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Pharmaceutical Analysis of Aparajit Avaleha: An Ayurved Formulation for Vataja Kasa (dry cough)

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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. Aparajit Avaleha has been mentioned in Chakradutta[1] texts in Vataja Kasa roga chikitsa. 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.

Keywords : Aparajit Avaleha, Vataja Kasa, HPTLC

INTRODUCTION:

Good Health requires the commitment of many, from law maker to the lunch makers ans affected by activity, dietary habits and environment[2]. Ayurveda is considered as the science of life. The ultimate aim of *Ayurveda* is to guide every human being to maintain and promote health, and prevent ailments, which is the main hindrance to achieve dharma. The *Ayurveda* have the special branch which deals with the preparation of formulations. One among them is *Aparajit Avaleha* popularly used in the management of *Vataja Kasa* and it has been quoted as auspicious drug in classics.

This formulation in present era needs the standardization. In this study *Aparajit Avaleha* is prepared as per the quotations explained in the classics. The *Aparajit*

Avaleha is herbal preparation. The analytical study of Avaleha is performed with following parameters: physico- chemical parameters i.e. colour, taste, pH, Loss on Drying, total ash, acid insoluble ash, water soluble extractive, alcohol soluble extractive.
HPTLC analysis is performed for identification of chemical constituents.

MATERIALS AND METHODS:

Aim and objectives:

- Identification and authentication of raw drugs used for *Aparajit Avaleha.*
- Preparation of *Aparajit Avaleha* at GMP certified pharmacy as per classical explanation.
- Analytical study of Avaleha.

Drug review:

- The name of the drug, parts used and its quantity were mentioned in TABLE 1.

Collection, Identification and Authentication of Raw Drugs:

Herbal raw drugs like Karkatshrungi, Karchur, Bharangi, Musta, Pippali, Yavasa were purchased from authenticated resources at Vadodara.
Raw drugs identification and authentication was done by the Department of *Dravya guna,* Parul Institute of Ayurveda, Parul University, Vadodara.

CLASSICAL METHOD OF APARAJIT AVALEHA PREPARATION:

- First collected all the raw Material with required quality.
- Separate waste material from it then weighed properly and grinded them as coarse powder.
- Decoction of all drugs was made by adding 8 parts of water into it and heated on medium flame till 1/4th left.
- After cooling decoction was filtered with sieve and kept aside.
- Then jaggery was dissolved well in the decoction and boiled until attainment of two thread consistency, It should be soft when pressed between thumb and index finger or when it sinks in the glass of water without getting easily dissolved.
- Cow ghee , tila taila and honey was added in avaleha after complete cooling of it.
- Packaging was done finally as per required dose in air tight conatiners .

METHODS OF PHYSICOCHEMICAL EVALUATION:

Avaleha as analysed by using standard qualitative and quantitative parameters.
All the procedures were conducted at G.M.P certified pharmacological lab, Vadodara.
The physio- chemical parameters i.e. colour, taste, pH, Loss on Drying, total ash, acid insoluble ash, water soluble extractive, alcohol soluble extractive were analysed.

CHROMATOGRAPHY :

HPTLC (high-performance thin layer chromatography) is a sophisticated form of TLC, which provides superior separation efficiency. The HPTLC concept includes validated methods for qualitative and quantitative analysis, and fulfils all quality requirements for use in fully regulated environments. In this study HPTLC has been performed for drug analysis. It is an enhanced form of TLC. A number of enhancements can be made to the basic methods of TLC to automate the different steps, to increase the evolution achieved and to allow more accurate quantitative measurements. Method and other procedures followed for *Aparajit Avaleha.*

HPTLC as shown in IMAGE-1

RESULTS AND DISCUSSION :

1. **Organoleptic evaluation:**

Organoleptic Characteristics of Powder drugs details are mentioned in the TABLE 2

2. **Physico-Chemical Parameters[3]:**

Details of physico-chemicals values are mentioned in TABLE 3

Loss on drying: On drying the samples indicate that the samples were devoid of excess
water content and there was no microbial overgrowth or insect infestation present. In this sample loss on drying is 2.98%, it indicates the samples may have good shelf-life and may not decay
on storage.

Total ash and Acid insoluble ash: It indicates of contamination, substitution, adulteration.

The Low totalash and Acid insoluble ash signifying low levels of inorganic matter and silica content. In this Total Ash and Acid Insoluble Ash:
3.93% and 1.80%,. In this sample it is slightly more. May be due to presence of fibers and sclereids in the ingredients which are in normal limits and drug can be used internally.

Water soluble extract and Alcohol soluble: Water soluble extract and Alcohol soluble extract are 19.75% and 17.00% respectively. The high solubility of the sample in water denotes that drug is best suited for extraction with water or water based preparations. There is negligible presence of Volatile oils also favour the thermal extractions with water.

pH: The pH was measured to note the acidity or alkalinity of the aqueous solution of the drug. This helps in understanding the pharmacological basis of drug absorption and metabolism. In this sample pH is 6.5% so it is alkaline in nature.

Total Solid Content: The total solid value of Aparajit Avaleha is 92.6%.

3. **Qualitative study Phytochemical analysis of Aparajit Avaleha:**

On Qualitative Study: Alkaloid, Essential Oil, Flavanoid ,Saponin ,Glycoside ,Starch ,Tannin . It indicates that drug which used is genuine.(Table No-4)

4. High-performance Thin Layer Chromatography[4] study:

Preparation of test solution (T):

The Chromatographic techniques carried out are mentioned in Materials & Methods section.

Solvent system which was designed for HPTLC i.e. Toluene (10): Ethyl acetate (3):

Formic acid (1) was used for HPTLC studies. The results are tabulated as under. (IMAGE 3) Preparation of spray reagent (Anisaldehyde- sulphuric acid reagent) Image 3

Details of HPTLC profile of all tracks at 254 nm. Under the 254 nm wavelength-Track -1of *Aparajit Avaleha* (5µL) - 5 spots were detected and starts with respect to retardation factor 0.15,
0.21, 0.30 ,0.62 and 0.71.

Details of HPTLC profile of all tracks at 366 nm. Under the 366 nm wavelength-Track -1of *Aparajit Avaleha* (5µL) - 2 spots were detected and starts with respect to retardation factor 0.62,
0.79.

Details of HPTLC profile of all tracks at 540 nm. Under the 540 nm wavelength-Track -1of *Aparajit Avaleha* (5µL) - 4 spots were detected and starts with respect to retardation factor 0.21,
0.30, 0.63, 0.77.

CONCLUSION:

Any plant or formulation which is used medicinally requires detail study prior to its use because the therapeutic efficacy is depends on the quality of ingredients used for the medicine preparation. In this study, *Aparajit Avaleha* was prepared according to the classical textual standard operative procedure mentioned in classic. The raw drugs were indentified and authenticated before using for preparation. The prepared drug, *Aparajit Avaleha* was pharmacologically subjected for physicochemical analysis, HPTLC, and qualitative study of drug.

The ground work requisites for the standardization of *Aparajit Avaleha* were tried to cover in this study. In future, this study will be helpful for standardization of *Aparajit Avaleha* and for the preparation of the monography of *Aparajit Avaleha* in the Ayurvedic Formulary of India (AFI).

CONFLICT OF INTEREST: None

ACKNOWLEDGEMENT :

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Table-1 Ingredients of Aparajit Avaleha

NO.	NAME	BOTANICAL NAME	FAMILY	USEFUL PART
1.	Karchur (1 part)	Curcuma zedoaria Rosc.	Zingiberaceae	Rhizome
2.	Karkatsringi (1 part)	Pistacia integerrima	Anacardiaceae	Shringkar Khosa
3.	Pipalli (1 part)	Piper longum Linn.	Piperaceae	Fruit
4.	Bharangi (1 part)	Clerodendrum Serratum	Verbenaceae	Root
5.	Nagarmotha (1 part)	Cyperus rotundus	Cyperaceae	Rhizome
6.	Yavasa (1 part)	Alhagi camelorum	Leguminosae	Panchang
7.	Guda (12 parts)	Jaggery		
8.	Tila Taila (Q.S.)	Sesamum indicum	Pedaliaceae	Seed Oil

Table-2 Organoleptic Evaluation

Samples	Aparajit Avaleha
Colour	Brown
Odour	Aromatic
Touch	Soft
Consistency	Semi solid
Taste	Sweet and bitter

Table-3 Physico-chemical Parameters

Sample	Aparajit Avaleha
Parameters	Value
Loss of Drying at 110c (%w/w)	2.98
Total Ash Value (%w/w)	3.93
Acid Soluble Ash (%w/w)	1.80
Water Soluble Extractive (%w/w)	19.75
Alcohol Soluble Extractive (%w/w)	17.00
pH Value	6.5
Specific Gravity	---
Total Solid Content (%w/w)	92.6

Rancidity	Negative

Table No-4 QUALITATIVE ANALYSIS

Sample	Aparajit Avaleha
SOLVENT	PRESENT(+) / ABSENT(--)
Alkaloid	+
Vitamin C	--
Essential Oil	+
Flavanoid	+
Saponin	+
Glycoside	+
Starch	+
Tannin	+

HPTLC FINGERPRINTING REPORT

Sample	**:**	**Aparajita Avleha**
Name of Scholar	**:**	Dr. Anshul Baloda, PG Scholar, Parul Institute of Ayurveda, Vadodara
Sample ID	**:**	AD/20/042
Date of Report	**:**	22/02/2020

Preparation of Test solutions: Weigh 2 g of sample in a conical flask and add 20 mL of methanol to it. Reflux for 15 minutes on water bath, filter with the help of Whatman filter paper No.1. Use the test solution thus obtained for HPTLC fingerprinting.

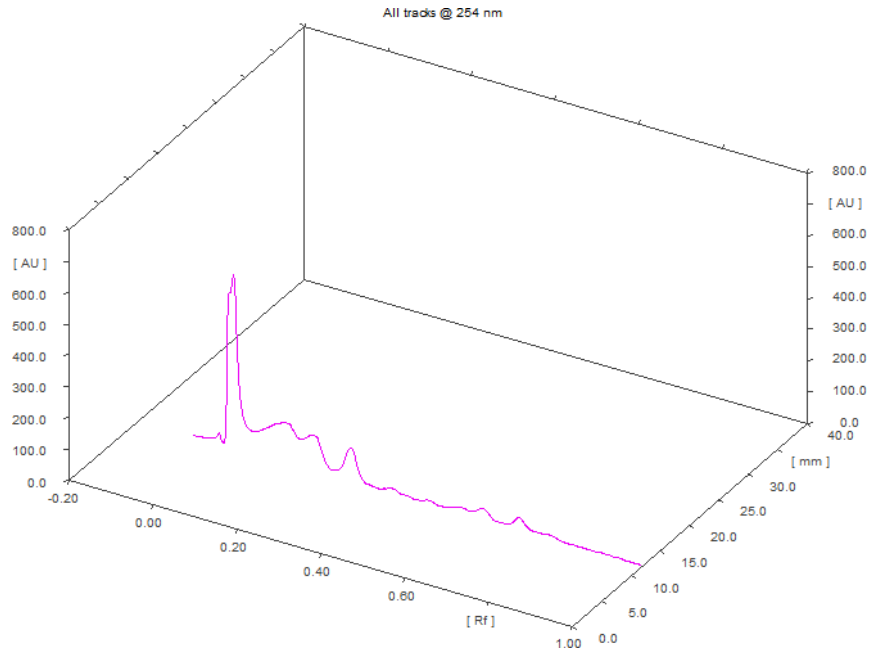
Preparation of Spray reagent [Anisaldehyde – sulphuric acid reagent]: 0.5 mL Anisaldehyde is mixed with 10 mL Glacial acetic acid, followed by 85 mL Methanol and 5 mL Sulphuric acid (98 %).

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	10.0 µL
Development Mode	CAMAG TLC Twin Trough Chamber
Chamber Saturation Time	30 minutes
Mobile Phase (MP)	Toluene : Ethyl Acetate : Formic Acid (10 : 3 : 1 v/v)
Visualization	@ 254 nm, @ 366 nm and @ 540 nm (after derivatization)
Spray reagent	Anisaldehyde Sulphuric acid reagent
Derivatization mode	CAMAG – Dip tank for about 1 minute
Drying Mode, Temp. & Time	TLC Plate Heater Preheated at 100± 5^0C for 3 minutes

1. Sample will not be retained by Vasu Research Centre. It is the responsibility of party to keep control.

HPTLC Chromatogram @ 254 nm



3D overlay chromatogram

R_f value

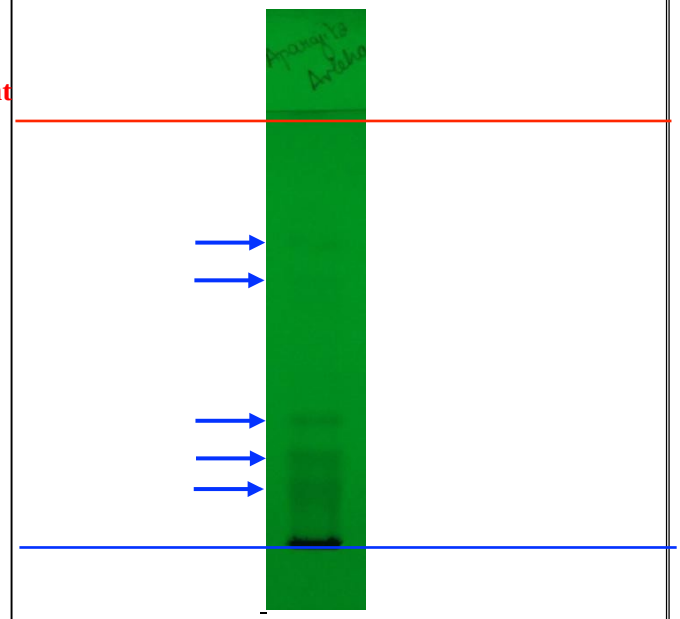
Spot No.	Track T1
1	0.15
2	0.21
3	0.30
4	0.62
5	0.71

Track T1: Aparajita Avleha

Base Spot

T1

HPTLC Plate



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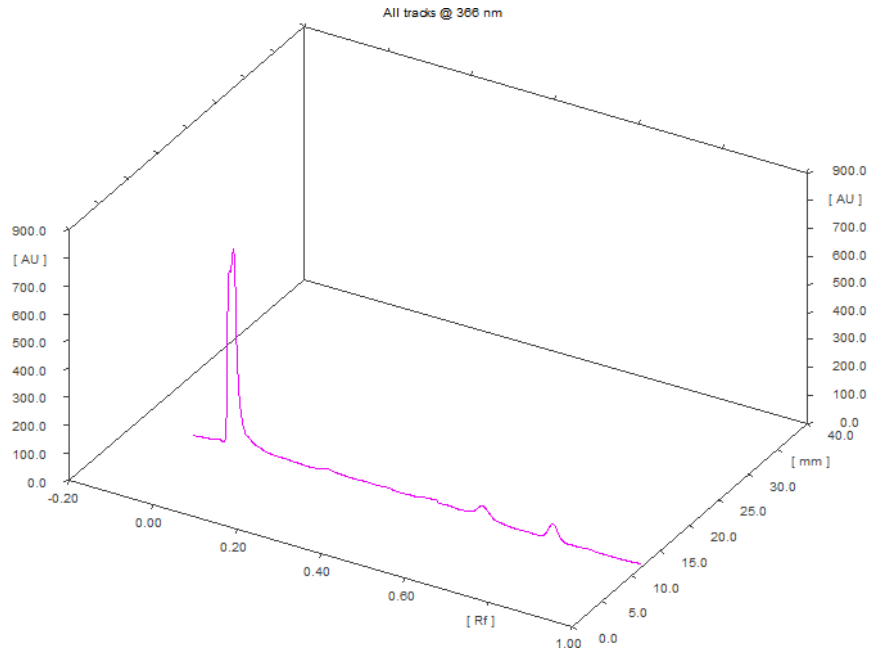
HPTLC Chromatogram @ 366 nm



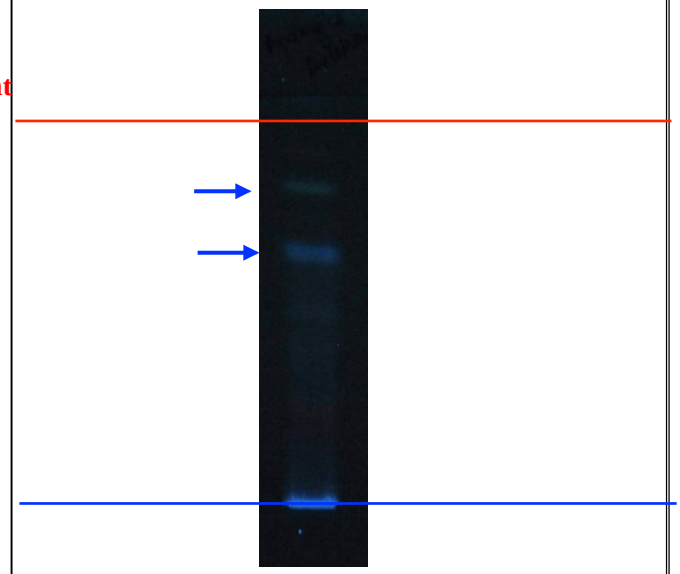
3D overlay chromatogram

R_f value

Spot No.	Track T1
1	0.62
2	0.79

Track T1: Aparajita Avleha

HPTLC Plate



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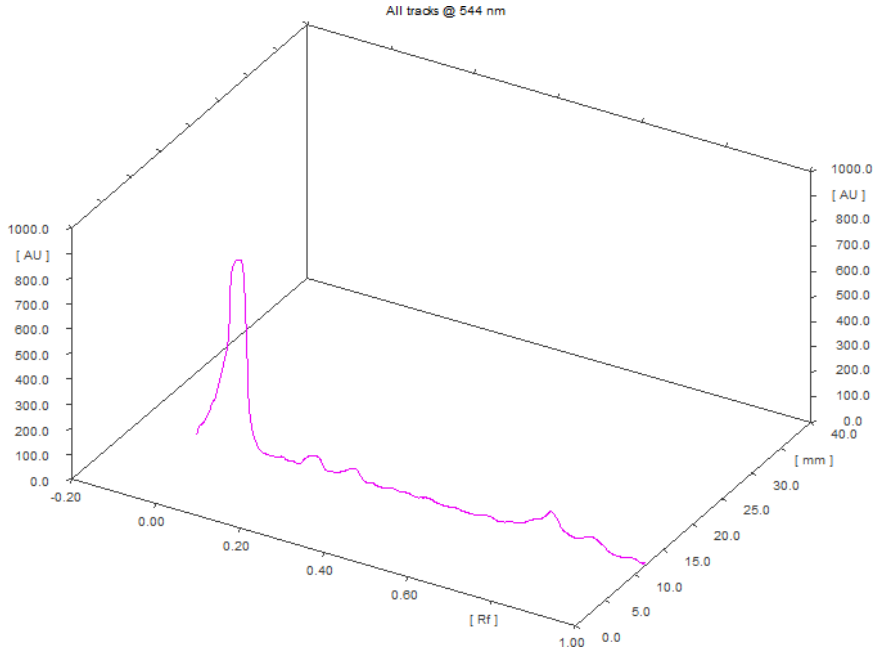
HPTLC chromatogram @ 540 nm



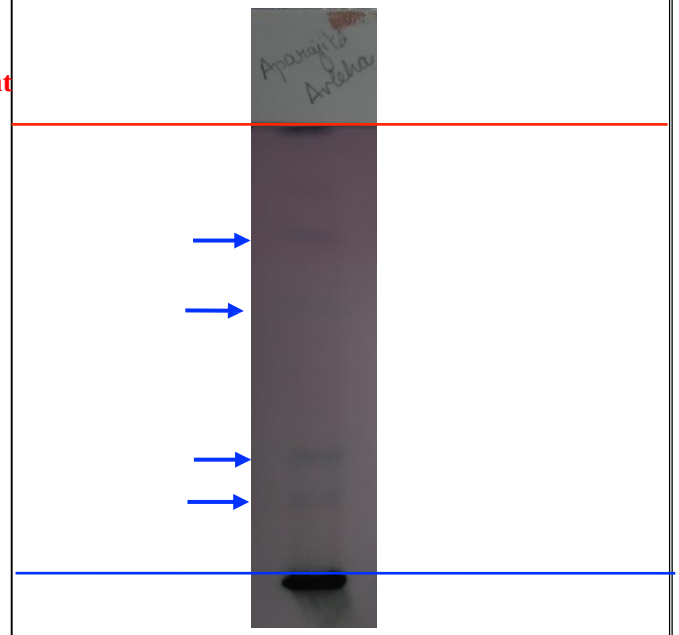
3D overlay chromatogram

R_f value

Spot No.	Track T1
1	0.21
2	0.30
3	0.63
4	0.77

Track T1: Aparajita Avleha

HPTLC Plate



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