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(RESEARCH ARTICLE)

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Formulation and validation on UV spectroscopy of Herbosomes loaded *Mahonia aquifolium* cream for psoriasis

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Abstract

Herbosome technology enhances the bioavailability of herbal excerpts. Herbosome act as the ground between the new delivery system and conventional delivery system. It's a complex fashion applied to phytopharmaceuticals for the improvement of bioavailability of herbal excerpt for medicinal operations. This composition overviews about herbosome technology, recent advance, their operation for colorful standardized herbal excerpts and aims to give complete of natural active constituents and phospholipid (phosphatidylcholine, phosphatidylserine etc.) which increases immersion of herbal excerpt. Herbosome is the new arising scientific information, characterization about herbosomes as a promising drug delivery system.

Psoriasis is an inflammatory skin condition characterized by scaling with inflammation (pain, edema, warmth, and redness) that results in regions of thick, red skin covered in silvery scales. These spots can be itchy or painful. Systemic treatment, topical therapy, and phototherapy are all now used to treat psoriasis. These treatments have a variety of negative and perhaps fatal side effects. Patients with psoriasis are more likely to acquire other conditions such as psoriatic arthritis, anxiety and depression, cancer, metabolic syndrome, cardiovascular disease, and Crohn's disease. The majority of people use herbal medicine because it is readily available, inexpensive, and effective. Many plants have promising features, including significant results in the treatment of psoriasis. The present study plans to emphasize such plants, herbal formulations, and associated therapy, which could add value to the development of a better, safe, and efficacious formulation to treat psoriasis that may help new researchers in this field

Keywords: Herbosomes; Phospholipid; Flavonoids; Phytomedicine; Psoriasis; Autoimmune disease; Medicinal plants; Herbal formulation; Topical therapy

1. Introduction

The word "Herbo" means plant and "some" means hand-like. Most of the bioactive substances of plants are polar or water-soluble molecules. However, water- soluble herbs (flavonoids, tannins, aglycones, etc.) are poorly absorbed due to their large molecular size and inability to be absorbed by passive diffusion or even weak gases. resolution.; Strictly limit their passage through lipid-rich bioavailability, resulting in poor bioavailability [1]. Herbosomes are an early form of herbal products combined with phospholipids to better absorb and utilize the products in our body, creating better therapeutic effects than herbs or action molecules that can then reduce the deficiency. Traditional medicine[2] Therapeutic models derived from medicinal plants such as Africa, China and India often contain the raw materials of different drugs of poor quality and often contain biological ingredients as well as active ingredients. As the fields of phytochemicals and analytical chemistry develop, specific products or groups of similar products are extracted, isolated and tested from plants for their different medicinal uses. However, separation and purification of a substance from the full herbal extract often results in partial or complete therapeutic activity. Despite their excellent bioactivity in vitro, plant extracts often show poor results in vivo or in animal models. The main reason why the bioavailability of herbal

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extracts is low is that the bioactive components of the drug have a polycyclic molecular structure and are not absorbed into the blood by simple passive diffusion. Plant ingredients are water-soluble and therefore their poor lipid solubility limits their ability to penetrate lipid biofilms. Additionally, taking bioactive botanical ingredients by mouth will reduce the results as they may be eliminated or lost from the stomach environment or interact with other medications or food products [3,4].

Mahonia aquifolium contains berberine, which may help to suppress inflammation that psoriasis causes . The plant also has antiproliferative effects, meaning it can slow down the growth of skin cells.

Cream formulations are used to deliver the drug topically because of easy application, increase contact time and minimum side effects as compare to other topical preparation.

Validation of the method is the mechanism used to ensure that the analytical technique employed for a specific test is appropriate for its intended use. Method validation can be used to assess the quality, reliability, and consistency of the analytical results and it is an essential part of good analytical practice. Different parameters of analytical validation are system suitability test, specificity, accuracy, range, linearity, precision, etc. The aim of this research was to validate a Herbosomal Cream for Psoriasis.

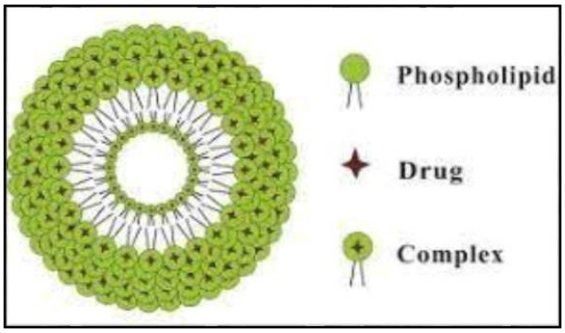

Figure 1 Herbosomes

2. Materials and methods

2.1. Materials

Mahonium Aquifolium root extract, White Willow Bark extract and Aloe vera leaf extract, were obtained from Zyrex Ayurveda. Raebareli, Uttar Pradesh And Soyalicithin (Phospholipid) were obtained from Shivabiochem industries. Maharashtra, India.

2.2. Formulation of herbosomes

2.2.1. Method

Rotary Evaporation technique

Specified amount/quantity of herb extract mixed with phospholipid in the ratio of 1:1 dissolved in 20ml of Dichloromethane and transfer it into the rotary evaporator flask reflux it till the formation of thin film occure at temp 40^{0c} and then hydrade the film with 20 ml of n Hexane with vigorous shaking and then transfer the suspension into the beaker and stirring on magnetic stirrer for 30min. and at last centrifuge the suspension for 15 min at 3000rpm and then observe the herbosomes under the microscope.

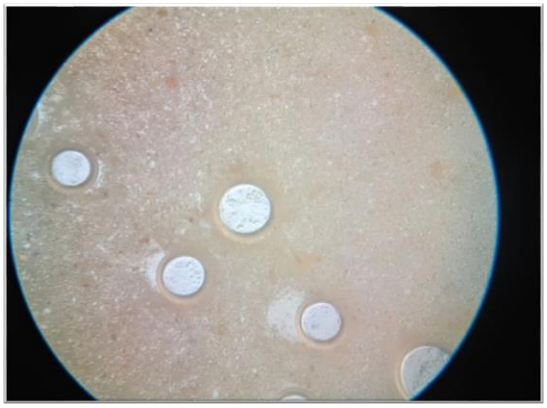

Figure 2 Microscopic image of Herbosomes

2.3. Cream formulation: [5]

Place the wax and propylene glycol into the first Beaker. Then heat it in a water bath to mix evenly. After a few minutes the oil phase starts to form. Put aloe vera extract and and white willow bark extract, distilled water, white soft paraffin and glycerin, Menthol, zinc oxide, sodium benzoate and methyl paraben into a second Beaker. Mix all ingredients by heating in a water bath to form an aqueous phase. Add the oil phase to the water phase and stir continuously until the material becomes semi-solid. Where aloe vera extract use as moisturizing agent and white willow bark extract use as pain reliver.

Table 1 Formula of cream formulation

Sr no	Ingredient	Quantity
1	Aleo Vera extract	1gm
2	White willow bark extract	1gm
3	Bees wax	3.2gm
4	White soft parrafin	11ml
5	Methyl paraben	0.5gm
6	Menthol	0.2ml
7	Glycerin	3ml
8	Propylene glycol	1ml
9	Zinc oxide	0.7gm
10	Sodium benzoate	0.2gm
11	Distilled Water	q.s.

2.3.1. Incorporation of Herbosome

Herbosome containing drug was mixed into different concentration of Cream by an electrical mixer 25rpm/2 min, with the concentration of herbosome in cream being 1% (w/w Herbosome suspension/total).

2.4. Development and validation

Instrument: Double beam UV Visible Spectrophotometer (UV SHIMADZU 1800)

2.4.1. Method

In order to ascertain the wavelength of maximum absorption of Mahonia Aquifolium, stock solution of 10 mg/ml was prepared by taking 10 mg of drug in 10 ml of Water. Different solution of drugs in water were scanned using

spectrophotometer within the wavelength region of 400-200 nm against Water as blank. The resulting spectra were shown in Fig. 3 and absorption curve showed characteristic absorption maxima at 260nm for drug.

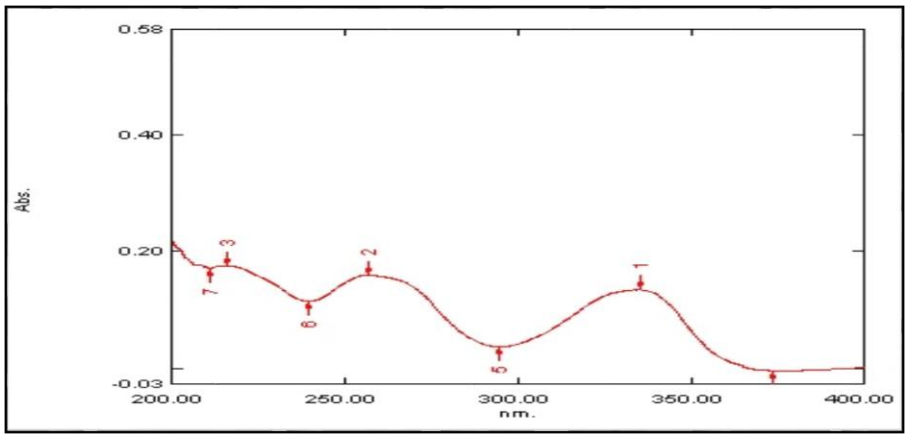

Figure 3 UV Spectrum of Mahonia Aquifolium in Water

Table 2 Data for Standard curve of Mahonia Aquifolium.

Y-Axis (concentration)	X-Axis (Absorbance)
0.5	0.56
1	0.76
1.5	1.02
2	1.18
2.5	1.37

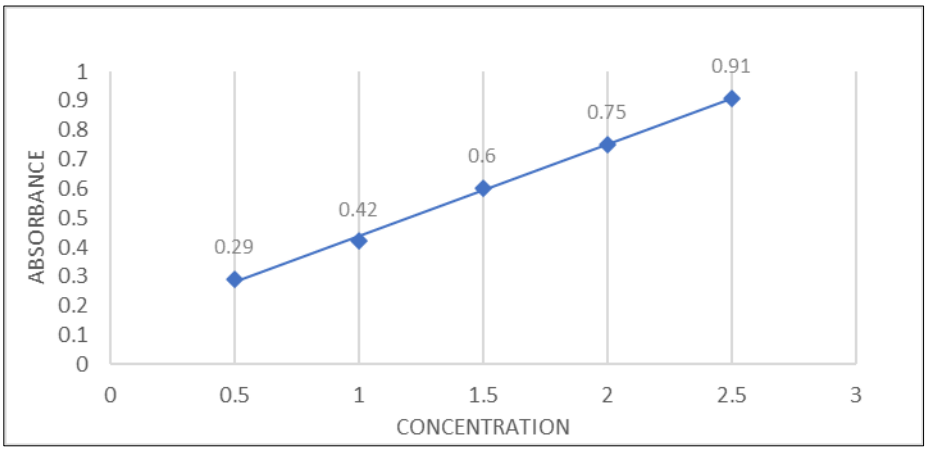

Figure 4 Standard curve of Mahonia Aquifolium

2.4.2. Preparation of standard stock solution of Mahonia Aquifolium

The standard stock solution was prepared with weighed amount of Mahonia Aquifolium (10 mg). The stock solution was dissolved separately in 10mL of water in a volumetric flask. A series of dilutions of 0.5, 1, 1.5, 2 and 2.5 were

prepared, and absorbance was measured at 260nm. These diluted solutions were analyzed for Linearity, Accuracy, Precision, Robustness, Limit of Detection (LOD) and Limit of Quantification (LOQ).

2.5. Validation parameter of herbosomal cream

Table 3 Data for linearity of herbosomal cream

Y-Axis (concentration)	X-Axis (Absorbance)
0.5	0.43
1	0.51
1.5	0.63
2	0.75
2.5	0.92

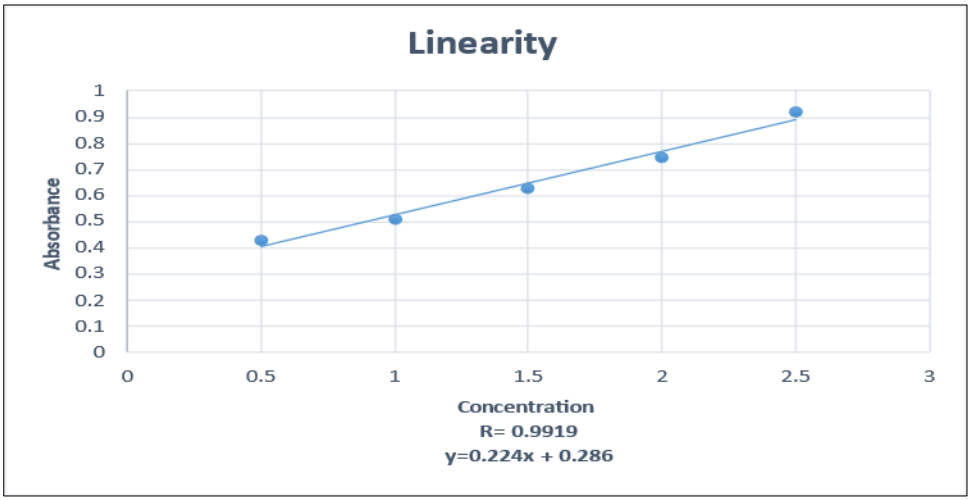

Figure 5 Standard curve of linearity of herbosomal cream

2.5.1. Linearity

The linearity of this method was determined at concentration levels ranging between 0.5 mg/ml and 2.5mg/ml. The plot of absorbance v/s concentration of Mahonia Aquifolium was found to be linear in the range Beer's law was obeyed over this concentration range.

2.5.2. Precision

The precision of the method was assessed by repeatability (intra-day) and intermediate precision (inter-day). Intra-day precision was determined by analysing 1microgram/ml Mahonia Aquifolium for three times within the day and average % RSD was calculated. Inter-day precision was determined by analysing the same concentration of solutions for three days and average % RSD was calculated.

Table 4 Intraday (On same Day)

Sr no.	Concentration (µg/ml)		Absorbance	Mean	SD	% RSD
1	10		0.73			
2	10	Morning	0.72	0.72	0.01	1.39 %
3	10		0.71			

4	10		0.61			
5	10	Afternoon	0.60	0.6	0.01	1.67 %
6	10		0.59			
7	10		0.89			
8	10	Evening	0.88	0.88	0.01	1.14 %
9	10		0.87			

Table 5 Interday (On different day)

Sr No	Concentration (µg/ml)		Absorbance	Mean	SD	% RSD
1	10	Day 1	0.61	0.6	0.01	1.67 %
2	10		0.60			
3	10		0.59			
4	10	Day 2	0.57	0.57	0.01	1.75%
5	10		0.56			
6	10		0.58			
7	10	Day 3	0.78	0.77	0.01	1.3%
8	10		0.77			
9	10		0.76			

% RSD should not be more than 2 %

2.5.3. Accuracy

Accuracy is defined as closeness of agreement between the actual (true) value and analytical value and obtained by applying test method for a number of times. Accuracy may often be expressed as % Recovery by the assay of known, added amount of analyte. It is measure of the exactness of the analytical method. The recovery experiments were carried out in triplicate by spiking previously analyzed samples of with three different concentrations of Mahonia Aquifolium.

Table 6 Accuracy Determination

Sr No	Concentration (%)	Original level (µg/ml)	Amount added (µg/ml)	Recovery	Recovery %	Mean % Recovery	% RSD
1	80	1.5	1.28	1.262	98.9	99.23	0.42%
	80	1.5	1.28	1.271	99.1		
	80	1.5	1.28	1.274	99.7		
2	100	1.5	1.60	1.628	100.5	98.83	1.58%
	100	1.5	1.60	1.589	98.6		
	100	1.5	1.60	1.570	97.4		
3	120	1.5	1.92	1.826	99.1	98.6	0.81%
	120	1.5	1.92	1.826	99.1		
	120	1.5	1.92	1.800	97.7		

2.5.4. LOD and LOQ

Limit of detection (LOD)

LOD is the lowest amount of analyte in a sample which can be detected but not necessarily quantitated as an exact value. LOD value was calculated from the calibration curve by using the equation.

LOD=3.3 x σ/S

where, SD is standard deviation of the standard curve.

Limit of quantitation (LOQ)

LOQ is the lowest amount of analyte in a sample which can be quantitatively determined with suitable precision and accuracy. The quantitation limit is a parameter of quantitative assays for low levels of compounds in sample matrices, and is used particularly for the determination of impurities and/or degradation products.

LOQ value can also be calculated from the calibration curve using the equation.

$$LOQ=10x\ \sigma/S$$

Where, σ = Standard deviation of the response S = Slope of the calibration curve.

3. Results

The Mahonia Aquifolium was found to be soluble in Water. The Wavelength of drug was found to be 256 nm(figure3). From the result obtained it was found that Mahonia Aquifolium obeys linearity within the concentration range of 0.5 mg/ml 2.5mg/ml and coefficient correlation was found to be 0.9919(figure4). The regression of the curve was y ¼ 0.224x + 0.286. The detection and quantitation limits as LOD and were calculated and these were found to be 2.67mg/ml and 8.10 mg/ml respectively. The precision (measurements of intra-day and inter-day) results showed significant reproducibility with percent relative standard deviation (% RSD) is below 2.0. (Table 4and 5). This indicated that method is highly precised. The percent recovery value which was higher than 100%, indicates the accuracy of the method. (Table 6).

4. Conclusion

The developed method was found to be simple, sensitive, accurate, precise, reproducible and most importantly cost effective. The proposed method is specific in estimating commercial formulations without excipient interference.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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