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PRE-FORMULATION STUDIES OF PAPAYA (C.PAW-PAW) EXTRACT TO USE FOR TABLET PREPARATION

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ABSTRACT

An object is to studies on the pharmacological conditioning of papaya (c. paw-paw) and bay splint parade that these shops effectively palliate degenerative conditions including diabetes. Still, herbal medicines from papaya and bay splint have no-way been made. The end of this exploration was to formulate a tablet from the combination of papaya excerpt and bay splint with different attention (1, 2, and 3) of polyvinyl pyrro lidone (PVP) K30 as a binder using the wet granulation system. (18)

KEYWORDS: Papaya, Papaya extract, Papaya leaf extract, Formulation, Tablets and Flavonoid.

I. INTRODUCTION

Paw paw fruit is a rich origin of phyto-nutrients, minerals, vitamins, and other composites similar as alkaloids, saponins, tannins, and flavonoids, which have antioxidant exertion and eventuality as an anti-hyperglycemic agent. A former study revealed that 5 mg/ kg BW papaya excerpt can significantly reduce blood glucose position in experimental mice (1). Bay leaves, in addition to their use as a food seasoning, have traditionally been used to treat gout, high cholesterol, and diabetic conditions. The active composites plant in bay splint similar as eugenol, tannins, and flavonoids are responsible for the factory's medicinal parcels(2). Bay splint excerpt at a cure of1.36 mg/ kg showed strong anti-hyperglycemic exertion in experimental mice (3). Flavonoids are plant abundantly in papaya and bay splint, and these groups of composites play an important part in the pharmacological parcels of these shops. Both papaya and bay splint excerpts contain flavonoids, and the combination of these two excerpts is anticipated to have an optimum effect as an antihy-perglycemic drug. In this study, two excerpts were combined and formulated into a tablet. The tablet form was named to formulate papaya and bay splint excerpts into a useful medicine because the tablet form has numerous advantages compared to other forms of medicine similar as invariant size, ease of consumption continuity, and ease of storehouse. The binder or tenacious substance is demanded to make good tablet, compact, and strong (4, 5). One binder generally used for making tablets is polyvinyl pyrrolidone (PVP), as PVP has not shown any poisonous effect and is fluently absorbed from the gastrointestinal tract

or mucous membranes when taken orally. The attention of PVP used as a binder ranges between0.5-5 [6]. The grains that use PVP as a binder have good inflow parcels, have a minimal angle of repose, have better compressibility and produce smaller forfeitures [7].Tablet decomposition time. Thus, the end of this study was to formulate .a tablet from the combination of papaya and bay splint excerpts using the Ac-Di-Sol as a super disintegrate. The attention of Ac-Di-Sol used in the wet clincher accoutrements granulation process is 3 [6]. To gain the stylish tablet formula, papaya splint and bay splint excerpts were combined and different attention of PVP K-30 (1 percent, 2 percent, and 3 percent) were added. The quality of the performing tablet was determined by an organoleptic test, which assesses weight uniformity, size uniformity, hardness, frangibility, decomposition time, and dissolution time. [18]

METHODS

Styles Tools and accoutrements: The tools used were digital scales (AND G-120), an roaster, a channel, callipers, a Tap Viscosity cadence (USP Bulk Density Tester 315-2E), a Flow cadence, sundials, a tablet printer (Delta), a frangibility test decomposition tester (Vanguard Pharmaceutical Machinery Inc., USA), Humidity balance(AND MX 50), a furnace (Ney), a spectrophotometer, glass tools. The accoutrements used were PVP K-30, Avicel pH 102, Ac-Di-Sol, Talc and magnesium stearate, 96 ethanol, distilled water, hydrochloric acid .2 N, gelatin 1, sodium chloride 10, iron (III) chloride, hydrochloric acid, sodium acetate 1M, methanol, magnesium greasepaint, reagent Mayer, Bouchardat, Dragendorff, quercetin, and aluminium chloride 10. All chemicals used were of logical grade.[18]

CHARACTERIZATION OF PLANT MATERIALS

Determination of Water Content

The water content of the plant materials was calculated in keeping with the standard method using moisture balance apparatus.

Determination of ash content

Ash content was firm after the plant materials were ashes within the furnace at a temperature of 600°C [8].[18]

EXTRACTION OF PAPAYA AND BAY LEAVES

1200 g of papaya leaf powder were immersed in a very pot that contained 6000 ml of H2O. 1000 g of herb powder were immersed in an exceedingly pot that contained 4000 ml of H2O. Each pot was then heated and infrequently stirred for quarter-hour. The temperature was gradually increased from 15°C to 900°C. The liquid extract obtained was sieved and dried during a vacuum dryer to get concentrated papaya and herb extracts.[18]

PHYTOCHEMICAL TEST

Flavonoid Test

The existence of flavonoids was ferreted (out) by staining method. Difference within the appearing colour (marked in red, orange, or green) shows the variation of flavonoids within the sample.[18]

Alkaloid Test

The existence of alkaloid was ferreted (out) by using testing agent Bouchardat. If the testing agent bring on brown to black colour then there'll likely be an alkaloid.[9][18]

Saponin Test

The existence of saponin is characterized by the formation of froth in an solution with a height of 1-10 cm, which is stable for no <10 minutes when a drop of acid 2 N was added to the solution [9, 18]

Tanin Test

The existence of tannin was resolute in keeping with a previous method:

a. The addition of 10% gelatine solution produces white precipitate. NaCl-gelatin solution made up of 1% gelatine solution in 10% NaCl ratio of 1:1[18]

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b. The addition of three solution iron (III) chlorides produces green-bluish to black [10].(18)

DETERMINATION OF TOTAL FLAVONOIDS EXTRACT

Determination of Wavelength Maximum Quercetin

A total of 10 ml of a customary solution of quercetin in a very methanol concentration of 10 ppm was put in an exceedingly 50 ml flask. The answer added by 1 ml of AlCl3 10%, 1 ml of 1 M sodium acetate and distilled water to the limit of flask. the answer was shaken until it was homogeneous and was left to face for half-hour. The absorbance at a wavelength of 380-780 nm was measured employing a spectrophotometer. (18)

DETERMINATION OF OPTIMUM INCUBATION TIME

The solution was measured at the most wavelength at 5, 10, 15, 20, 25, and half-hour to see the optimum time. (18)

CALIBRATION CURVE OF NORMAL

Quercetin standard solution series were made 2, 4, 6, 8, and 10 ppm. Standard solution 100 ppm was pipetted 1, 2, 3, 4, and 5 ml into a 50-ml flask. Then, 1 ml of AlCl3 10% and 1 ml of 1 M sodium acetate were added and diluted with H2O to the limit of flask. the answer was shaken until it had been homogeneous, and then, allowed at the optimum incubation time. the answer was then measured at a wavelength of maximum absorbance. Curve was made between the absorbance measurements and quercetin standard solution concentration. It was produced regression toward the mean equation (y= bx+a). The equation was wont to calculate the extract concentration (ppm) by entering the extract absorbance as y-values into the equation. (18)

DETERMINATION OF TOTAL FLAVONOIDS

Extract 200 mg of papaya leaf extract, 54.4 mg of herb extract, and 254.4 mg of a mixture of papaya leaf extract and bay leaves corresponded to five times the dose of every formula. Each performed the assay extract manner diluted with methanol to 50 ml and was shaken for 10 minutes to extract soluble in methanol. Each solution of papaya extract, herb extract, and the mixture of papaya and herb extracts were pipetted into a 50-ml flask. Then, 1 ml of AlCl3 10% and 1 ml of 1 M Na acetate was added. Distilled water was added to the limit of flask. The answer was shaken until it was homogeneous so allowed at the optimum incubation time. Absorption was then measured at the most wavelengths the resulting absorbance was added to the regression of y on x of the quality curve quercetin, and therefore the total flavonoid content was then calculated. (18)

TABLETING-METHODS

Three different formulas were accustomed make a tablet, as shown in Table 1. Each formula consisted of 500 tablets, and every tablet weighed 300 mg.

A tablet was made using the wet granulation method. All ingredients were sieved using 30 meshes. Papaya leaf extract, herb extract, PVP-K30, Ac-Di-Sol, and Avicel pH 102 were weighted per the formula. PVP K-30 as a binder solution was prepared by dissolving it in 70% ethanol. All the ingredients were stirred to get a uniform mixture. The binder was stirred into the mixture to reinforce the strength of the powder particles. Wet tablet powders were formed into granules or a moist mass to create a granulation. Moist granules or powder-sieved wet mass was pressed past an 8-mesh sieve to create granules. The granules were dried in an oven that was thermostatically controlled to record a time, temperature, and humidity constant. (18)

DETERMINATION OF FLAVONOID CONTENT WITHIN THE TABLET

The total flavonoid content within the tablet decided employing a method the same as that won't to determine the full flavonoid content in papaya and herb extracts. 20 tablets were weighed then crushed into a fine powder. The powder weighed corresponding to the content of the amount of

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extract 254.4 mg. a complete number of grams of the powdered tablets that had been equated were put during a 50-ml flask together with methanol to the limit. The answer was shaken for 20 minutes employing a magnetic stirrer. Then, 2 ml solution was pipetted, 1 mL of AlCl3 10%, and 1 ml of sodium acetate 1 M were added. H2O was added up to the limit of the 50-ml flask. The answer was shaken until it absolutely was homogeneous so allowed for the optimum time. Absorption was then measured at the most wavelengths. The resulting absorbance was inserted into the equation of the quality curve of quercetin.(18)

Table 1: Tablet formulation from papaya and bay leaf extracts

Materials	Formulation (%)		
	I	II	III
Papaya leaf extract	13.35	13.35	13.35
Bay leaf extract	3.6	3.6	3.6
PVP K-30	1	2	3
Ac-Di-Sol	3	3	3
Mg stearate	1	1	1
Ac-Di-Sol	0.5	0.5	0.5
Talk	2	2	2
Avicel pH 102 ad.	100	100	100

PVP: Polyvinylpyrrolidone

RESULTS AND DISCUSSION

Characterization Of Simplified

Fresh leaves of papaya and bay plants (Figs. 1 and 2) obtained 9.43% of dry leaf powder. The papaya dry leaf powder encompasses a bright green, a specific odor, and a really bitter taste with 4.84% of water content and 8.7% of ash content.The water content of papaya and herb dry extracts were 4.7% and 4.46%, respectively; the ash content of papaya and herb dry extracts were 9.4% and 8.2%, respectively. The results obtained were in line with the recommended quality standard during which the ash content of bay leaf extract shouldn't be quite 10.1% [11]. the worth and quality of extracts varied reckoning on the extract's ash content, purity, and contaminants.(18)

PHYTOCHEMICAL TEST

The results of phyto-chemical tests conducted on some classes of the main active compounds contained within the dry extracts of papaya and bay leaves showed that both extracts contained flavonoids, alkaloids, saponins, and tannins in moderate-to-high levels.(18)

TOTAL CONTENT OF FLAVONOIDS

The maximum absorption was 430 nm. The optimum incubation time was 20 and 25 minutes with absorption of 0.151 nm. The results of the linearity of the equation y=0.0773x−0.003 with a coefficient of correlation of r=0.9998, which confirms the linearity of the connection between absorbance and concentration. (18)

The total flavonoid content within the dry papaya and herb extracts was 1.562% while the full flavonoid content of the mixture of papaya and bay leaf extract was 4.675%. This data showed that the whole flavonoid content of the mixture of dry papaya and herb extracts were higher than level of total flavonoid content from those single extracts. Based on this data, papaya and herb extracts were mixed to get higher levels of flavonoid content.(18)

EVALUATION OF TABLET CHARACTERISTICS

The uniformity within the weight of the papaya and herb tablets was tested by weighing each tablet, and therefore the results were presented as percentages of deviation. The hardness of the tablets that resulted from the third formula is comparable to that of the tablets that resulted from the primary and second formulas per literature and as shown in Table 4, where the hardness of tablets range between 4 and eight kp[13]. The tablets that resulted from Formula II had the very best hardness compared to the tablets that resulted from Formula I and Formula III. This result could be related to the air mass employed in the printing of the tablets yields a high hardness level. The results of a friability test (Table 5) show that each one of the tablet formulas were eligible in line with literature, because the average friability ranged between 0.8% and 1% [14]. the very best friability was found

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within the tablets with Formula III while the bottom friability was found within the tablets with Formula II. The discrepancy within the friability of the tablets could also be related to the difference within the moisture content of Formulas I, II, and III.[18]

Fig. 1: Papaya leaf

Fig. 3: Dry extract of papaya leaf

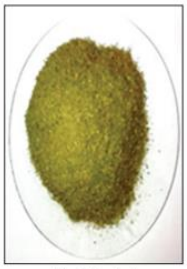

Fig. 2: Bay leaf

Fig. 4: Dry extract of bay leaf

Which determined that the disintegration time of a good tablet should be <15 minutes [15]. The disintegration of the tablets was influenced by the concentration of the binder. Formula III has the longest disintegration time. The tablets' disintegration time was possibly influenced by the tablets' level of super disintegrate and fillers within the tablets' formulation. The super disintegrate Ac-Di-Sol used in the tablets has an intense mechanism of destruction although it can be compared to other styles of disintegrate at low concentrations. The use of avicel because the filler within the tablet formulas also affected the disintegration time of tablets. Consistent with the literature, the substance that can improve the flow of powder will accelerate the dissolution of the tablet obtained, and hydrophilic derivative compounds like avicel don't seem to be soluble in water; thus, avicel can absorb water into the tablet and facilitate the discharge and dissolution of the tablet and its content [16].

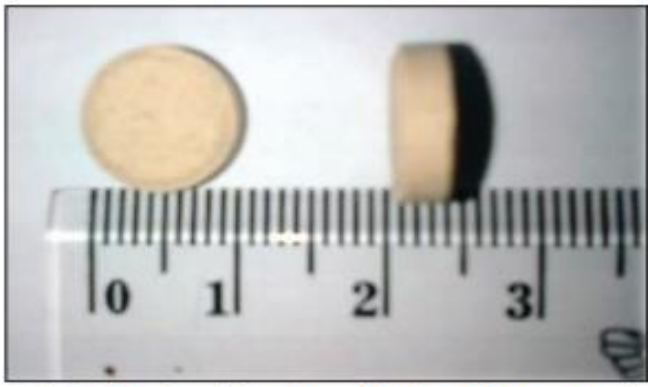

Fig. 5: Tablets formed from the combination of dry papaya and bay leaf extracts

Table 2: Characteristics of the granules from dry papaya and bay leaf extracts

Granule evaluation	Formula		
	I	II	III
Water content (%)	3.30	3.53	4.16
Flow test (g/s)	12.16	11.06	10.80
Angle of repose (°)	28.24	22.11	26.00
Compressibility (%)	11.76	13.32	13.47

Table 3: The thickness and diameter of the tablets

Results	Average measurement (cm)		Requirement	
	Thickness	Diameter	1 1/3	3
Formula I	0.393	0.957	0.524	1.179
Formula II	0.392	0.957	0.523	1.176
Formula III	0.391	0.957	0.521	1.173

Table 4: Average hardness of papaya and bay leaf tablets

Results	Average hardness (kp)	Hardness range (kp)
Formula I	5.465	4.5-6.5
Formula II	6.945	5.6-8.2
Formula III	5.810	4.7-6.8

Table 5: Average of tablets' friability

Results	Average friability (%)
Formula I	0.34
Formula II	0.27
Formula III	0.53

Table 6: Average of tablets' disintegration time

Results	Disintegration time
Formula I	6 minutes 8 seconds
Formula II	11 minutes 35 seconds
Formula III	13 minutes 97 seconds

TOTAL FLAVONOID CONTENT WITHIN THE TABLETS

Quantitative analysis was conducted to work out the flavonoid content in the tablets. The analysis was done using UV-Vis spectrophotometery methods because other

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excipients like the fillers within the tablets don't absorb UV light, and thus, didn't interfere with the measurement [17]. (18)

The average total flavonoid content of the tablets obtained from Formula I, Formula II, and Formula III were 4.157%, 4.217%, and 3.756%, respectively. The extent of flavonoid content within the tablets was decreased by 13.5% on the average. This reduction in flavonoid content may occur because of the damage of certain flavonoid compounds during the granulation and tableting processes further because the effect of the moisture level of materials within the formula.(18)

CONCLUSION

It is concluded that PVP K-30 concentration is used as a binder to formulate dry papaya and herb extracts into high-quality and ready-to-consume tablets. The concentration of PVP–K30 was 1% (Formula I), 2% (Formula II), and three (Formula III). the overall flavonoid content found within the papaya leaf extract was 1.562%, the herb extract was 2.240% and tablets Formula I, Formula II, and Formula 2 were 4.157%, 4.217%, and 3.756%, respectively.

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