

PHYSICO-CHEMICAL AND HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY EVALUATION OF *PANCHAGAVYA GHRITA*

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ABSTRACT

Introduction: Standardization of drugs is highly important to assure the reliability especially in terms of quality, purity, efficacy and safety of the drugs. Pharmaceutics is the discipline of pharmacy that deals with the process of turning a new chemical entity into a medication to be used safely and effectively by patients. On the other hand, in the time of commercialization each and every entity is being adulterated, drug too is not left behind. So the standardization of any drug is the need of today. **Material and Method:** *Acharya Charak* has mentioned *Panchagavya Ghrita* in the management of *Apasmara* (epilepsy). In this study *Panchagavya Ghrita* was used for *Chittodvega* (Generalized Anxiety Disorder-GAD). The present study deals with the Physico-Chemical analysis, High performance thin layer chromatography (HPTLC) and Organoleptic characters of finished product of *Panchagavya Ghrita*. **Results:** All parameters were within limit, Acid Value-3.59, Saponification value-201, Iodine value-32.82, Specific Gravity-0.9218 and pH-5. **Conclusion:** All the physico-chemical parameters were within limit. All the results showed the quality of the preparation is standard.

Keywords: HPTLC, *Panchagavya Ghrita*, Pharmaceutical Study, Physico-chemical parameters, organoleptic character.

INTRODUCTION

Ayurveda is an ancient system of medicine, having aim to maintain the balanced health status in

healthy individuals and to cure the disease of diseased one.¹ According to *Ayurveda*, Drug

plays a vital role in the treatment of disease. Drugs are described as an instrument (*Karana*) of physician for treating disease.² A drug that is not understood perfectly is comparable to poison, weapons, fire and the thunderbolt, while the perfectly understood drug is comparable to ambrosia.³ The consideration of the drugs during the line of treatment for particular ailment has great importance. For using the drugs to treat a disease, it is essential to have the complete knowledge regarding the drugs. Analytical procedure helps in determination of the presence of the materials in terms of elements or compounds in the test drug. It is commonly used in chemical, clinical and pharmaceutical research laboratories as a part of quality control measures. *Panchagavya Ghrita*⁴ was the formulation used for the research work on *Chittodvega*⁵ (GAD) was subjected to various physico-chemical and

HPTLC analysis in the Pharmaceutical Chemistry Laboratory of I.P.G.T & R.A., Jamnagar. All the experiments were done by following the standard procedures mentioned in *Ayurvedic Pharmacopoeia of India*.

The analytical study of sample was undertaken with the following aim:

Aim:

To carry out the organoleptic and physico-chemical analysis and HPTLC of finish product of *Panchagavya Ghrita*.

Materials and Method:

Panchagavya Ghrita was prepared in the Department of Rasa Shashtra and Bhaishajya Kalpana, IPGT & RA, Jamnagar.

Method of preparation

Ingredients of *Panchagavya Ghrita* are mentioned in Table no.1

Table 1: Ingredients of *Panchagavya Ghrita*

S. no.	Ingredients	English name	Proportion
1.	<i>Go-Ghrita</i>	Cow Ghee	1 part
2.	<i>Go-Dugdha</i>	Cow milk	1 part
3.	<i>Go-Dadhi</i>	Curd of cow milk	1 part
4.	<i>Go-Mootra</i>	Cow's Urine	1 part
5.	<i>Go-Maya</i>	Juice of Cow dung	1 part

Go-Ghrita was taken in stainless steel vessel and placed over mild fire when fumes started, *Ghrita* was taken from fire and *Kalka* (paste) of *Go-Shakruta* was added and fried. Soon after *Go-Dadhi*, *Go-Mootra*, *Go-Mayarasa*, and lastly *Go-dugdha* were added to vessel and boiled further with frequent stirring maintaining on mild temperature. Continue the process on mild heating till the observation of *Snehapaka Siddhi Lakshana*⁶ (Chief desired Characteristic of ghee) appeared. After obtained *Snehapaka Lakshana*, it was filtered in warm condition through cotton

Cloth and allows cooling and then stored in a sterile glass container.

Parameters employed for the analysis of *Panchagavya Ghrita* are as follow,

1. Organoleptic parameters-

The prepared drug *Panchagavya Ghrita* was evaluated by organoleptic characters like colour, taste, odour etc., and was carefully noted down⁷

2. Physico chemical parameters-

Panchagavya Ghrita was analyzed using various standard physico-chemical parameters such as acid value, saponification value, and iodine value, specific gravity was determined.⁸

3. High Performance Thin Layer Chromatography of *Panchagavya Ghrita*-

High performance thin layer chromatography (HPTLC)⁹ is an invaluable quality assessment tool for the analysis of a broad number of compounds both efficiently and cost effectively. Methanol extract of *Panchagavya Ghrita* was used for High performance thin layer chromatography (HPTLC) study. A drop of sample was diluted with hexane (as per require) then application of the sample at the one end of the precoated plate through linomat V (150 µl/sec) then on the sample zone again applied 7% alcoholic KOH then leave for 10-15 minutes at 60-80°C in oven. The plate is then developed by the suitable mobile phase in a chromatographic chamber which was previously saturated with

the mobile phase. After development, Densitometry scanning was performed with a CAMAG TLC scanner III in reflectance absorbance mode at 254 nm and 366 nm under control of Win CATS software (V1.2.1. CAMAG).^{12, 13} Then the plate was sprayed with Vanillin sulphuric acid followed by heating and then visualized in day light.¹⁰ The R_f value and the colours of resolved bands and fingerprinting profiles were recorded.

RESULTS:

Organoleptic parameters: Organoleptic characters of *Panchagavya Ghrita* such as colour, odour, taste etc. examined by sensory organs and results are summarized in Table no. 2.

Table 2: Organoleptic characters of *Panchagavya Ghrita*

Properties	Observation
<i>Rupa</i> (Colour)	Greenish brown
<i>Gandha</i> (Odour)	Characteristic
<i>Rasa</i> (Taste)	Bitter
<i>Sparsha</i> (Touch)	Sticky

Physico-Chemical Analysis: The Physico-chemical parameters of the *Panchagavya Ghrita*

obtained were as per API standards.¹¹ Physico-chemical parameters of *Panchagavya Ghrita* are mentioned in Table no.3

Table no. 3: Physico-chemical parameters of *Panchagavya Ghrita*

S. no	Parameters	Sample Result
1.	Acid value	3.59
2.	Saponification value	201
3.	Iodine value	32.82
4.	Specific Gravity	0.9218
5.	pH	5.3

HPTLC profile of *Panchagavya Ghrita*

Chromatogram shows 3 prominent spots at 254nm with maximum R_f value 0.03, 0.79, 0.91 and 2 spots at 366nm with maximum R_f val-

ue 0.03, 0.97. [Table no. 4 and Fig. 1] HPTLC finger prints at 254nm, 366nm and after spray are shown in Fig. no. 3

Table 4: R_f values of *Panchagavya Ghrita*

Wavelength	No. of Spots	R _f value
Short UV (254 nm)	03	0.03, 0.79, 0.91
Long UV 366nm	02	0.03, 0.97

Fig. 1: Densitogram of *Panchagavya Ghrita* at 254 nm and 366nm

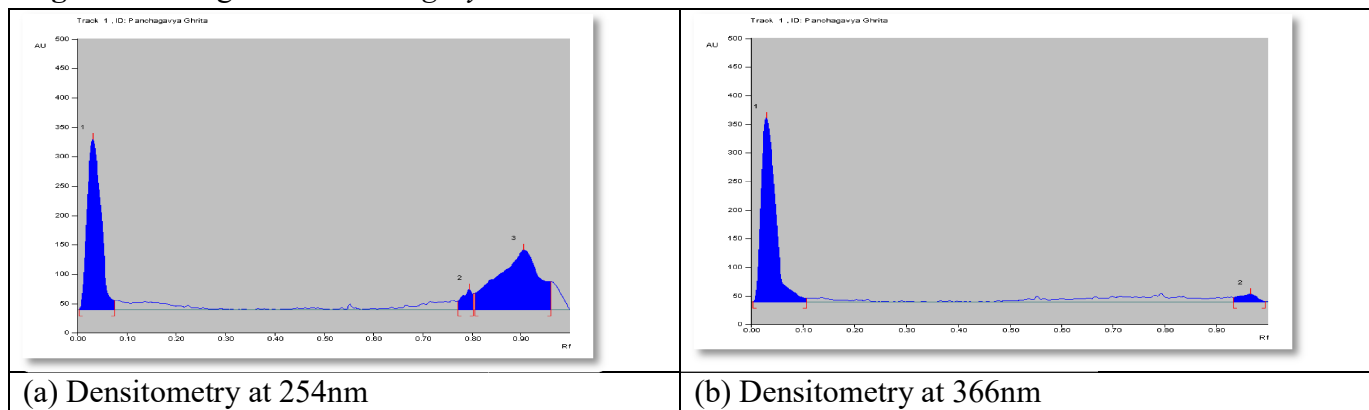


Fig. 2: Three dimensional (3D) Densitogram at (a) 254nm (b) 366nm (c) specific comparator graph

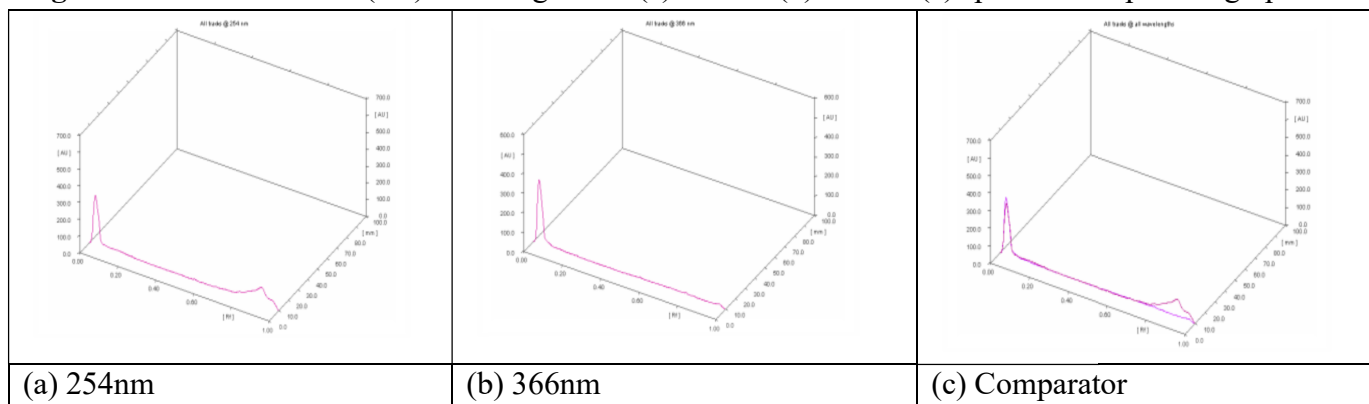
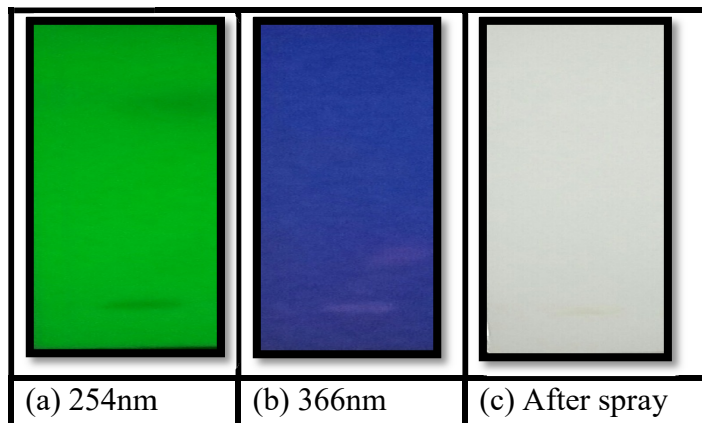


Fig. 3: HPTLC finger prints at (a) 254nm (b) 366nm (c) after spray



DISCUSSION

In this study Physico-chemical parameters like specific gravity, iodine value, acid value and saponification value and pH were determined. The acid value which is an index of free fatty acid content due to enzymatic activity, in present study, it was found to be 3.59. Saponification value of an oil or fat is defined as the number of milligrams of KOH required to neutralize the fatty acids resulting from the complete hydrolysis of 1 g of sample.¹² It depends on the kind of fatty acid contained in the fat. The long chain fatty acids found in fats have a low saponification value because they have a relatively fewer number of carboxylic functional groups per unit mass of the fat as compared to short chain fatty acids. In present study Saponification value of *Panchagavya Ghrita* was 201. There are different methods to evaluate or checking the unsaturation level in fatty acids, one among them is by determining the iodine value of fats. Iodine value is the number of grams of iodine consumed by 100 g of fat.¹³ A higher iodine value indicates a higher degree of unsaturation. If the iodine number is between 0 - 70 g I₂/100g, it will be a fat and if the value exceeds 70 g I₂/100g it is oil.¹⁴ If the iodine value is higher, stability of the oil is less and vulnerable to oxidation and free radical formation. Oxidization and polymerization readily occurred when using oils with high iodine value. In this study iodine value of *Panchagavya Ghrita* was 32.82, so stability of *Panchagavya Ghrita* is more. Specific gravity of *Panchagavya Ghrita* was 0.9218 and pH was 5 which indicate *Panchagavya Ghrita* is acidic in nature. All these parameters are normal in limit and shows the product is of good quality and better results in the diseases. HPTLC results showed that the 3 spots at 254 nm and 2 spots at 366 nm.

CONCLUSION

All the physico-chemical parameters were within the normal range. All the results showed the quality of the preparation is standard. On the basis of observations made and results of experimental studies, this study may be beneficial for future researchers and can be used as a reference standard in the further quality control researches.

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