	AV (%)		
CF1	650.35 ±1.62	4.235	4.77±0.02	13.24±1.02
CF2	650.36±1.03	2.857	4.72±0.01	14.35±1.05
TF1	649.95±1.31	2.993	4.77±0.03	13.45±0.90
TF2	650.17±1.22	3.066	4.71±0.01	15.07±0.66
Requirement		<15.0%	±5%	<10kg/cm2
CF :comparison formula, TF: test formula, SD: standard deviation ,AV :acceptance value				

Dissolution testing (in vitro drug release study)

Dissolution testing was the last evolution. The goal of in vitro dissolution is to provide a prediction between the product and in vivo bioavailability. The result of the evaluation is that the dissolution requirement was met, as shown in Table 4. The result said that the tablet that used goatskin gelatin was easy to dissolve compared with the one that used bovine gelatin as a binder.

Table 4

The result of friability, disintegration and dissolution of tablets

Formula	Friability	Disintegration	Dissolution
CF1	0.64±1.52	1.92±0.26	96.00±3.95
CF2	0.68±1.73	3.62±0.85	93.08±1.44
TF1	1.18±0.74	1.65±2.12	95.47±1.35
TF2	0.62±1.25	3.71±1.00	99.43±0.94
Requirements	<1%	<15 minute	<80%
CF :Comparison formula , TF: Test formula			

Conclusion

Present study of above project showed that the tablets that used goatskin gelatin as a binder had faster disintegration time and were easier to dissolve compared to the ones using bovine gelatin. The ideal concentration of goatskin gelatin as a binder was 3%. In short, the goatskin gelatin was very promising as a binder in pharmaceutical dosage forms, especially tablets.

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