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FORMULATION AND EVALUATION OF RAUWOLFIA AND AMLA POLYHERBAL TABLETS

PRACHET P*, REEMA G, KAMAKSHI DEVI N, HARITHA CHOWDARY D AND RAMA RAO N

Department of Pharmaceutical Analysis, Chalapathi Institute of Pharmaceutical Sciences, Lam, Guntur-522034

***Corresponding Author: Dr. Pinnamaneni Prachet: E Mail: prachetpinnamaneni@gmail.com**

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ABSTRACT

The aim of present study was to develop a polyherbal solid dosage formulation using *Phyllanthus emblica* (Amla) and *Rauwolfia serpentina* (Indian snakeroot) in defined ratio. Polyherbal formulation was developed using powders of medicinal plant parts like Amla fruit and Rauwolfia root. These powders were evaluated for their physical properties like Bulk density, tapped density, Angle of repose and Hausner's ratio separately. Granules were prepared using wet granulation technique with the help of powders and other excipients. Polyherbal tablets were formulated finally and evaluated by different methods like Physical appearance, Thickness, Weight variation, Hardness, Friability and Disintegration and all were within the acceptance limits. Optimized formulation F5 can be used for treating hypertension with less side effects and maximum potency rate.

Keywords: Amla, Rauwolfia, polyherbal tablets, wet granulation

INTRODUCTION

Poly herbalism is an ancient medical science followed traditionally in India fromcenturies to treat illness **[1]**. In a polyherbal formulation more than one herb is used rather than a single herb because when some herbs are used together, they exhibit synergistic property. For achieving better therapeutic activity the concept of poly herbalism is stated in ayurvedic literature named Saragadhar Samhithain 1300 A.D **[2]**. According to a survey by World Health Organization (WHO) almost

80% of the population depends on herbal medicine for the treatment of minor ailments **[3]**. This is because of its cheaper cost, flexibility of usage which does not depend on any age group and gender. The use of polyherbal formulation reduces the risk of side effects when compared to allopathic medicines. Plants used in tablet formulation are Amla and Rauwolfia.

Phyllanthus emblica (Vernacular names: Amla, Amlaki, Nelli) belongs to family Phyllanthceae is indigenous fruit of Indian sub-continent which is known for more than 3500 years. All parts of this tree are used for the treatment in ayurvedic system of medicine where fruit is one of the most important among other parts. Amla fruit is a capsular berry which is light green in color and turns to greenish yellow on ripening **[4]**. The major biologically effective phytoconstituents of Amla are gallic acid, quercetin, ellagic acid, emblicanin A and B, phyllanemblin and ascorbic acid. It has proven reports on cardio-protective, hepato-protective, gastro-protective, neuro-protective, antioxidant, analgesic, anti-tussive, antiatherogenic, adaptogenic and anticancer properties. It is efficacious against various ailments like diabetes, hypertension with lifestyle diseases, cancer, liver and heart diseases, parasitic diseases, atherosclerosis, inflammation, neurological disorders, osteoporosis and other infectious diseases **[5]**. Additionally, Amla is considered as a strong immunity booster.

Rauwolfia serpentina (vernacular names: Sarpagandha, Indian snakeroot, devil pepper, or serpentine wood) belongs to family Apocynaceae and indigenous to the Indian subcontinent and East Asia **[6]**. Mostly roots of this plant are used for treatment in ayurvedic system of medicine. Several alkaloids like reserpine, ajmaline, ajmalicine, yohimbine, etc are isolated from the root bark of this plant. The therapeutically effective phyto-constituents present in rauwolfia are reserpine which is an indole alkaloid and also contain recinnamine, serpentine, ajmalimine. Roots are reported for various pharmacological activities like hyperglycemic, hypolipidemic, anti-proliferative, anti-hypertensive, anti-microbial and various psychiatric diseases. It is extensively used in the treatment of snake bite and insanity **[7]**.

The main intension of selecting these two plants is amla promotes diuresis and rauwolfia directly acts on blood vessels and hence reduces blood pressure. When these two herbal drugs are combined together, they exhibit synergistic property. Hence these are used together for the treatment of hypertension.

The objective of the experiment was to formulate and evaluate an effective

polyherbal tablets of Amla and Rauwolfia which shows anti-hypertensive activity.

MATERIAL AND METHODS

Materials:

Phyllanthus emblica and *Rauwolfia serpentina* are obtained from medicinal garden of Chalapathi institute of Pharmaceutical Sciences. Micro crystalline cellulose, starch, magnesium stearate and talc are obtained from Industrial Pharmacy laboratory, Guntur. All other chemicals and solvents were found to be analytical grade.

Method of preparation of Amla and Rauwolfia polyherbal tablets:

Amla and Rauwolfia polyherbal tablets were prepared by wet granulation method because these powders are water soluble and thermo stable. Micro crystalline cellulose and starch acts as a disintegrant and binder. The concentrations of aboveingredients were optimized in the **Table 1**. All the ingredients were weighed accurately. The blend was mixed with the lubricant and glidant magnesium stearate, talc and compressed using 12mm punch. Finally, the tablet weight for compression was set to be 675 mg.

Table 1: Composition of Amla and Rauwolfia Polyherbal Tablets

Ingredients	F1	F2	F3	F4	F5
Phyllanthus emblica(Amla)	300mg	300mg	300mg	300mg	300mg
Rauwolfia serpentine	300mg	300mg	300mg	300mg	300mg
MCC	-	50mg	50mg	-	50mg
Starch Paste 5%	q.s	q.s	q.s	q.s	q.s
Talc	6.5mg	-	6.5mg	-	6.5mg
Magnesium state	-	13mg	-	13mg	13mg
Total	675mg	675mg	675mg	675mg	675mg

EVALUATION PARAMETERS:

Pre-Compression Evaluation:

Angle of repose:

Angle of repose is the angle of inclination, formed to the flat surface by the bulk powder when it is allowed to flow under gravitational force from a fixed height. The angle of repose of Amla and Rauwolfia and prepared mixture was determined by fixed funnel method.

$$\theta = \mathrm{Tan}^{-1}\, h/r$$

where, θ is angle of repose, h is the height of powder above the flat surface and r is the radius of the circle formed by the powder **[8]**.

Bulk density:

The bulk density of a material is the ratio of the mass to the volume (including the interparticulate void volume) of an untapped powder sample. The bulk density is obtained by adding a known mass of powder to a graduated cylinder. The density is calculated as mass/volume.

$$\text{Bulk density} = \frac{\text{mass}}{\text{bulk volume}}$$

Tapped density:

The tapped density is obtained by mechanically tapping a graduated cylinder containing the sample until little further volume change is observed.

$$\text{Tapped density} = \frac{\text{weight of powder(g)}}{\text{tapped volume(ml)}}$$

Hausner ratio:

The Hausner ratio is closely linked clear and fast methods for characterizing the material. We calculate bulk mass, particle size, form, surface region, amount of moisture, and substrate cohesiveness indirectly. Hausner ratio involve assessing or understanding the bulk density and tapped density of a powder mixture. They are measured by using a 250 mL graduated cylinder with a test sample weight of 100 g. The average of three determinations is recommended **[9]**.

The Hausner ratio was determined by using Equation

$$\text{Hausner ratio} = \frac{\text{tapped density}}{\text{bulk density}}$$

Post-compression evaluation:

Physical appearance:

The shapes and texture of the compressed tablets were examined by visual means. The thickness and diameter of the compressed tablets were measured and recorded using a calibrated Vernier calliper. Three tablets of each formulation were randomly selected and the average thickness was measured **[10]**.

Weight variation: Take 20 tablets and weighed individually. Calculate average weight and compare the individual tablet weight to the average. The tablet passes the U.S.P. test if no more than 2 tablets are outside the percentage limit and if no tablet differs by more than 2 times the percentage limit **[11]**.

Hardness:

The hardness test is not a standard test, it was included in the quality control procedures for tablets. Since the hardness of the tablet plays an important role in its disintegration rate. Pfizer hardness tester was used to measure the hardness. Tablet was placed between spindle and anvil of the tester and the calibrated scale adjusted to zero then applied a diametric compression force on the tablet and the position on the calibrated scale at which the tablet broke was recorded in kg units. A mean value is taken to check for their hardness **[12]**.

Friability:

From each formulation six pre-weighed tablet samples were taken and placed in the Roche friabilator which was then operated for 100 revolutions (4 minutes) to check lose in weight. Then friability (F) was calculated using the formula

$$F = (1-W\backslash W_0) \times 100$$

Where, W_0 is the initial weight and W is the final weight of the tablets.

Disintegration test:

From each formulation 6 polyherbal uncoated tablets were randomly selected to determine the disintegration time. The 0.1 M HCl used as a disintegration medium and temperature was maintained at 37±20^{o}C **[13]**.

RESULTS AND DISCUSSION

Amla and Rauwolfia polyherbal tablets were formulated by using wet granulation method. The tablets for each formulation F1-F5 were evaluated for pre and post compression parameters. The bulk density of the powder blend was found in between0.27±0.04 to 0.41±0.01 gm\cm^3. Tapped density of the powder blend was found in between 0.52±0.07 to 0.58±0.02 gm\cm^3 indicates good packing capacity of powder blend. The angle of repose of the powder blend was found in between 28.9±0.53 to 42.8±2.37 this indicates the powder blend has good to fair flow properties. The Haunser's ratio of the powder blend was found in between 1.41±0.01to 1.53±0.02, this indicates the powder blend has very poor flow properties. The results of pre compression parameters are listed in the **Table 2**. The thickness of the tablets was found in between 4.96±0.04 to5.12±0.12. Weight variation of the tablet was found in the range of 670±0.741 to 678±0.444. The hardness of the tablet was found in the range of 3.6±0.321 to 4.2±0.577 indicates the tablet shows moderate hardness. The friability of the tablets was found in the range of 0.59±0.428 to 0.82±0.246 because slight variation in the compression force. The results of post compression parameters are listed in the **Table 3**. The disintegration time of the tablets was found below 15 min, this indicates the disintegration time was within the limit.

Table 2: Various Pre- Compression evaluation parameters for powder blend

S. No.	Parameters	F1	F2	F3	F4	F5
1.	Bulk density (g/cm^3)	0.39±0.023	0.41±0.01	0.39±0.015	0.27±0.04	0.35±0.05
2.	Tappeddensity (g/cm^3)	0.54±0.025	0.56±0.02	0.53±0.03	0.52±0.07	0.58±0.02
3.	Hausner's ratio	1.41±0.01	1.43±0.0	1.49±0.02	1.53±0.02	1.45±0.04
4.	Angle of repose (θ)	34.9±2.35	42.8±2.37	33.2±0.09	35.2±1.86	28.9±0.53

Table 3: Various Post-compression evaluation parameters of compressed tablets

Formulation Code	Thickness (mm)	Weight variation	Hardness (Kg/cm^2)	Friability
F1	4.98±0.02	672±0.444	3.7±0.293	0.61±0.351
challegesF2	5.00±0.00	674±0.148	4.2±0.577	0.59±0.428
F3	5.12±0.12	678±0.444	3.7±0.293	0.67±0.138
F4	5.05±0.05	670±0.741	3.6±0.321	0.78±0.149
F5	4.96±0.04	675±0.00	3.9±0.269	0.82±0.246

CONCLUSION

Both pre and post compression parameters are evaluated for all polyherbal formulations F1-F5. All are within the accepted limits. From the obtained results, out of all these formulations F5 containing Amla, Rauwolfia, micro crystalline cellulose, talc and magnesium stearate in optimized concentrations shows good flow properties, good packing ability, good hardness, minimum weight deviation and with 1.5 min disintegration time. As the polyherbal formulation showing good results it is used in the treatment of Hypertension with maximum potency and lesser side effects.

FUTURE CHALLENGES

The prepared optimized formulation was characterized by using different analytical techniques and for biological evaluation for antihypertensive activity.

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REFERENCES

[1] Subramani P, Gan Siaw T, and Sokkalingam A, Polyherbal formulation: Concept of ayurveda. *Pharmacogn.* 8 (16), 2014, 73–80.

[2] Dr.Minakshi K, Dr. Renuka C, Dr. Rashmi S, Dr. Navneet S, Dr. Ashwani U, Principles of compound formulations in Ayurveda, World journal of pharmaceutical and medical research, 3(9), 2017, 169-173.

[3] Malik JK, Thacker AM and Ahmed A. Ethnoveterinary medicine in western India, Ethnoveterinary Research and Development, Edited by Mc Corkle C, (Intermediate Technology Publication, UK), 1996, 148.

[4] Fairuz Fatema P, Mohammad Sayful I, *Phyllanthus emblica*. Linn (Amla) – A natural gift to humans: An overview, Journal of Diseses and Medicinal plants, 5(1), 2019, Vol.5, 1 – 9.

[5] Rehman H.U, Yasin KH *et al*, Studies on the chemical constituents of *Phyllanthus emblica*, Journal of Natural Product Research, 21, 2012, 775-781.

[6] Oudhia, P. and Tripathi, R.S, Identification, cultivation and export of important medicinal plants, In Proc. National Seminar on Horticulture Development in Chhattisgarh: Vision and Vistas. Indira Gandhi Agricultural University, Raipur (India), 2002, 78-85.

[7] William. R Livesay *et al*, Treatment of hypertension with Rauwolfia serpentina alone and with other

drugs, JAMA, 155(12), 1954, 1027-1035.

[8] Lachman L., Liberman H.A., The Theory and Pratices of Industrial Pharmacy, special Indian ed. 2009, reprint 2010; 296-320.

[9] Aulton ME; Pharmaceutics: The science of Dosage form. Churchill Livingstone, 1996: 304.

[10] Anonymous: Indian Pharmacopoeia. Government of India, Ministry of Health and Family Welfare, Controller of Publication, New Delhi, 2007.

[11] Nagasamy VD, Jawahar N, Ganesh GNK, Suresh K R, Senthali V, Samanta MK, Sankar S, Elango K; Development and in vitro evaluation of sustained release matrix tablets of theophylline using hydrophilic polymer as release retardant. Int J Pharm Sci and Nanotech, 2(1), 2009, 370-375.

[12] Sahoo HB, Asati AK, Toppo FA, Kori ML; Evaluation of polyherbal formulation for diuretic activity in albino rats, Asian Pacific J Tropical Disease, 2(1), 2012, 442-445.

[13] Monton C, Saingam W, Suksaeree J, Sakunpak A, Kraisintu K. Preformulation and physical properties study of fast disintegrating tablets from Thai traditional formula, Int J Pharm Pharm Sci,6, 2014, 431-434.