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Formulation Development and HPTLC Estimation of Polyherbal Formulation containing Hydro-Alcoholic extract of Drimiopsis kirkii Baker and Momordica charantia Linn

Shweta Bhandari[1], Amit Bhargava[2]

[1]*Research Scholar, B N University, Udaipur, Rajasthan, India*
[2]*Faculty of Pharmacy, B N University, Udaipur, Rajasthan, India*
Email: bhandariiiiiss@gmail.com

Poly herbal formulations, which include various plants, have the potential to improve therapeutic efficacy. Herbs may act through a variety of processes, including hormone regulation, insulin sensitivity improvement, inflammation reduction, and organ support. The synergistic action of these herbs may lead to better therapeutic outcomes than single-component therapies. Many polyherbal treatments include herbs high in vitamins, minerals, antioxidants, and other bioactive substances. Traditional treatments can include side effects that are inconvenient or even serious. Polyherbal medicines, on the other hand, are made from natural ingredients and are said to have less negative effects. In the current study, a polyherbal formulation (tablet) including a hydro-alcoholic extract of the bulb of Drimiopsis kirkii Baker and the fruits of Momordica charantia Linn. was made using the wet granulation method and evaluated. The presence of active components in the PHF-T was estimated using HPTLC and reported in this research.
Keywords: Formulation, Polyherbal Tablet, Estimation.

1. Introduction

Drimiopsis kirkii may have strong pharmacological characteristics. These compounds contribute to its reported antimicrobial, anti-inflammatory, analgesic, and possibly cardiotonic properties. Despite its broad traditional use, there are insufficient phytochemical and

pharmacological investigations to scientifically substantiate its therapeutic potential. Momordica charantia is a very important medicinal plant having a solid base in traditional medicine and growing scientific support for its therapeutic potential. Its diverse chemical composition, which includes triterpenoids, flavonoids, alkaloids, and phenolic chemicals, aids in a variety of pharmacological effects. Notably, it has antidiabetic, antibacterial, anticancer, and anti-inflammatory effects, making it an attractive choice for natural health products and pharmaceuticals. The plant's hypoglycemic components assist manage blood sugar, while its antibacterial and anticancer properties indicate its potential for treating infections and suppressing tumour growth.
As a result, while Drimiopsis kirkii is still regarded as a decorative plant, its potential as a medicinal resource should not be underestimated, and further scientific research is needed to fully understand its therapeutic potential. [1-2] Furthermore, Momordica charantia's various pharmacological properties support its historic usage in medicine while highlighting its potential for future therapeutic applications. [3] As a result, these two plants were chosen for the study to develop a polyherbal formulation in the form of a tablet.

2. Material and Methods

Development of Polyherbal Formulation (Tablets)

The wet granulation method was used to prepare a polyherbal formulation (tablet) (PHF-T) containing a hydro-alcoholic extract of the bulb of Drimiopsis kirkii Baker and the fruits of Momordica charantia Linn. The excipients used included microcrystalline cellulose, starch, crospovidone, aerosil, and magnesium stearate. [4] The composition of PHF-T is shown in Table 1.

Table 1: Composition of Polyherbal formulation (Tablet)

Ingredients	Quantity (mg)
HAEDKB	100
HAEMCF	100
Microcrystalline Cellulose	150
Starch	50
Crospovidone	20
Granulation	
Water	q.s.
Prelubrication	
Starch	30
Aerosil	10
Talc	20
Lubrication	
Magnesium Sterate	10
Methyl Paraben	5

Total weight (mg)	500

Note: All quantity is in mg

Evaluation of Polyherbal Formulation (Tablets)

Appearance

The prepared polyherbal formulation (tablet) were evaluated for their color and appearance. In this study color, odor, taste were noted down. [4]

Hardness

Randomly five polyherbal formulation (tablet) were taken out from each batch and crushing strength was determined using Monsanto tablet hardness tester. [4]

Friability

Randomly 25 polyherbal formulation (tablet) were taken and weighed out and was placed in Electrolab friabilator and was rotated at 25 rpm for 4 mts to determine the frability. (Annappan et al., 2024) The percentage friability was calculated by using formula as mentioned below:

$\%F= (1-WI/WF)*100$

Where, WI=Initial weight of the 25 tablets;

WF=Final weight of 25 tablets

Weight Variation

Randomly selected 20 polyherbal formulation (tablet) were evaluated for weight variation as per IP 2018. [4]

Disintegration Time

Randomly 6 polyherbal formulation (tablet) were taken from each batch and were placed in USP disintegration apparatus using 0.1 N HCl at 37^0C. The time was noted down when the tablet get disintegrates completely. [4]

HPTLC analysis

Preparation of standard solution

A stock solution of standard quercetin (1000 µg/mL) was prepared by transferring 10 mg of quercetin, accurately weighed, into a 10 mL volumetric flask, dissolving in 5 mL methanol. It was then sonicated for 10 minutes and the final volume of the solutions was made up to 10 mL with the methanol to get stock solutions containing 1000 µg/mL.

Preparation of sample solution

Polyherbal formulation (tablet) was extracted in methanol, dried and concentrated under vacuum. 10 mg of the dried methanolic extract was dissolved in 10 ml of methanol. (Concentration-1000 µg/ml).

HPTLC development

The sample was spotted using Camag microlitre syringe (2 µl) on a precoated silica gel plates

F 254 (10 cm X 10 cm, E. Merck). The plates were developed in a solvent system in glass chamber, previously saturated with the solvent for 30 min.

TLC plates were air dried and scanning was performed on a Camag TLC Scanner at 366 nm

Quercetin estimation

Silica gel F 254 plates were used as a stationary phase. Ethyl acetate: Toluene (3: 7) was used as a mobile phase. Limit of detection was 1000 µg/mL. Quercetin (1000 µg/mL) was used as a standard. Scanning wavelength was 366 nm, migration distance was 90 mm, and selected wavelength for overlaid spectra was 272 nm. [5-6]

3. Results and Discussion

A polyherbal formulation (tablet) containing a hydroalcoholic extract of the bulb of Drimiopsis kirkii Baker and the fruits of Momordica charantia Linn was tested for appearance, hardness, friability, weight variation, and disintegration time. The physical appearances of PHF-T are shown in Table 2. The results obtained indicate that polyherbal tablets have no flaws. Table 3 shows the evaluation parameters for PHF-T. The results show that the data obtained falls within the IP limit. The brown colour of the polyherbal formulation was generated, with a distinctive odour and a faint bitter taste. Other evaluation parameters are within the limits mentioned in the IP. HPTLC examination of the standard flavonoid, quercetin, was performed in the polyherbal formulation tablet (PHF-T), and the Rf of 0.90 was found to be similar to that of standard quercetin. The results are shown in Table 3. Figure 2 shows a comparison of the spectra of standard and PHF-T. Figures 3 and 4 depict the HPTLC chromatograms of PHF-T and standard quercetin.

Table 2: Physical appearance of PHF-T

S/No.	Parameters	Inference
1.	Color	Light Brown
2.	Odor	Characteristics
3.	Taste	Slight Bitter
4.	Shape	Circular biconvex

Table 3: Evaluation Parameters of PHF-T

S/No.	Parameters	Inference
1.	Weight variation (%)	±3.10
2.	Hardness (kg/cm^2)	3.89±0.16
3.	Friability (%)	0.46
4.	Disintegration time (mts)	18.10±0.22

Note: All values are Mean±SEM, n=3

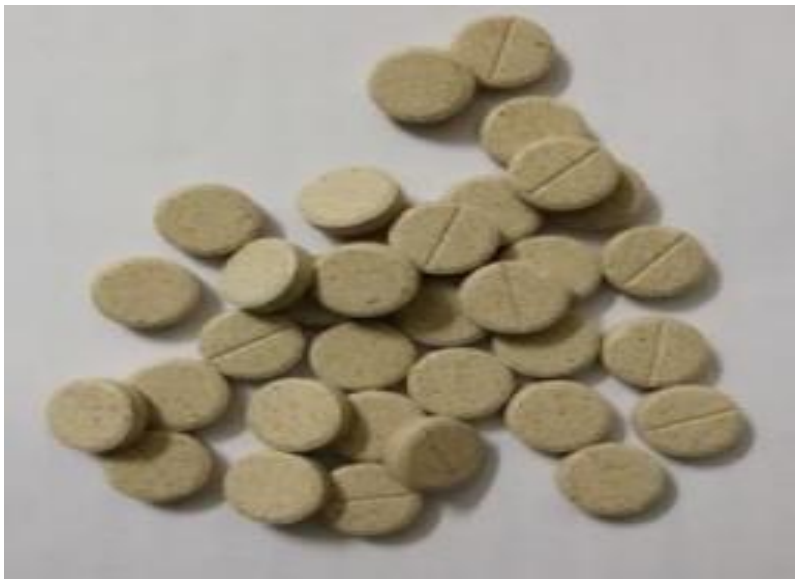

Fig. 1: Prepared Polyherbal Formulation (Tablet)

Table 4: Determination of Rf Values in standard and PHF-T

Tracks	Sample	Starr R_f	Maximum R_f	End R_f
1	PHF-T	0.72	0.82	0.90
2	Standard	0.73	0.90	0.90

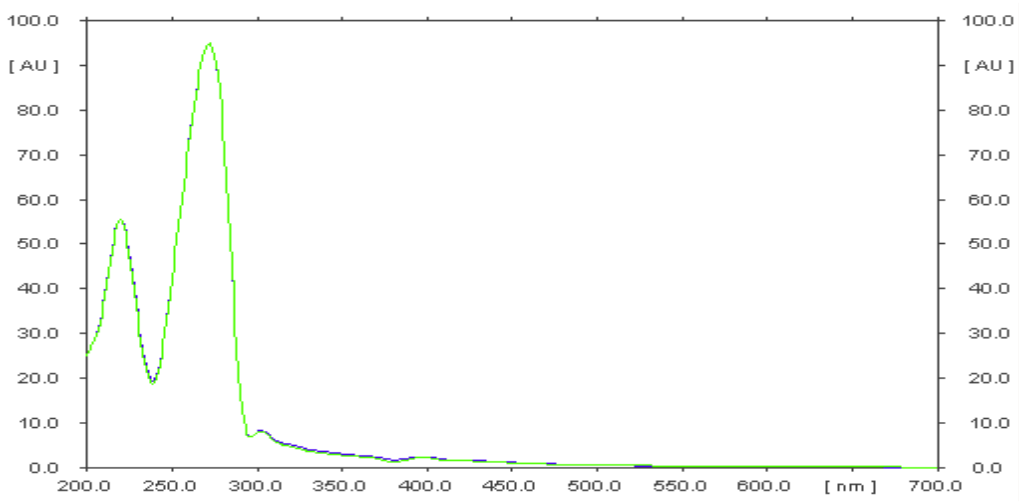

Fig. 2: Comparison of Spectral of Standard and PHF-T

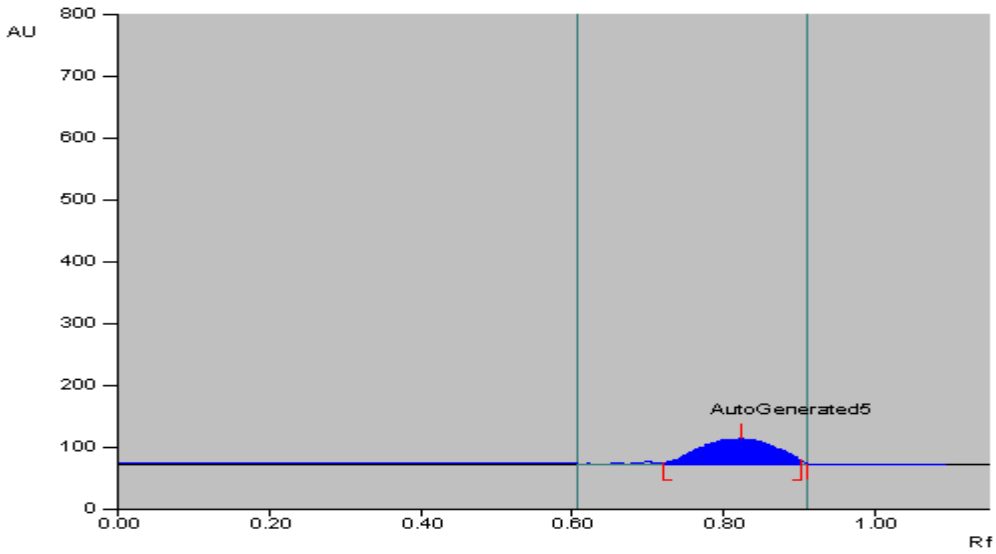

Fig. 3: Chromatogram of PHF-T

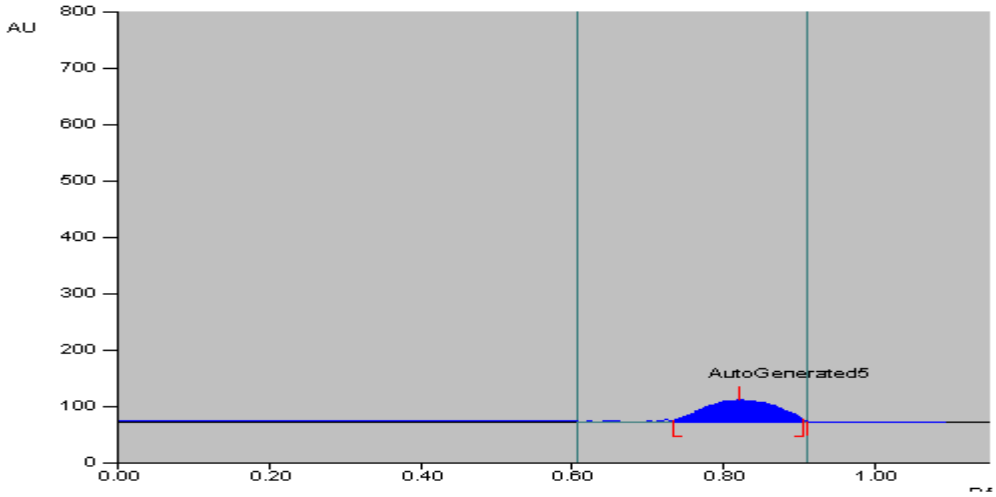

Fig. 4: Chromatogram of Standard

4. Conclusion

The current study presented the findings of the development and evaluation of a polyherbal formulation (tablet) including a hydroalcoholic extract of the bulb of Drimiopsis kirkii Baker and the fruits of Momordica charantia Linn. The prepared polyherbal pill was brown in colour with a distinct odour and a slightly bitter flavour. Other evaluation criteria are within the limits indicated in the IP. HPTLC analysis of the standard flavonoid, Quercetin, was performed in the PHF-T and validated by a similar Rf of 0.90 to that of ordinary quercetin.

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