IJISET - International Journal of Innovative Science, Engineering & Technology, Vol. 8 Issue 4, April 2021
ISSN (Online) 2348 – 7968 | Impact Factor (2020) – 6.72
www.ijiset.com

Pharmaceutical Analysis of HaridradiAvaleha: An Ayurved Formulation for Bronchial Asthma

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ABSTRACT

Ayurveda is one of the most ancient medical science of the world . The purpose of Ayurveda is to protect the health of the healthy and to alleviate disorders of the diseased. There are mainly eight branches of Ayurveda out of which one among them deals with preparation of formulations. HaridradiAvaleha has been mentioned in Gadanigraha texts in shwasarogachikitsa. Since the therapeutic values and efficacy of the formulation depends on many factors, a physicochemical assay and HPTLC analysis of the above formulation has been taken up for the present study.

INTRODUCTION:

HaridradiAvaleha is a classical formulation indicated in shwasaroga. This is a polyherbal formulation containing Haridra, Marich, Pippali, Rasna, Shati, Draksha, Guda and Taila. The aim of this study is to highlight the physicochemical assay and HPTLC analysis. The analytical study of Avaleha is performed with following parameters: physicochemical parameters i.ecolour, taste, p^H ,loss on drying, total ash, acid insoluble ash, water soluble extractive, alcohol soluble extractive are performed. HPTLC was performed for identification of chemical constituents.

MATERIALS AND METHODS

Aim and objectives :-

- Identification and authentification of raw drugs used for HaridradiAvaleha.
- Preparation of HaridradiAvaleha at GMP certified pharmacyasperclassics.
- Physicochemical and HPTLCanalysis ofHaridradiAvaleha.

Drug review :-

- The name of the drug, parts used and its quantityweremention edinTABLE1.

Collection, Identification and Authentication of Raw Drugs –

Haridrais the main ingredient of the HaridradiAvaleha. All the Herbal raw drugs which are present in HaridradiAvaleha were purchased from authenticated resources at Vadodara.
Raw drugs identification and authentication wasdone by the Department of Dravyaguna,Parul Institute of Ayurveda, ParulUniversity, Vadodara.

Classical method of HaridradiAvalehapreparation:-

Ingredients :Kwatha, drakshaphalamajja paste,jaggery , coarse powder of herbal drugs, Tila tail .

Procedure: First clean and wash all raw herbal drugs. After that coarse powder of raw drugs was done. Coarse powder was put in a vessels and kept on gas on medium flame after adding 8 times water into it and boiled and reduce to $1/4^{th}$ then kwatha was filtered with sleeve and kept aside.

Draksha soaked in water for overnight.On next day, seeds were removed and drakshphalamajja paste was

prepared and fried with TilaTaila.Thendrakshaphalamajja paste was added into the Kwatha and mixed thoroughly. Then jaggery was added into it and kept on medium flame with continuous stirring till it attains two thread consistency.

Methods of physicochemical evaluation:-HaridradiAvalehawas analyzed by using standard qualitative and quantitative parameters. All the physicochemical parameters were analysed at G.M.P certified pharmacological laboratory,Parul Institute of Ayurved, Vadodara. The physico- chemical parameters i.e. colour, taste, pH, Loss on Drying, total ash, acid insoluble ash, water soluble extractive, alcohol soluble extractive were analyzed.

Chromatography

HPTLC (high-performance thin layer chromatography)isasophisticatedformofTLC, which provides superior separation efficiency. The HPTLC concept includes validated methods for qualitativeandquantitativeanalysis,andfulfilsall quality requirements for use in fully regulated environments. In this study HPTLC has been performedfordruganalysis.Itisanenhanced formofTLC.Anumberofenhancementscanbe made to the basic methodsof TLC to automate the different steps, to increase the evolution achievedandtoallowmoreaccuratequantitative measurements. HPTLC was done at Vasu Research Laboratoty, Vadodara.

HPTLC as shown in IMAGE-1.

RESULTS AND DISCUSSION:-

Organolepticevaluation:

Organoleptic Characteristics of Powder drugsdetails are mentioned in the TABLE 2 .

2:- **Physico-ChemicalParameters:**

Details of physico-chemicals values are mentioned in TABLE 3.

Loss on drying: On drying the samples indicate that the samples were devoid of excesswater content and there was no microbial overgrowthorinsectinfestationpresent.Inthis sampleloss ondryingis38%,itindicatesthesamples mayhavegoodshelf-lifeandmaynotdecayon storage.

Total ash and Acid insoluble ash: It indicates of contamination, substitution, adulteration.The Low total ash and Acid insoluble ash signifyinglowlevelsofinorganicmatterandsilica content.InthisTotalAshandAcidInsolubleAsh: 2.4% and 1.80%,. In this sample itis slightlymore.Maybeduetopresenceoffibers and sclereids in the ingredients which are in normallimitsanddrugcanbeusedinternally.

Water soluble extract and Alcohol soluble: Water soluble extract and Alcohol soluble extract are 7% and 10.75% respectively. The high solubilityofthesampleinwaterdenotesthatdrug isbestsuitedforextractionwithwaterorwater basedpreparations.Thereisnegligiblepresenceof Volatile oils also favour the thermal extractions withwater.

pH: ThepHwasmeasuredtonotetheacidityor alkalinityoftheaqueoussolutionofthedrug.This helps in

understanding the pharmacological basis of drug absorption and metabolism. In this samplepHis6%soitisalkalineinnature.

3:High-performance Thin Layer Chromatographystudy:

Preparation of test solution (T): The Chromatographic techniques carried out are mentioned in Materials & Methodssection. Solvent system which was designed forHPTLC i.e. Toluene (10): Ethyl acetate (3):Formicacid(1)wasusedforHPTLCstudies.The results are tabulated as under. (IMAGE 2) Preparation of spray reagent (Anisaldehyde- sulphuric acid reagent) Image2.

Details of HPTLC profile of all tracks at 254 nm. Under the 254 nm wavelength-Track-1 of HaridradiAvaleha(5µL) - 10 spots were detected and starts with respect to retardation factor 0.19,0.26,0.30, 0.43, 0.50, 0.60, 0.66, 0.71, 0.81, 0.87 (IMAGE 3).

Details of HPTLC profile of all tracks at 366 nm. Under the 366 nm wavelength-Track-1 of HaridradiAvaleha(5µL) - 5 spots were detected and starts with respect to retardation factor 0.43, 0.50, 0.55, 0.60.and 0.71 (IMAGE 4).

Details of HPTLC profile of all tracks at 540 nm. Under the 540 nm wavelength-Track -1of HaridradiAvaleha(5µL) - 3 spots were detected and starts with respect to retardation factor 0.19, 0.50, and 0.66 (IMAGE 5).

CONCLUSION:

Any plant or formulation which is used medicinallyrequiresdetailstudypriortoitsuse becausethetherapeuticefficacyisdependsonthe quality of ingredients used for the medicine preparation. In this study,HaridradiAvalehawas prepared according to the classical textual standard operative procedure. The raw drugs were indentified and authenticatedbeforeusingforpreparation.The prepared drug,HaridradiAvalehawas pharmacologically subjected forphysicochemicalanalysis, HPTLC, analysis ofdrug.Themainingredientof is HaridradiAvalehais Haridra. Thegroundwork requisites for the standardization of HaridradiAvalehawere tried to cover in this study. In future, this study will be helpful for standardization of HaridradiAvalehaand for the preparationofthemonographyofHaridradiAvalehain theAyurvedicFormularyofIndia(AFI).

Conflict of Interest: None

Acknowledgement : The authors are thankful to all the managing trustees of Parul University, Vadodara for availing the infrastructure required for the study. Also thankful to staff of Pharmacognosy laboratory, Pharmacology laboratory and Pharmacy of Parul Institute of Ayurved, Vadodara. Authors are also thankful to Vasu Research Laboratory, Vadodara.

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Table – 1 Ingredients of HaridradiAvaleha

SLNO	DRUG	BOTANICAL NAME	PART USED	TOTALQUANTITY
1	Haridra	Curcuma longa Linn	Rhizome	1 Part
2	Maricha	Piper nigrum Linn	Fruit	1/2 Part
3	Draksha	Vitisvinifera Linn	Fruit	1 Part
4	Pippali	Piper longum Linn	Fruit	3/4 Part
5	Rasna	Pluchealanecolataoliver &Hiern	Root	1 Part
6	Shati	Curcuma zedoariaRosc	Rhizome	1 Part
7	Guda	Jaggery	-	8 Part
8	Taila	Tilataila	Tilataila	1/10 Part

Table -2 Organoleptic Characteristics

Sr. No.	Characters	Observation
1.	Colour	Dark Brown

2.	Odour	Aromatic
3.	Touch	Soft
4.	Consistency	Semi solid
5.	Taste	Sweet & Pungent

.

Table -3 Physicochemical Parameters

SL No	Parameter	Observation
1.	Loss on Drying	38%
2.	Total Ash	2.4%
3.	Acid Insoluble Ash	1.80%
4.	Water Soluble Extractives	7%
5.	Alcohol Soluble Extractives	10.75%
6.	pH	6

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Research Centre
(A Division of Vasu Healthcare Pvt. Ltd.)

Haridradi Avleha	Sample ID	AD/20/064
	Received Date	09/03/2020
	Report Date	20/03/2020
Name of Scholar	Dr. Rimpi, PG Scholar, Parul Institute of Ayurveda, Vadodara	

Sr. No.	Parameters	Result
ASSAY		
1	Total sugar by UV (%)	38.41
INSTRUMENTAL ANALYSYS		
1	HPTLC Fingerprinting	Report attached

	Analyzed by	Checked by	Approved by
Designation	Executive- R&D	Asst. Manager – R&D	Sr. Manager – R&D
Signature			

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HPTLC FINGERPRINTING REPORT

Sample	:	**Haridradi Avleha**
Name of Scholar	:	Dr. Rimpi, PG Scholar, Parul Institute of Ayurveda, Vadodara
Sample ID	:	AD/20/064
Date of Report	:	20/03/2020

Preparation of Test solutions: Weigh 5 g of sample in a beaker and add 10 mL of Water to it. Sonicate for 15 Minutes, and transfer it to a separating funnel and partition with 20 mL Ethyl Acetate. Repeat the procedure twice with 15 mL Ethyl Acetate. Collect all Ethyl acetate layer and evaporate to dryness. Reconstitute the sample with 2 mL Ethyl Acetate and filter with 0.22 µm syringe filter. Use the Test solution thus obtained for HPTLC fingerprinting.

Preparation of Spray reagent [Vanillin – sulphuric acid reagent]: 50 mg Vanillin in 2 mL Methanol and 8 mL Sulphuric acid (98 %). From this stock solution prepare 10 % solution in Methanol.

Chromatographic Conditions:

Application Mode	CAMAG Linomat 5 - Applicator
Filtering System	Whatman filter paper No. 1
Stationary Phase	MERCK - TLC / HPTLC Silica gel 60 F_{254} on Aluminum sheets
Application (Y axis) Start Position	10 mm
Development End Position	80 mm from plate base
Sample Application Volume	14.0 µL
Development Mode	CAMAG TLC Twin Trough Chamber
Chamber Saturation Time	30 minutes
Mobile Phase (MP)	Toluene : Ethyl Acetate : Formic acid : Methanol (6 : 3 : 0.1 : 1 v/v)
Visualization	@ 254 nm, @ 366 nm and @ 540 nm (after derivatization)
Spray reagent	Vanillin Sulphuric acid reagent
Derivatization mode	CAMAG – Dip tank for about 1 minute
Drying Mode, Temp. & Time	TLC Plate Heater Preheated at 100± 5°C for 3 minutes

	Analyzed by	Checked by	Approved by
Designation	Executive – R&D	Asst. Manager – R&D	Sr. Manager – R&D
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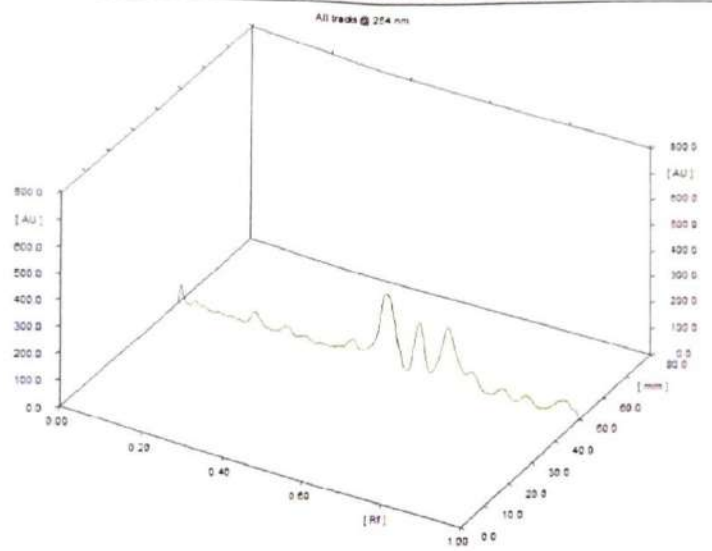
HPTLC Chromatogram @ 254 nm



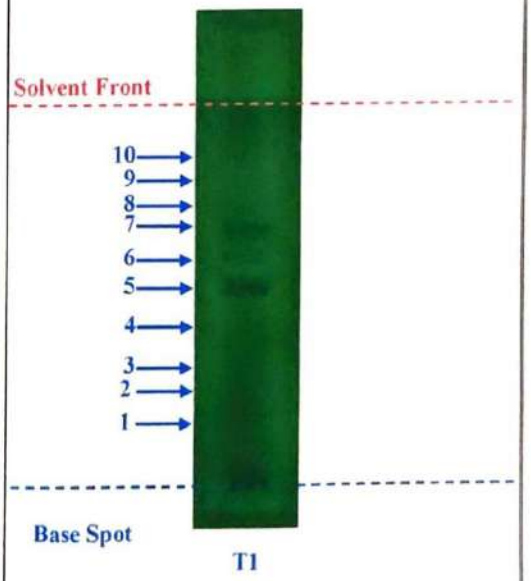
3D overlay chromatogram

R_f value

Spot No.	Track T1
1	0.19
2	0.26
3	0.30
4	0.43
5	0.50
6	0.60
7	0.66
8	0.71
9	0.81
10	0.87

Track T1: Haridradi Avleha

HPTLC Plate



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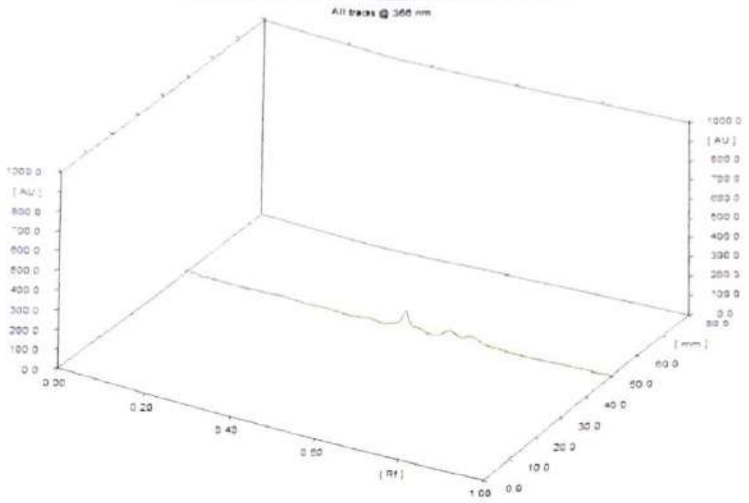
HPTLC Chromatogram @ 366 nm



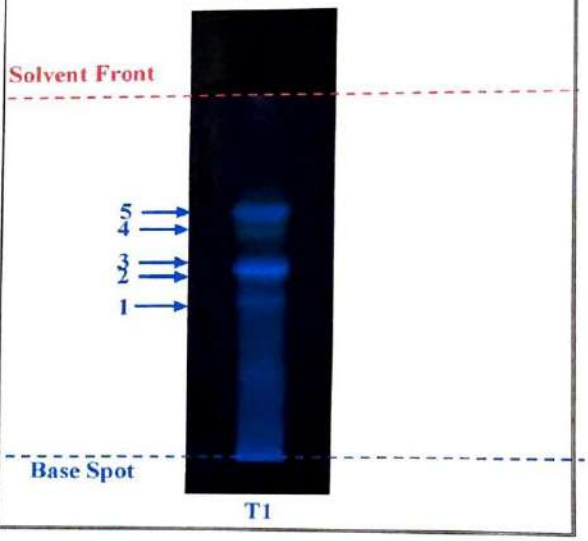
3D overlay chromatogram

R_f value

Spot No.	Track T1
1	0.43
2	0.50
3	0.55
4	0.60
5	0.71

Track T1: Haridradi Avleha

HPTLC Plate



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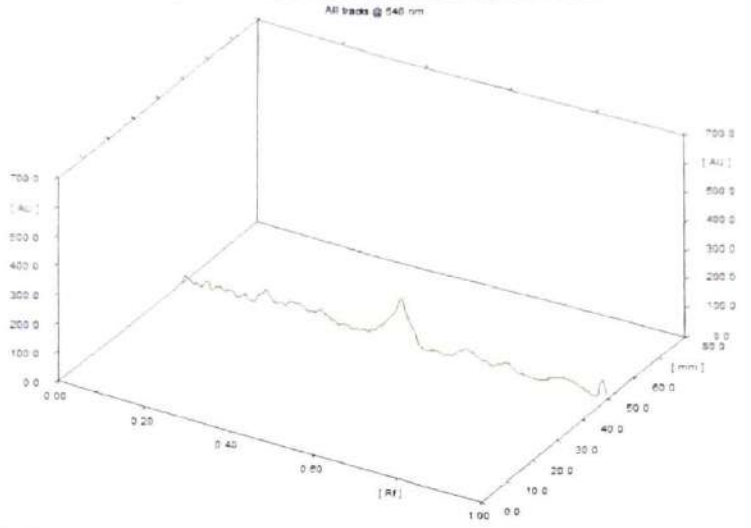
HPTLC chromatogram @ 540 nm



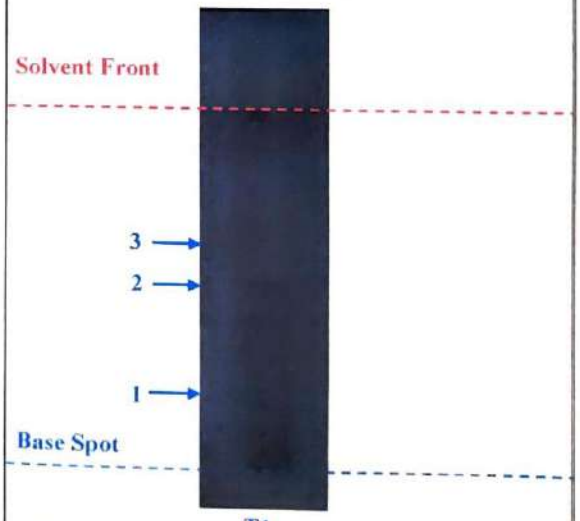
3D overlay chromatogram

Rf value

Spot No.	Track T1
1	0.19
2	0.50
3	0.66

Track T1: Haridradi Avleha

HPTLC Plate



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