WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 7.523
Volume 6, Issue 11, 786-795. Research Article ISSN 2277– 7105

PHARMACOGNOSTICAL AND PHYSICOCHAMICAL ANALYSIS OF MODIFIED *MUSTA TRIPHALADI AVALEHA*–A POLY-HERBAL FORMULATION USED IN THALASSEMIA MAJOR

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Article Received on
26 July 2017,

Revised on 16 August 2017,
Accepted on 05 Sept. 2017

DOI: 10.20959/wjpr201711-9560

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ABSTARCT

Ayurveda is one of the oldest system of medicine in the world, its antiquity going back to the Vedas. It adapts a unique holistic approach to the antire science. *Aachaaryas* have mentioned various herbal formulations in *Samhitas.* Also Mentions methods to quality control and to standardization those formulations. And also it has been developed different techniques to evaluate the quality of medicines by modern science. So there is a current need of analyze Ayurvedic products also according to modern scientific. So this study is prove to authenticity and quality of the drugs. Hence the present study was carried out to pharmacognostical parameters like organoleptic and microscopic, Phrmaco chemical parameters like loss on drying, ph, Ash value, Water soluble extract, Alcohol soluble extract and sugar lavel, HPTLC Study of Modified *Musta triphaladi avaleha*. It has been using in to treatment of Thalassemia major as a adjuvant therapy.

KEYWORDS: Thalassemia, Modified *Musta triphaladi avaleha*, pharmacognostical, HPTLC, Pharmaco chemical.

INTRODUCTION

Ayurveda is one of the oldest surviving health care system that originated in india. *Ayurveda* is not only the science of therapeutics but it advocates more of promotion of health and

prevention of disease than cure. There is a huge trend in people to turn towards herbal medicine like *Ayurveda*. Though *Ayurveda* is holistic and cost effective with good therapeutic effects, the therapeutic effect depends on the quality of the drug administered. A quality of drug gives best results on disease. *Musta triphaladi avaleha* were used in treatment of Thalassemia major with good results. In Modified *Musa triphaladi avaleha* there were added 5 main effective drugs like Devdaru, Agatsya, Kumari, Rohitaka, Agnimantha which was also given in *Ayurveda* science. Present study is carried out for standardization of Modified musta triphaladi avaleha for in idendity, quality and purity. This Ayurvedic formulations used in adjuvant therapy of Thalassemia major.

According to the World Health Organization (WHO) Thalassemias are the most common inherited single-gene disorders in the world. Thalassemias are inherited from a person's parents. characterized by abnormal synthesis of hemoglobin due to defects in the globin chain. This causes early excessive destruction of red blood cells leading to hypochromic, microcytic anemia the characteristic presenting symptom of Thalassemia. It can be classified into 3 types, such as Thalassemia Major (TM), Thalassemia Intermedia (TI) and Thalassemia minor (Tm) or traits. The main stay of managing these diseases is repeated blood ransfusion. chronic red cell transfusion therapy leads to progressive iron accumulation in the body. It can be reduce by iron chelation therapy. But iron chelators are coastly and have side effect like growth retardation, visual andauditory toxicity, cataract etc. Due to those complications and incompleteness of modern medical management, there is a need of some adjuvant therapy like *Ayurveda*, and it should be applied simultaneously with the blood transfusion which help to increase the blood transfusion interval, to enhance the quality of life and life span of the thalassemic patients, and to minimize the complications. Modified *Musta-triphaladi Avaleha* is a herbal drug compound prepared in dosage format of Avaleha (i.e. lincture) and has been tried clinically as an adjuvant with proven results. To ensure the quality standards of the formulation such as identity, quality, and purity of ingredients and finished product along with preliminary physico-chemical parameters and pharmacognostical characteristics, this study was carried out.

MATERIALS AND METHODS

Drug materials

Collection, Identification and authentication of raw drugs

The raw drugs for the study were procured form the Pharmacy of Institute of Post Graduate Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar. The ingredients were identified and authenticated in the Pharmacognosy Laboratory, Institute of Post Graduate Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar. The ingredients and parts used are listed in the table 1.

Table 1: Ingredients of Modified *Musta- Triphaladi Avaleha* Drug.

No.	Drug Name	Botenical Name	Part Used	Quantity
1	*Musta*	*Cyprus rotundus* Nust.	Dry Rhizome	1 part
2	*Amalaki*	*Emblica officinalis* Gaertn.	Dry Fruit	1 part
3	*Haritaki*	*Terminalia chebula* Retz.	Dry Fruit	1 part
4	*Vibhitaki*	*Terminalia bellerica* Roxb.	Dry Fruit	1 part
5	*Katuki*	*Picrorhiza kurroa* Royle ex Benth.	Dry Root	1 part
6	*Kakamachi*	*Solanum nigrum* Linn.	Dry Whole plant	1 part
7	*Kutaja*	*Holarrhena antidysenterica* Wall.	Dry Bark	1 part
8	*Haridra*	*Curcuma longa* Linn.	Dry Rhizome	1 part
9	*Vidanga*	*Embelia robusta* Burm	Dry Fruit	1 part
10	*Guduchi*	*Tinospora cordifolia* Willd.	Dry Stem	1 part
11	*ShwetaPunarnava*	*Trianthem aportulacastrum* Linn.	Dry Root	1 part
12	*Sharapunkha*	*Tephrosia purpurea* Linn.	Dry Root	1 part
13	*Apamarg*	*Achyranthus aspera* Linn.	Dry Whole plant	1 part
14	*Kadali*	*Musa paradisiacal* Linn,	Dry Rhizome powder	1 part
15	*Shatavari*	*Aspergus recemosus* Willd.	Dry Root	1 part
16	*Shigru*	*Moringa Oleifera* Lam.	Dry Root bark	1 part
17	*Vasa*	*Adhatoda vasica* Nees	Dry Leaves	1 part
18	*Daruharidra*	*Berberis aristata* DC	Dry Root	1 part
19	*Sariva*	*Hemidesmus indicus* R.Br.	Dry Root	1 part
20	*Manjishtha*	*Rubia Cordifolia* Linn.	Dry Root	1 part
21	*Agnimantha**	*Clerodendrum phlomidis* Linn.	Dry Root	1 part
22	*Rohitaka**	*Tecomella undulate* seem.	Dry Bark	1 park
23	*Agatsya**	*Sesbania grandifolia* linn.	Leaves	1 part
24	*Kumari**	Aloe barbadensis Mill.	Leaves	1 part
25	*Devadar**	Cedrus deodara Roxb.	Dry Root	1 part
26	*Madhu*	-----	-----	q.s
27	*Sharkara*	*Saccharum officinarum* Linn	Crystal	q.s
28	*Chaturjata*			*Praksepa*
a.	*Twak*	*Cinnamomum zeylanicum* Blume	Dry Bark	q.s
b.	*Ela*	*Elettaria cardamomum* Maton	Dry Seed	q.s
c.	*Tamalapatra*	*Cinnamomum tamala* Nees & Eberm	Dry Leaf	q.s
d.	*Nagakesara*	*Mesua ferrea* Linn	Dry Pushpakalika	q.s
29	*Trikatu*			*Praksepa*

a.	*Shunthi*	*Zingiber officinale* Rosc.	Dry Rhizome	q.s.
b.	*Maricha*	*Piper nigrum* Linn.	Dry Fruit	q.s.
c.	*Pippali*	*Piper longum* Linn.	Dry Fruit	q.s.

Method of Preparation of The Modified *Musta- Triphaladi Avaleha* Drug Avaleha

Method of preparation was adopted as standard procedure from *Sharangdhara Samhita Madhyama Khanda*.[1] All the raw drugs except *Agatsya patra* and *kadali patra* were Provided by the raw drug store of Pharmacy, The whole plant of *Agatsya Patra*(*Sesbania grandifolia* linn.). Was collected from the Dist. Kodinar and rhizomes of *Kadali* (Musa paradisiacal Linn.) were collected from Behind the farmacy, GAU, Jamnagar. They were authenticated by the experts of Pharmacognosy laboratory, I. P. G. T. & R. A., Jamnagar and then submitted in Pharmacy for making of Modified *Musta-Triphaladi Avaleha*. The Finished product of test drug was used for the pharmacognostical and physico-chemical Parameters study at the Pharmacognosy laboratory and the Pharmaceutical chemistry laboratory.

Pharmacognostical evaluation

Pharmacognostical study comprises Organoleptic study and Microscopic study of finished products. Raw drugs were identified and authenticated by the Pharmacognosy lab, IPGT&RA, Jamnagar. For pharmacognostical evaluation, drugs studied under the Corl zeiss Trinocular microscope attached with camera, with stain and without stain.[2] The microphotographs were also taken under the microscope.

Method of Physico-chemical evaluation

Modified *Musta Triphaladdi Avaleha* was analysed by using standard qualitative and quantitative parameters, HPTLC was carried out after making appropriate solvent system with Methanolic extract of Modified *Musta Triphaladdi Avaleha* at the Pharmaceutical Chemistry lab, I.P.G.T. & R.A. Gujarat Ayurved University, Jamnagar. Presence of more moisture content in a sample may create preservation problem. Hence loss on drying[3] was also selected as one of the parameters. Ash value,Water soluble extract[4], Methanol soluble extract[5], pH[6], Reducing, Nonreducing and Total sugar[7] selected as the parameters. Organoleptical parameters, Physicochemical analysis, investigations were carried out by following standard procedure. High Performance Thin layer chromatography (HPTLC) studies were carried out with acid hydrolysed methanolic extract on pre-coated silica gel GF 254(E.Merck) precoated TLC aluminium plate as 5mm bands, 5mm apart and 1cm from the edge of the plates, by means of a Camag Linomate V sample applicator fitted with a 100 µL

Hamilton syringe The mobile phase used was Toluene: Ethyl acetate: Glacial acetic acid: Formic acid (5:5:1:0.5). The plates were developed in Camag twin trough chamber (20 x 10 cm2) and spots were detected in short U.V. (254 nm), Long U.V (366nm). Camag Scanner II (Ver. 3.14) and Cats soft ware (Ver. 3.17) were used for documentation.

OBSERVATIONS AND RESULTS

Pharmacognostical study

Organoleptic study

Organoleptic features of Modified *Musta Triphaladi Avaleh* were observed by sensory observations results were mentionedin table no.2 All parameters found as per API standards.

Table 2: Organoleptic characteristics of Modified mustatriphaladi avaleha.

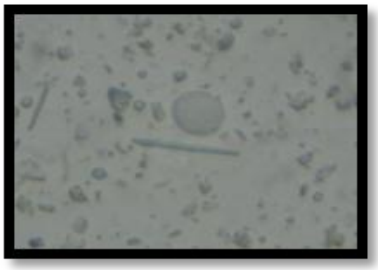
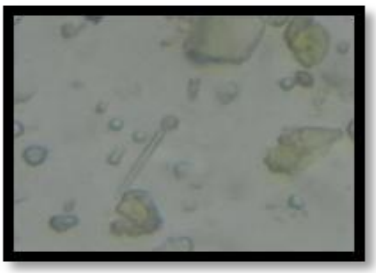
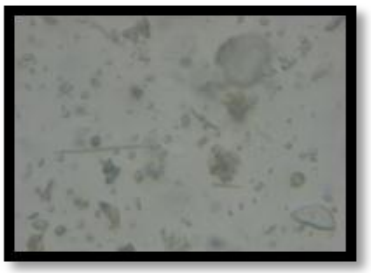
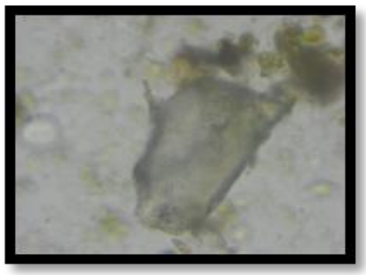
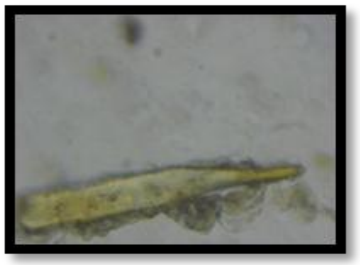
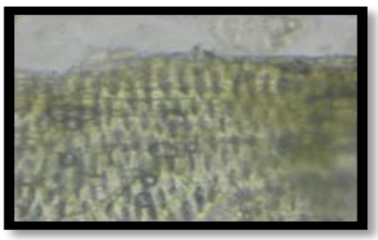
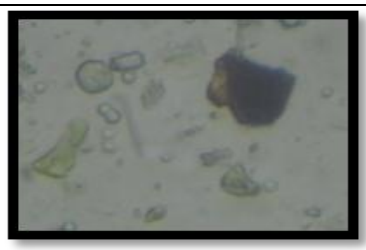
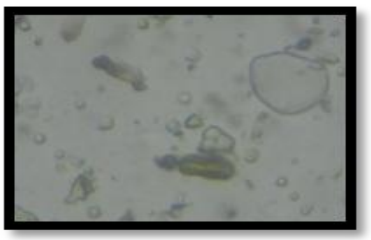
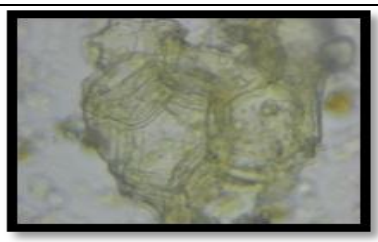
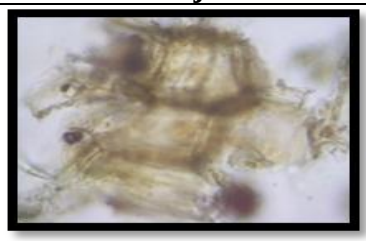
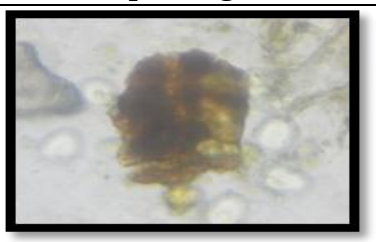
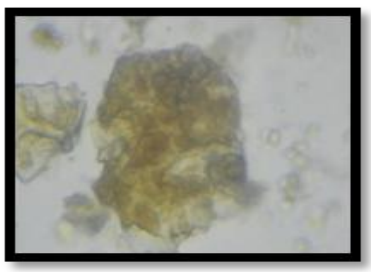
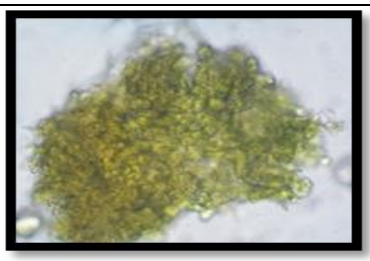
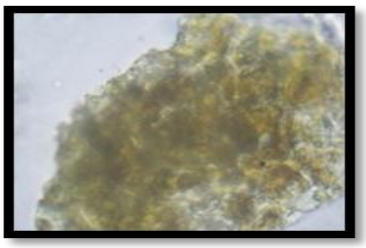
Sr.No	Parameters	Observations
1.	Colour	Brown
2.	Odour	Fragrant
3.	Taste	Sweet
4.	Touch	Semi solid

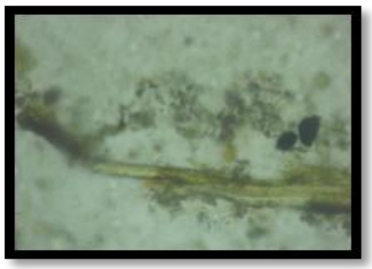
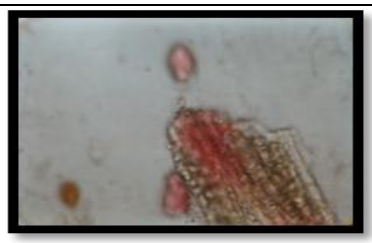
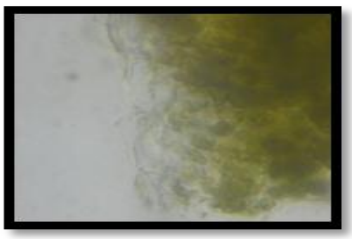
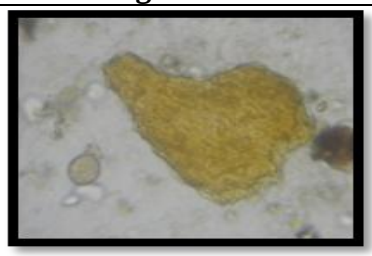
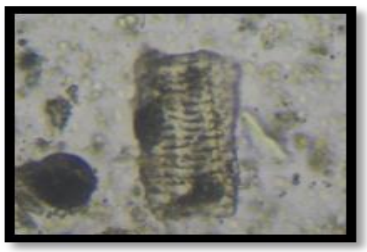
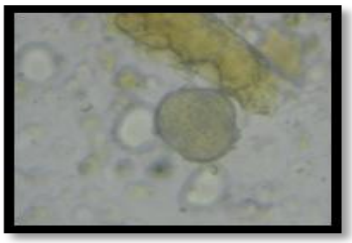
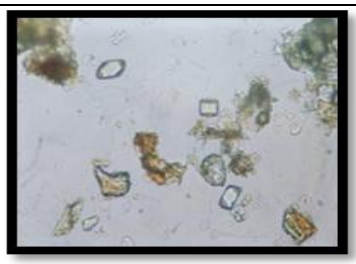
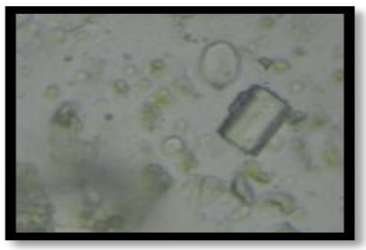
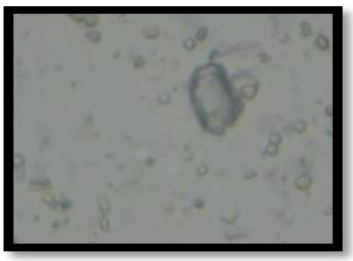
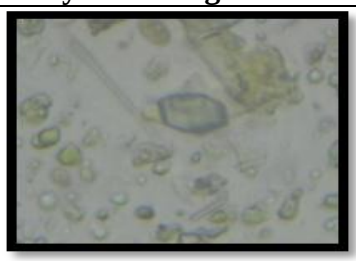
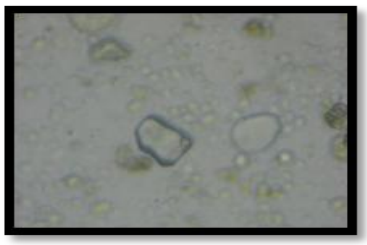
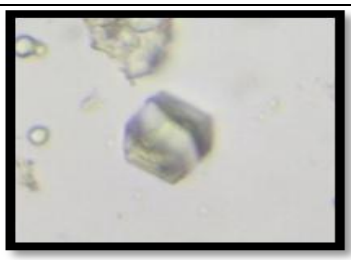
Microscopical Study

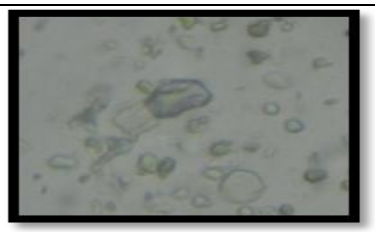
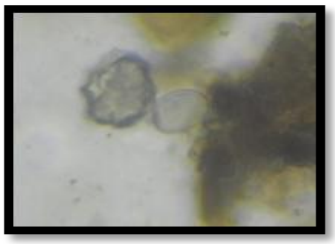
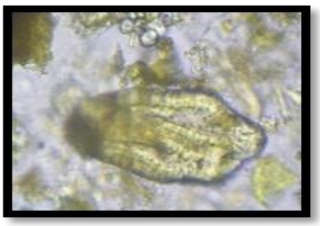
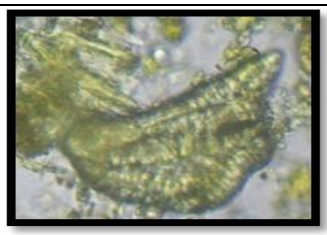
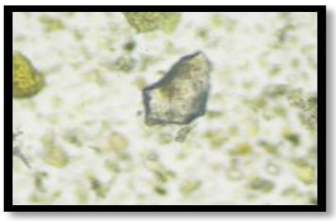
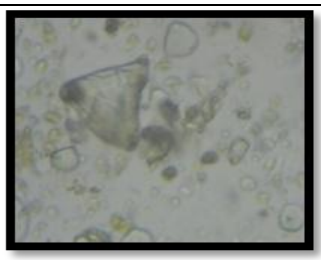
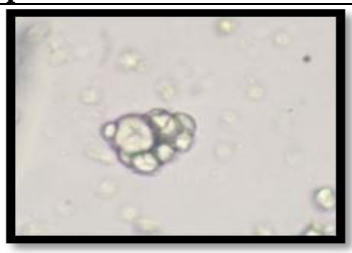
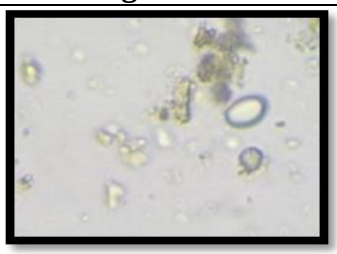
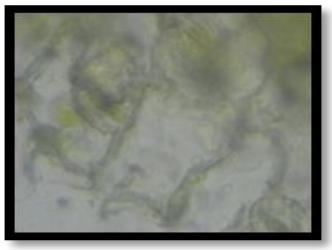
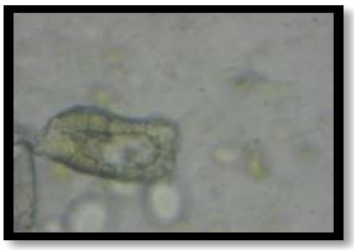
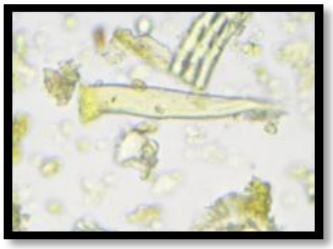
Microscopically evaluation is very important in the initial identification of ingredients as well as in the detection of adulterations. Identification of original drug is the first step to maintain the quality of the final product. Microphotographs taken under the microscope. All the ingredients were authenticated with help of characters mentioned in the API.

Diagnostic characters of the Modified *Musta Triphaladi Avaleh* are Acicular crystal of Kumari, Manjistha, shatavari. Cork cells of Guduchi, Rohitaka. Cork and tannin of tvaka. Epidermal cell of agatsya, Kakmachi, Vasa. Fiber of Daruharidra, Shunthi. Blunted fibre of Tamal patra. Lignified fibre of Agnimantha, Aela Prismatic crystal of Agnimantha Devdar Sariva. Rhomboidal crystal of Agnimantha Daruharidra, Kutaja, Rohitaka, Shigru. scleroids of Amlaki, Haritaki, Bibitaki. Silica deposition of amalaki and Musta. Starch grain of Musta, Kadali, Katuki, Shunthi. Compound starch grain of Apamarg. stone cell of Maricha Kutaja. Trichomes of Sweta punarnava, Bibitaki. Spiral vessels of Kakmachi and Pitted vessels of Katuki. Border pitted vessels of Guduchi,stomata of sarpunkha,Mesocarp cells of pippali,Parenchyma cells of haridra, Pollen grain of Nagakesara, Rosette crystals of Ela, Blunted fibre of Tamal patra Annular vessels of Vasa,Black dabbries of Maricha. the microphotographs of the same are depicted in Plate1.

Plate 1: Microphotographs of Modified *Musta triphaladi Avaleha.*

 Acicular crystal of Kumari	 Acicular crystal of Manjista.	 Acicular crystal of Shatavari
 Annular vessels of Vasa	 Black debbries of Maricha	 Blunted fibre ofTamal patra
 Border pitted vessels of Guduchi	 Colouring matter of Manjista	 Compound starch grains of Apamargha
 Cork cells of Guduchi	 Cork cells of Rhohitaka	 Cork with tannin of Twak
 Epidermal cells of Agastya	 epidermal cells of Kakamachi	 Epidermal cells of Vasa

 Fibre of daruharidra	 Fibres of Shunti	 Group of scleroids of amalaki
 Lignified fibres of agnimanth	 Lignified testa of Ela	 Mesocarp cells of Pippali
 Parenchyma cells of Haridra	 Pitted vessels of Katuki	 Pollen grain of Nagakesar
 Prismatic and rrhomboidal crystals of Agnimanth	 Prismatic crystal of Devadaru	 Prismatic crystal of Sariva
 Rhomboidal crystal of Dharuharidra	 Rhomboidal crystal of Kutaja	 Rhomboidal crystal of Rhohitaka

 Rhomboidal crystal of Shigru	 Rosette crystal of Ela	 sceelroids of Amalaki
 Sceroids of Haritaki	 Scleroids of Bibitaki	 Silica deposition of Amalaki
 Silica deposition of Musta	 spiral vessels of Kakamachi	 Starch grain of Musta
 Starch grains of Kadali	 Starch grains of Katuki	 Starch grains of Shunti
 Stomata of Shankapuspi	 Stone cells of Kutaja	 Trichome of Sweta punarnava
 Stone cells of Maricha	 Trichome of bibitaki	

Physico- chemical Parameters

Standardization of herbal products is the need of time because of several reasons. Physico-chemical Parameters of the Modified *Musta Triphaladi Avaleha* like loss on drying, water soluble extract etc. were examined and found as per (Table 3). All these parameters need evaluation in different size of batches. Also need validation for batch to batch variation.

Table 3: Physico-Chemical Parameters of Modified *Musta-Triphaladi Avaleha.*

Sr No.	Parameters	Results
1.	Loss on drying at 110◦C	26.8 % w/w
2.	Ash Value	8.6 % w/w
3.	Alcohol soluble extrac	65.04 % w/w
4.	Water soluble extract	68.48 % w/w
5.	pH Value	7.0
6.	Total sugar	101.1mg
7.	Reducing sugar	33mg
8.	Non Reducing sugar	68.1mg

HPTLC STUDY RESULTS

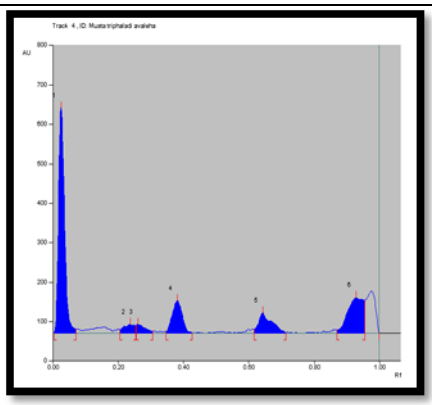
On performing HPTLC, visual observation under UV light showed few spots but on analysing under densitometer much more was observed (Table 4).

Table 4: Max rf value observed In HPTLC study.

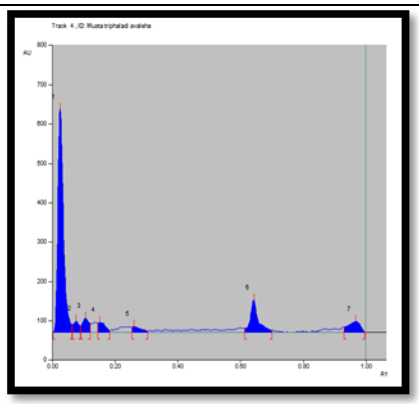
Wave lengths	254nm	366nm
No of Spots	6	7
Max.Rf Value	0.03,0.24,0.26,0.38,0.64,0.63	0.03,0.08,0.11,0.15,0.26,0.64,0.97

HPTLC could not assess according to standards as the parameter not mentioned in API for the drug Modified MTA.

Results of HPTLC



Densitogram on wave lenghth 254



Densitogram on wave lenghth 366

DISCUSSION

The significant effect of the drug on the particular Diseases is shows quality of particular drug. There should be present all ingredients in drug formulation for the good outcomes. Under the microscope Modified *Musta triphaladi avaleha* shows all pharmacognostical characteristics in it. All pharmaceutical parameter reveals the drug is forms under standard method of preparations and pharmaco chemical parameters all are in standard range.

CONCLUSION

Modified *Musta triphaladi Avaleha* is a potent medicine in the management of disease Thalassemia. Preliminary Pharmacognostical organoleptic and microscopy of results Modified *Musta triphaladi Avaleha* showed all ingredients used were genuine and no adulterants found. Quality of Modified *Musta triphaladi avaleha* is established in the given parameters. This study outcome may be considered as reference standard in future scientific studies.

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