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Research Article

PHARMACUTICAL STANDARDIZATION AND ANALYTICAL EVALUATION OF *MADURANTAK VATI* PREPARED WITH *GUDUCHI SATVA*

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ABSTRACT

Standardization of Ayurvedic formulations is crucial for ensuring quality, safety, and therapeutic efficacy. *Madhurantak vati* consists of ingredients like *Guduchi, Tulsi* etc and is indcated in enteric fever. Considering the role of *Madhurantak vati* in infectious conditions, it was decided to carry out anti-microbial study of these formulations against microorganisms namely *Salmonella typhi, Salmonella Paratyphi, E coli* and *Streptococcus pyogens*. Incorporation of *Guduchi Satva*, derived from Tinospora cordifolia, is believed to enhance its immunomodulatory properties. Scientific pharmaceutical and analytical validation of this preparation is essential for quality assurance. **Methods:** *Madhurantak Vati* was prepared according to classical Ayurvedic references using authenticated raw materials and standardized *Guduchi Satva*. Pharmaceutical standardization included organoleptic evaluation (color, odor, taste, texture) and tablet parameters such as uniformity of weight, hardness, friability, and disintegration time. Analytical evaluation involved physicochemical parameters including loss on drying, total ash, acid-insoluble ash, water- and alcohol-soluble extractive values, and pH. Preliminary phytochemical screening and chromatographic profiling (TLC/HPTLC) were performed to establish characteristic fingerprints. **Results:** The formulation showed satisfactory organoleptic properties and complied with acceptable pharmacopeial limits for tablet evaluation parameters. Physicochemical values were within permissible ranges, indicating purity and stability. **Discussion:** The study establishes preliminary pharmaceutical and analytical standards for *Madhurantak Vati* prepared with *Guduchi Satva*. These findings provide a scientific basis for ensuring batch-to-batch consistency, safety, and therapeutic reliability of the formulation.

INTRODUCTION

Ayurveda, the science of life is regarded as the complete health care system for prevention as well as treatment of various diseases. It emphasizes on sustaining equilibrium of the body, mind and soul for the maintenance of proper health. *Bhaishajya Kalpana* is a specialized branch of Ayurveda which deals with the procurement, processing and right application of a drug to cure any diseases. Simply it is an art of preparing and dispensing of medicine.

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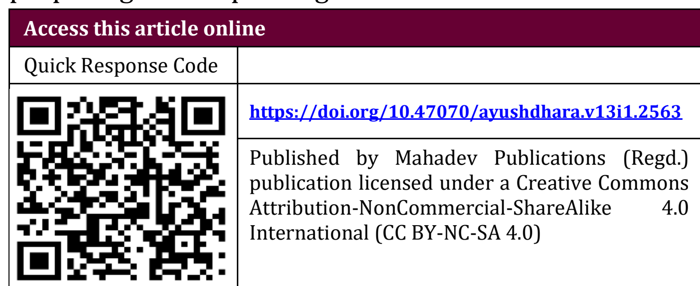

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Diseases are broadly classified into exogenous and endogenous based on etiological origin.

Micro-organism plays a major role among the exogenous categories a lot of literature is available about the presence of antimicrobial principles in plants and minerals where it has been described as *Krimighna dravyas*. It is quite natural that Ayurveda, the oldest health care system in the world, will not have the word 'Antibiotics'. But a curious search in its literature will definitely yield a number of references stating that certain diseases are produced due to micro-organisms and one has to destroy them to preserve the health. The term "*Krimi*" as mentioned in Ayurveda classics have broad meaning. It is the greatness of Ayurveda that when there were no scientific tools available, in those days itself, they

identified that the microbes are responsible for causation of certain diseases [1].

Infectious diseases are taking a great toll on the health care system today. However much more is the problem created by the rapid emergence of resistant bacteria occurring worldwide endangering the efficacy of antibiotics. Many decades after the first patients were treated with antibiotics, bacterial infections have again become a threat. The United Nations declared antimicrobial resistance to be one of the biggest threats to global health. [2]

The development of antimicrobial-resistant bacterial species stems from a number of factors which include the prevalent and sometimes inappropriate use of antibiotics, extensive use of these agents as growth enhancers in animal feed, and increased trans boundary passage of antibiotic-resistant bacteria [3]. Some *Staphylococcus* spp. and *Streptococcus* spp. involved in the pathogenesis of respiratory and skin infections, along with Pseudomonas and members of the Enterobacteriaceae causing gastrointestinal, urogenital diseases and wound contamination are resistant to virtually all of the older antibiotic[4]. Clinical isolates of *Staphylococcus aureus*, the leading cause of nosocomial infections, are increasingly resistant to an array of antimicrobial agents like penicillin, gentamicin, tobramycin, amikacin, ciprofloxacin, clindamycin, erythromycin, chloramphenicol, trimethoprim-sulfamethoxazole and vancomycin[5]. A major challenge in global health care is the need for novel, effective and affordable medicines to treat microbial infections, especially in developing countries of the world, where up to one-half of deaths are due to infectious diseases[6]. Against this backdrop, the development of alternative drug classes to treat such infectious diseases is urgently required [7].

A number of Ayurvedic classical preparations are being used in cases of infections, and are found to be effective clinically. *Madhurantak vati* is a herbal formulation mentioned in the text '*Rasa tantra saar evam Sidhaprayoga Sangraha*[8]'. *Madhurantak vati* consists of ingredients like *Guduchi, Tulsi* etc and is indicated in enteric fever. Considering the role of *Madhurantak vati* in infectious conditions, it was decided to carry out anti-microbial study of these formulations against microorganisms namely *Salmonella typhi, Salmonella Paratyphi, E coli* and *Streptococcus pyogens*.

Standardization is an important aspect for maintaining and assessing the quality and safety of the polyherbal formulation as these are combinations of more than one herb to attain the desire therapeutic effect. Standardization minimizes batch to batch variation; assure safety, efficacy, quality and acceptability of the polyherbal formulations [9]. Considering the above fact physic chemical analysis of the formulation was also carried out following the guidelines set by WHO for the standardization of herbal drugs.

AIMS AND OBJECTIVES

1. To analyze the prepared samples as per the parameter mentioned in Laboratory guide for the analysis of Ayurveda and Siddha Formulation published by CCRAS and PLIM, Ghaziabad.
2. To evaluate the antimicrobial activity of *Madhurantak vati* against microorganisms namely, *Salmonella typhi, Salmonella Paratyphi, E coli* and *Streptococcus pyogen.*

MATERIALS AND METHODS

- All the raw materials except *Guduchi* and *Kassani beeja* were procured from the pharmacy N.I.A., Jaipur. *Kasani beeja* was procured from a local vendor in Jaipur and fresh *Guduchi* stem was collected from in and around the campus of National Institute of Ayurveda, Jaipur.
- Two samples of *Madhurantak vati* were prepared with proper S.O.P & SMP's as mentioned in the text in Pharmaceutical Lab of *Rasashastra* and *Bhaishajya Kalpana* N.I.A., Jaipur.

  Sample 1-As per the classical reference.

Table 1: Ingredients of *Madhurantak Vati*

S.No.	Ingredients	Latin name/English name	Parts
1.	*Tulasi*	*Ocimum sanctum*	24 g
2.	*Guduchi*	*Tinospora cordifolia*	*12 g*
3.	*Lavanga*	*Syzygium aromaticum*	6g
4.	*Dhanyak*	*Coriandrum sativum*	6g
5.	*Kasani*	*Cinchorium intybus*	6g
6.	*Ela*	*Elettaria cardamomum*	6g
7.	*Vanshlochana*	*Bambusa arundinacea*	6g
	Tulasi patra swarasa for *Bhavana*	*Ocimum sanctum*	QS

Following steps were followed in the preparation of *Madhurantak vati.*

1. Preparation of *Guduchi Satwa* in 3 batches.
2. Powdering of all other ingredients and mixing in proper ratio.
3. *Bhavana* with *Tulasi Swarasa* and preparation of *Vati.*

Guduchi Satva

Method of preparation

- *Fresh Guduchi* stem was collected, the physical impurities were removed & washed thoroughly with water.
- Cleaned stem were cutting in to small pieces 2-3 inches. (Average dia-2cm average length 2.6cm).
- 5kg of *Guduchi* stem pieces were pounded in *Khalwa* until fibers of stem got separated and the material becomes sticky.
- Four times R O water (20 litres) was added into it and rubbed well with hands thoroughly and kept overnight for soaking.
- Next day the material was again well rubbed, until the sliminess disappears into the same water. Then fibers were removed and the remaining material was strained through clean cloth.
- The strained material was collected in a flat bottom stainless steel container and allowed for the sedimentation.
- When the solid particles in the materials were sedimented on the bottom of container, the upper liquid portion was decanted carefully. After decantation the starch obtained was again mixed with little quantity of water and allowed again for sedimentation and then liquid portion was removed by decantation process. Repeated washing and decantation were done, for 15 times. Then clear white starch was obtained.
- Obtained starch was taken in a SS plate and dried.
- The obtained *Satva* was stored in air tight bottle to avoid moisture absorption of *Satva*.

Observations

- During the initial stage of maceration, the pulp was too slimy, as the procedure continued sliminess decreased and totally reduced after one hour of maceration.
- At the time of maceration, the colour of water turned turbid.
- The colour of liquid after straining with four folded cloth was greenish brown.
- Additional amount of water was required for continuous decantation and sedimentation to obtain clear white *Satva*.
- The colour of final product was pure white.

Precautions

- *Guduchi* stem was crushed sufficiently.
- Maceration of the crushed *Gudichi* stem was carried out till the whole sliminess disappeared

Obtained *Satwa* was properly dried to prevent contamination and deterioration.

Table 2: Process Validation for *Guduchi Satva* (3 Batches)

Parameters	Batch 1	Batch 2	Batch 3
Weight of fresh *Guduchi* stem	5 kg	5kg	5kg
Size of *Guduchi* stem pieces	2.6	4.2	2.6
Diameter of *Guduchi* stem pieces	2.1	2	1.9
Quantity of water used	20 lit	20 lit	20 lit
Duration (h)	*25*	*22*	*23*
Yield of starch (*Satva*) obtained	121.8 g	90.1 g	30.9 g
Yield in %	2.4%	1.8%	0.61%
Avg. % of yield	1.6 %		

Preparation of Three Samples of *Madhurantak Vati* with *Guduchi Satva* (MVS1, MVS2, MVS3)

Table 3: Ingredients of *Madhurantak Vati* Sample

S.N.	Ingredients	Ratio of each ingredient	Quantity
1.	*Tulsi Patra*	4 Parts	40 g
2.	*Guduchi satva*	2 Parts	20 g
3.	*Vanslochan*	1 Part	10 g
4.	*Dhanyaka*	1 Part	10 g
5.	*Ela*	1 Part	10 g

6.	*Lavang*	1 Part	10 g
7	*Kasani beej*	1 Part	10 g
8	Total wt.		110 g

Procedure

- All the powdered ingredients were weighed as per the requirement.
- Powdered *Vanslochan* was taken in a *Khalva-yantra* and *Mardana* was carried out for few minutes.
- Then fine powders of *Lavang* and *Kasani Beej* were added one by one and triturated it for few minutes.
- The remaining fine powders of *Guduchi Satva, Tulsi Patra, Dhanyak,* and *Ela* were added and triturated for few minutes till it attained a uniform mixture.
- Finally, this uniform mixture was levigated with required quantity of *Tulsi patra swarasa* till it attained semi solid state.
- *Bhavana* with *Tulsi Patra Swarasa* was repeated two more times.
- Then handmade *Vati* of size 125mg were prepared, dried in shade and stored in airtight container.
- Similar procedure was adopted for preparation of two more batches of *Madurantak vati*.

Observations

The amount of *Swarasa* kept on decreasing with each *Bhawana* may be due to absorbed moisture by herbal ingredients.

Precautions

Before Preparation of *Vati*

- Preparation of *Vati*, fine *Churna* must be used. (Mesh size No.-80)
- Drug used in *Vati nirmana* should be free from dust insects and worms etc.
- *Swarasa* should be used according to their description.

During Preparation of *Vati*

- Fine powder (*Churna*) of all ingredients must be properly mixed before preparation of *Vati nirmana.*
- Care was taken during the preparation of the *Vati*, so that the matter may not spill out of *Khalva yantra.*
- *Vati* was prepared immediately after *Mardana* when the mixture is moist enough to prepare the *Vati*.
- *Vati* should be equal in shape, size and appearance also.
- If preparation of *Vati, Mardana* should be properly done.

After Preparation of *Vati*

- Prepared *Vati* should be dried in shadow.
- Prepared *Vati* should be kept in air tight container.

Table 4: Preparation of Three Samples of *Madhurantak Vati* with *Guduchi Satva* (MVS1, MVS2, MVS3)

Drug	*Bhavana*	Quantity of *Tulsi swarasa* consumed for each *Bhawana* (ml)	Total quantity consumed (ml)	Wt. of Sample drug Before *Bhavana* (g.)	Wt. of mixture after 3 *Bhavana* (g.)	Increase in weight (g.)	Mean Value (g.)
MVS1	1st	210	360	110	124.5	14.5	12.43
	2nd	70					
	3rd	80					
MVS2	1st	200	370	110	122.8	12.8	
	2nd	90					
	3rd	80					
MVS3	1st	210	360	110	120.0	10	
	2nd	70					
	3rd	80					

Analytical Study

Following parameters were selected for the quality assurance of the formulations.

Organoleptic parameters, loss on drying, ash value, acid insoluble ash, alcohol soluble extractive, water soluble extractive, pH value, hardness, uniformity of weight, disintegration test, HPTLC, microbial contamination, heavy metal analysis.

Table 5. Organoleptic Characters of MVS

S.No	Characters	MVS1, MVS2, MVS3
1	Appearance/texture	Round shaped, smooth surface
2	Colour	Dark green
3	Odour	Characteristic
4	Taste	*Katu, Kashaya*

Table 6: Physico Chemical Parameters of MVS

S.No	Parameter	Result			
		MVS1	MVS2	MVS3	Mean
1.	Loss on drying at 105°C	9.70%	8.9	9.2	9.26%
2.	Total ash	15.86%	19.10%	17.85%	17.60%
3.	Acid insoluble ash	6.65%	7.55%	6.31%	6.83%
4.	Water soluble extractive value	3.88%	7.44%	5.88%	5.73%
5.	Alcohol soluble extractive value	9.42%	7.45%	8.85%	8.57%
6.	pH value (10%aqueous extract)	5.80%	5.80%	5.30%	5.63
7.	Uniformity of weight (mg)	Avg-150.6 Max-160.0 Min.-142.0	Avg-128.0 Max-138.0 Min.-120.0	Avg-136.8 Max-144 Min.-128.0	138.46 (Uniform)
8.	Hardness	06 kg	03 kg	09 kg	6 kg
9.	Disintegration time	45min	45min	45min	45 min

Table 7. Microbial Contamination of MVS

S.No.	Test parameter	Result	Limits
		MVS1	
1.	Total bacterial count	700 cfu/g	NMT 100000 cfu/g
2.	Total fungal count	50 cfu/g	NMT 1000 cfu/g
3.	E. coli	Absent/g	Should be absent
4.	Pseudomonas aeruginosa	Absent/g	Should be absent
5.	Staphyllococcus aureus	Absent/g	Should be absent
6.	Salmonella spp.	Absent/g	Should be absent

Table 8: Heavy Metal Analysis of MVS1

S.No.	Heavy Metal	Result	Limits
		MVS1	
1.	Lead	7.4 mg/kg	NMT 10 mg/kg
2.	Cadmium	BLQ (LOQ 0.1) mg/kg	NMT 0.3 mg/kg
3.	Mercury	2.27 mg/kg	NMT 1 mg/kg
4.	Arsenic	109.45 mg/kg	NMT 3 mg/kg

HPTLC Finger Print Analysis

Figures 5.1, 5.2, 5.3: Visualization of MVS at 245nm, 366nm and 510nm respectively

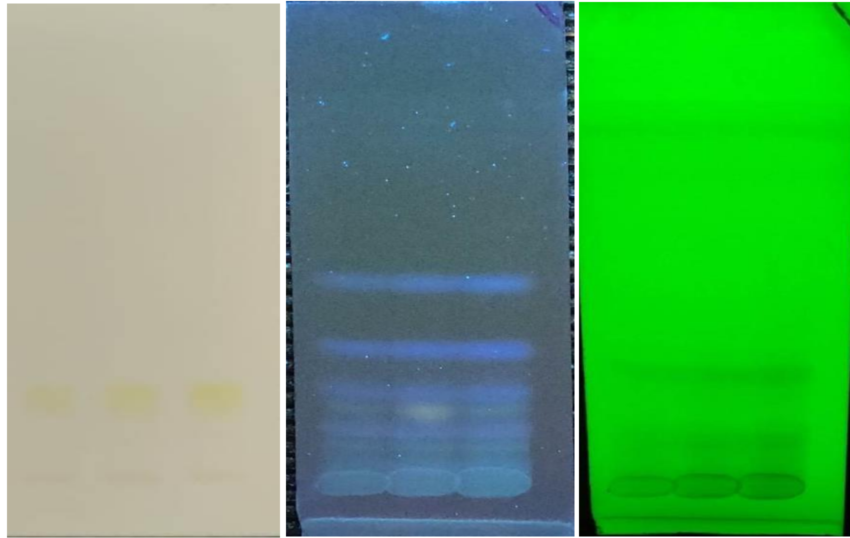


Fig 5.4 Fig 5.5 Fig 5.6

Fig.5.7: HPTLC Fingerprint Profile of MVS -All Tracks at 254 nm wavelength

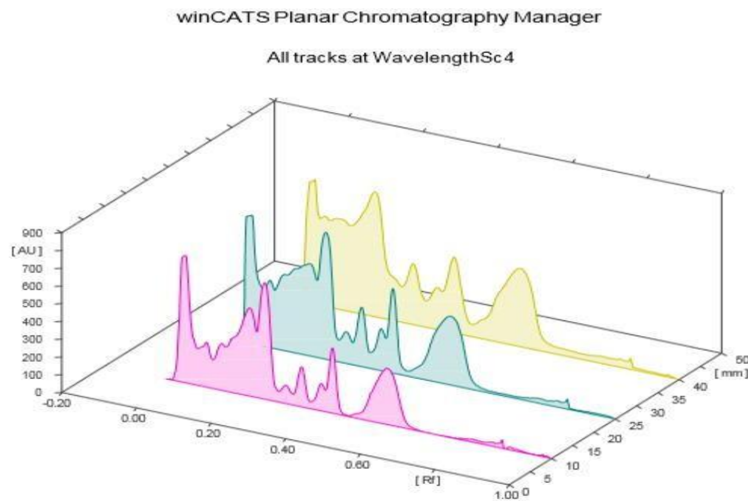
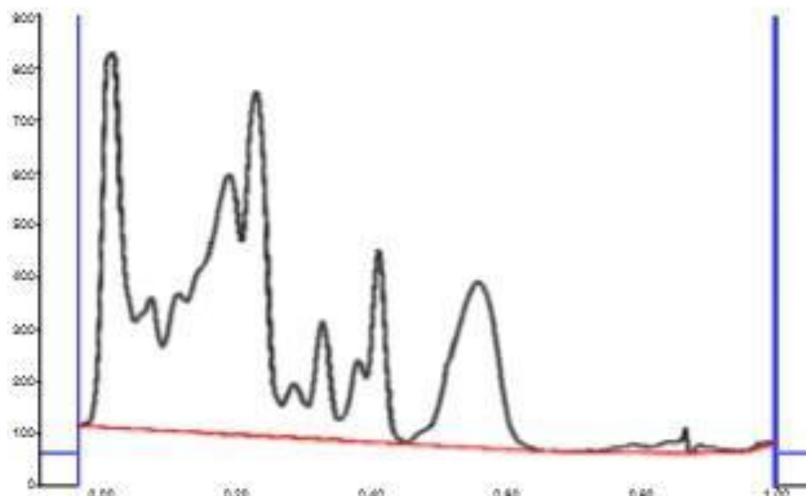


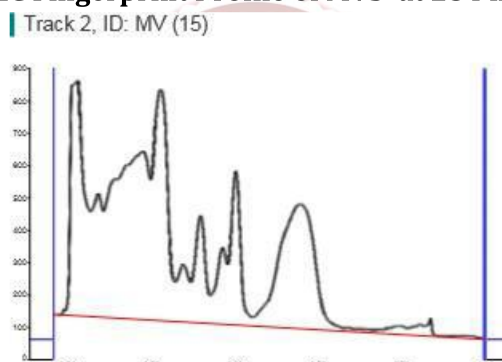
Fig 5.8: HPTLC Fingerprint Profile of MVS at 254 nm wavelength

Track 1, ID: MV (10)



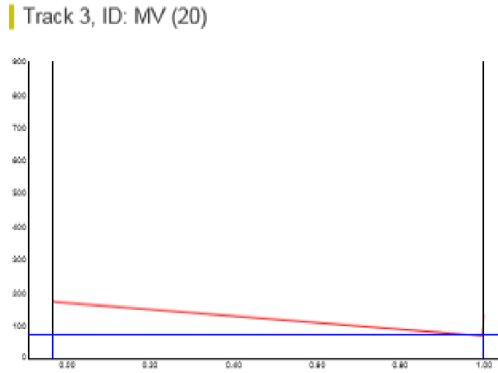
Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area
1	-0.02	4.6	0.02	718.1	19.49	0.05	206.3	22371.9
2	0.05	207.1	0.07	253.5	6.88	0.09	162.2	7736.9
3	0.09	163.3	0.12	263.8	7.16	0.13	249	6916.7
4	0.13	249.5	0.19	496	13.47	0.21	369.6	27336
5	0.21	374.3	0.23	656.3	17.82	0.27	60	20032.7
6	0.27	60.5	0.29	103.3	2.8	0.3	66.1	2600
7	0.31	61.3	0.33	225.2	6.11	0.35	38.9	5273.4
8	0.35	39.5	0.38	154.7	4.2	0.39	122.3	3560.6
9	0.39	122.9	0.41	366.7	9.96	0.44	6	7576
10	0.46	4.2	0.56	316.7	8.6	0.63	8.7	21334.7
11	0.75	3.4	0.79	17.6	0.48	0.8	11.4	576.3
12	0.82	12.5	0.84	23.3	0.63	0.85	20.2	516.6
13	0.85	20.4	0.87	48.2	1.31	0.87	1.3	520.4
14	0.88	0.5	0.89	16.9	0.46	0.9	10.5	247.5
15	0.9	10.8	0.91	11.8	0.32	0.93	4.1	218.2
16	0.96	0.1	0.97	11.5	0.31	0.98	6	109.2

Fig.5.9: HPTLC Fingerprint Profile of MVS at 254 nm wavelength



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area
1	-0.01	14.7	0.03	727	17.85	0.06	325.7	24250.4
2	0.06	326.8	0.07	380.2	9.34	0.09	329	9503.6
3	0.12	429.5	0.18	519.8	12.76	0.2	434.9	34588.6
4	0.2	438.8	0.22	714.3	17.54	0.26	123.4	24455.9
5	0.26	123.4	0.28	178.7	4.39	0.3	124.5	5002.9
6	0.3	124.9	0.32	333.1	8.18	0.34	87.8	8622.5
7	0.34	88.1	0.37	236.9	5.82	0.38	187	6203.2
8	0.39	187.8	0.4	476.6	11.7	0.44	27.9	11197.8
9	0.45	29.9	0.56	387.3	9.51	0.64	17.9	32844.3
10	0.76	13.8	0.79	26.7	0.66	0.81	23.4	1060.2
11	0.83	27	0.85	35.2	0.86	0.85	30.4	661.6
12	0.86	30.4	0.87	56.8	1.39	0.88	5.8	741.8

Fig.5.10: HPTLC Fingerprint Profile of MVS at 254 nm wavelength



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area
1	-0.03	0.8	0.02	703.3	15.76	0.04	489.5	22734.4
2	0.04	490.8	0.05	507.4	11.37	0.06	489.9	10489.8
3	0.06	490	0.08	509.5	11.41	0.09	509.2	11556.9
4	0.09	509.4	0.1	511.2	11.45	0.12	483.9	12534.9
5	0.12	483.9	0.19	702.4	15.74	0.26	201.8	56711.1
6	0.26	202.3	0.29	343.8	7.7	0.32	148.3	13979
7	0.32	148.5	0.35	237.1	5.31	0.36	220.7	7714.2
8	0.37	221.4	0.4	428.4	9.6	0.44	67.7	17965.1
9	0.44	68.2	0.57	440.3	9.87	0.66	41.4	44106.7
10	0.86	41	0.87	63.9	1.43	0.9	10.8	998
11	0.97	7.6	0.97	15.8	0.35	0.99	0.1	175.9

Fig 5.11: All tracks at 366 nm wavelength

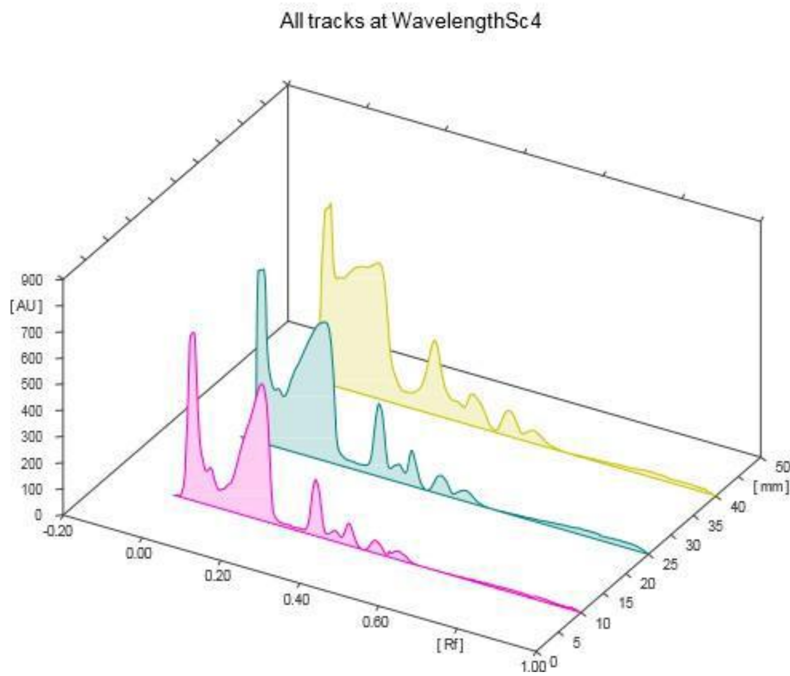
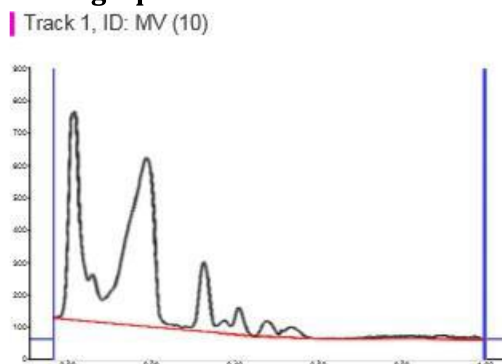
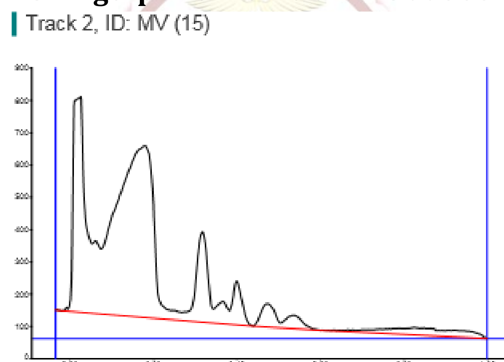


Fig 5.12: HPTLC Fingerprint Profile of MVS at 366nm wavelength



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area
1	-0.02	3.4	0.02	642.8	37.13	0.05	127.2	18011.8
2	0.05	127.6	0.06	145.8	8.42	0.08	69.1	3338.4
3	0.09	70.2	0.19	520.4	30.06	0.24	12.5	33404.5
4	0.3	11.3	0.33	215.1	12.42	0.35	20.4	5287.1
5	0.36	20.7	0.38	41.7	2.41	0.39	23.8	1040.2
6	0.39	24.7	0.41	84.3	4.87	0.44	5.5	1893.1
7	0.45	0.2	0.48	48.9	2.82	0.51	8.3	1356.6
8	0.52	17	0.54	32.2	1.86	0.58	2	1075.9

Fig.5.13: HPTLC Fingerprint Profile of MVS at 366nm wavelength



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area
1	0	7.3	0.03	668.1	33.08	0.05	215.8	19589.2
2	0.05	216	0.06	224.6	11.12	0.07	200.8	4082.5
3	0.08	201.5	0.18	530.4	26.26	0.23	29.3	46849.1
4	0.28	27.2	0.32	279.1	13.82	0.34	42.9	7743.6
5	0.34	43.5	0.37	68.2	3.38	0.38	42.1	1912.4
6	0.38	42.9	0.4	135.9	6.73	0.44	1.2	3015.4
7	0.44	0.6	0.47	71.9	3.56	0.5	15.4	2419.1
8	0.51	15.7	0.54	41.7	2.06	0.58	2.2	1705.3

Fig 5.15: All tracks at 510 nm wavelength

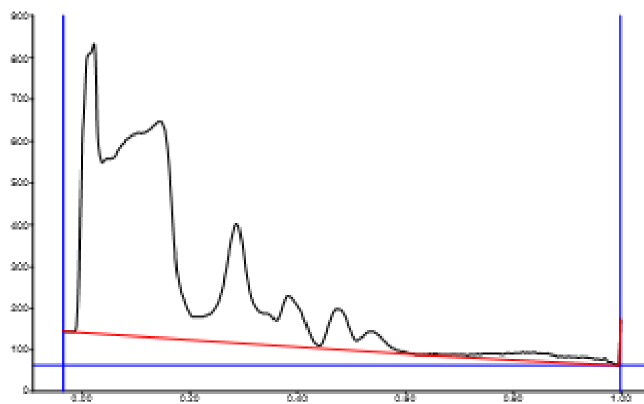


Fig 5.14: HPTLC Fingerprint Profile of MVS at 366nm wavelength

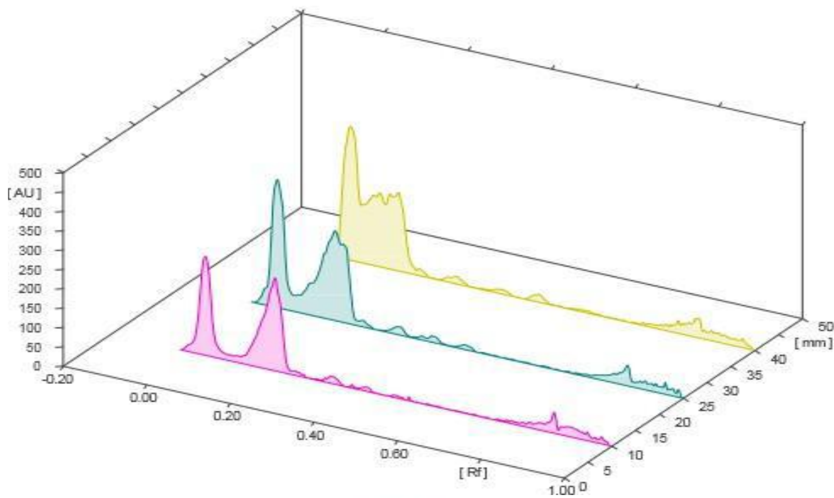
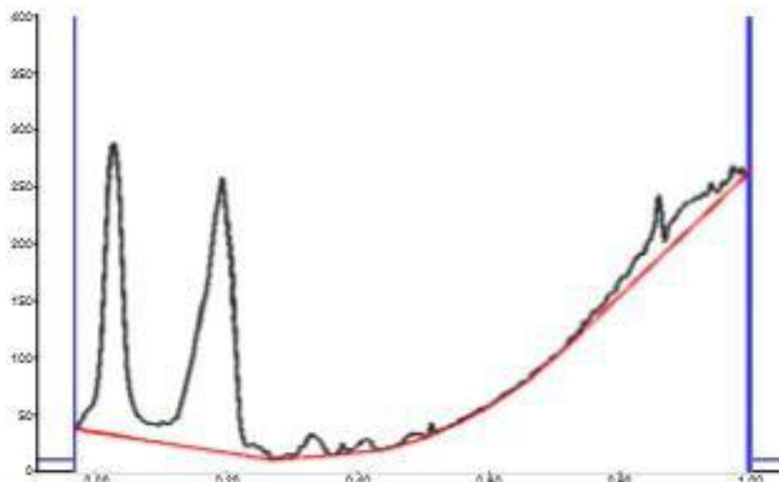


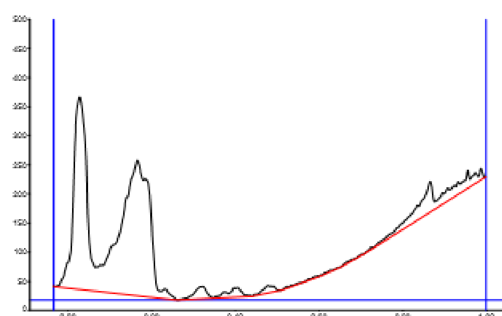
Fig 5.16: HPTLC Fingerprint Profile of MVS at 510nm wavelength.



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area
1	-0.02	1.8	0.02	693.5	38.95	0.04	411.4	21118.3
2	0.05	421.2	0.14	518.5	29.12	0.21	55.4	52055.7
3	0.22	57.2	0.29	284.2	15.96	0.34	74.9	14310
4	0.36	61.3	0.38	120.7	6.78	0.44	6.9	5114.8
5	0.44	7	0.47	97.2	5.46	0.51	24.9	3592.8
6	0.51	25.3	0.54	49.4	2.77	0.61	1.8	2176.6
7	0.97	12.2	0.97	17.1	0.96	0.99	2.8	207.6

Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area
1	-0.03	0.4	0.03	255.9	38.18	0.08	14.4	7768.3
2	0.11	16.7	0.19	240.6	35.89	0.23	9.1	11150.4
3	0.23	9.2	0.24	12.1	1.8	0.26	5.3	236.6
4	0.3	1.7	0.33	19.7	2.94	0.36	0	536.4
5	0.39	2.7	0.41	11.1	1.65	0.43	1.2	237.3
6	0.51	0.1	0.51	10.4	1.56	0.52	0.7	50.1
7	0.85	23.7	0.86	54.6	8.15	0.87	9.8	708.2
8	0.88	21.3	0.9	25.5	3.81	0.93	18.3	847.6
9	0.94	15.2	0.94	22.3	3.33	0.95	8.1	249.6
10	0.96	8.5	0.97	18.1	2.7	0.99	0	266.4

Fig.5.17: HPTLC Fingerprint Profile of MVS at 510nm wavelength

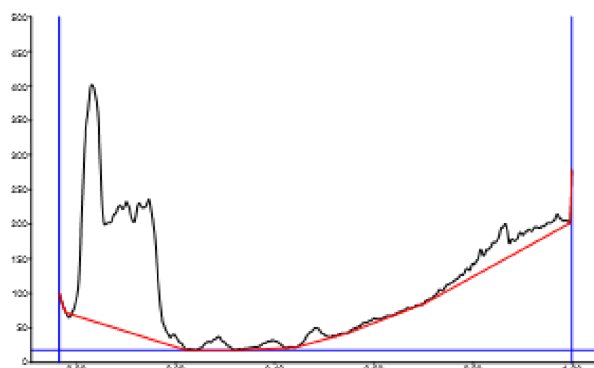


Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area
1	-0.03	0	0.03	331.3	42.73	0.07	40.9	10589.6
2	0.08	45	0.17	232.6	30	0.22	12	15824.3
3	0.22	12.1	0.23	16.8	2.17	0.26	0.3	315.4
4	0.27	0.8	0.32	21.3	2.75	0.35	0.8	642.1
5	0.38	6.9	0.4	16	2.07	0.43	2.4	390.8
6	0.45	1.5	0.48	12.8	1.64	0.5	1.2	335.8
7	0.82	15.1	0.87	52.9	6.82	0.88	12.8	1560.1

8	0.88	12.4	0.91	22.7	2.93	0.91	16.7	488
9	0.94	15.6	0.96	30.7	3.96	0.96	12.9	391.8
10	0.96	13.4	0.97	18.7	2.41	0.98	8.6	264.3
11	0.98	10.2	0.99	19.5	2.52	1	0.9	137.2

Fig.5.18: HPTLC Fingerprint Profile of MVS at 510nm wavelength

Track 3, ID: MV (20)



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area
1	-0.01	0.9	0.03	345.8	26.72	0.06	148.7	12073.3
2	0.06	149.4	0.09	182.4	14.1	0.09	178.6	5144.6
3	0.09	178.9	0.1	191	14.76	0.12	164.2	3580
4	0.12	165.3	0.13	193.9	14.98	0.13	188.1	2779.1
5	0.13	188.3	0.15	203.2	15.71	0.19	12.1	5389.4
6	0.19	12.9	0.2	17.9	1.38	0.22	0	277.5
7	0.24	0.1	0.29	19.7	1.52	0.32	0.1	659.9
8	0.35	2.7	0.4	12.4	0.96	0.42	0.6	415
9	0.45	0.7	0.48	20.5	1.59	0.51	1.2	592.1
10	0.8	16.4	0.82	33.2	2.57	0.82	21.8	428.3
11	0.83	26.3	0.87	50.7	3.92	0.89	18.9	1600.2
12	0.96	16.1	0.97	23.2	1.79	0.99	8.1	385.3

DISCUSSION

In the present study *Madhurantak vati* MVS was prepared in three batches. For the preparation of *Madhurantak vati* practicals like *Guduchi satva* preparation of *Tulsi swarsa,* powdering of raw drugs and *Bhavana* were carried out. Preparation of *Guduchi satva* According to the A.F.I *Satva'* is aqueous extractable solid substance collected from herbal Plant. Word *"Guduchi Satva"* For the very first time mentioned in *"Rasendra Mangalam"* in context of *"Panchamruta Ras."* due to its usefulness it is incorporated in the various preparations like *Panchamruta Ras*. *Guduchi satva* preparation has been mentioned in *Yoga Ratnakar*, *Rasa Yoga Sagar, Siddhayoga Sangraha, Dravyaguna vigyana* etc. All these texts have mentioned different methods of preparation. According to *Yoga Ratnakar Guduchi* stem was cut into small pieces and triturated well in water then it was filtered through cloth and supernatant liquid is decanted and *Shankhanibha* sediment is collected the quantity of liquid and overnight soaking is not stated, in this reference. *Shankhanibha* reveals the colour of *Satva* i.e., White colour. According to *Siddha Yoga Sangraha Guduchi* stem is cut into small pieces and pounded well then it was kept for overnight soaking in water. Next day it was filtered through cloth, allowed for sedimentation, supernatant liquid is decanted and sediment was collected. In this reference soaking was mentioned but the volume of liquid is not mentioned author advised to take the water quantity sufficient. According to *'Rasa Yoga Sagar 'Guduchi satva'* is called as *Guduchi modak. 'Rasa Yoga Sagar'* has also not mentioned the quantity of water

but it stated that the *Kalka* should be made so fine by trituration & the colour of *Satva* is described as *Shubhrakhandanibha.* In commentary of *Bhavaprakash* four times of water for soaking and time of soaking (12-24 hrs) was also mentioned. In the present study *Guduchi satva* was prepared as per the reference of *Dravyaguna vigyana* by *Yadavji Trikamji Acharya*. Three batches of *Guduchi satva* were prepared. For each batch 5 kg of fresh *Guduchi* was utilized. Five kg of *Guduchi* stem pieces were pounded in *Khalwa* until fibers of stem got separated and the material becomes sticky. Four times R O Water (20 litres) was added into it and rubbed well with hands thoroughly and kept overnight for soaking. Next day the material was again well rubbed, until the sliminess disappears into the same water. Then fibers were removed and the remaining material was strained through clean cloth.

The strained material was collected in a flat bottom stainless steel container and allowed for the sedimentation and then liquid portion was removed by decantation process. Repeated washing and decantation were done, for 15 times. Then clear white starch was obtained. And then liquid portion was removed by decantation process. Repeated washing and decantation were done, for 15 times. Then clear white starch was obtained. The whole process took 7 days for completion. Decantation was done repeatedly to get pure white coloured starch. Percentage yield of *Guduchi satva* of three batches were 2.4%, 1.8% and 0.61% respectively. Yield was different for the three batches. Earlier scholars worked in the pharmaceutical aspect of *Guduchi satva* reported quantitative variation in the final product. These variations may be due to difference in the species, size of the stem, collection time and levels of the maturity of the plant. The yield of the *Guduchi Satva* greatly depends on the size, environment, association and cellular activities. In the present study more yield of *Guduchi satva* was obtained in practical one which was carried out in the month of February. The next two batches prepared in the month of March and April yielded less starch. Yield of GS is found to be more in January-February (*Shishira*); and least in May-June (*Grishma*). This may be due to impact of different seasons on cellular proliferation and plant maturity. Colour of *Guduchi satva* of all the three batches were white in colour and all the three samples were tasteless. For preparation of *Vati* Powdered *Vanslochan* was taken in a *Khalva-yantra* and *Mardana* was carried out for few minutes. Then fine powders of *Lavang* and *Kasani Beej* were added one by one and triturated it for few minutes. The remaining fine powders of *Guduchi Satva, Tulsi Patra, Dhanyak,* and *Ela* were added and triturated for few minutes till it attained a uniform mixture. Finally, this uniform mixture was levigated with required quantity of *Tulsi patra swarasa* till it attained semi solid state. *Bhavana* with *Tulsi Patra Swarasa* was repeated two more times. Similarly other batches were also prepared. Total weight of powders were 110g. An average increase in weight of 12.43 g was observed after three *Bhavana* with *Tulsi patra* in case of MVS.

Showing physico chemical analysis of MVS

S.No	Parameter	Result
		MVS (Mean value)
1.	Loss on Drying at 105 ^{0}c	9.26%
2.	Total Ash	17.60%
3.	Acid Insoluble Ash	6.83%
4.	Water Soluble Extractive Value	5.73%
5.	Alcohol Soluble Extractive Value	8.57%
6.	pH value (10%aqueous extract)	5.63%
7.	Hardness	6kg
8.	Disintegration Time	45 min
9.	Uniformity of weight	uniform

HPTLC is an analytical technique and efficient tool for quantitative and qualitative analysis of compounds. These studies are among the key identity tests in most Pharmacopoeial monographs and Pharmacopoeial standards are the basic need for QC of particular formulation. In the present study visualization was done at 254, 366 and 510 nm. For MVS At 254nm 16 peaks were observed in track one,12 peaks in track 2 and 11 peaks in tracks 3. Maximum area were found in 7 peaks of track 1 having RF values 0.02, 0.07, 0.12, 0.19, 0.23, 0.41 and 0.56. In track 2 the rf values 0.03, 0.07, 0.18, 0.22, 0.32, 0.40, 0.56 had maximum area and in track 3 rf values 0.02, 0.05, 0.08, 0.29, 0.29, 0.40, 0.57 had maximum peak area. For MVS At 366nm 8 peaks were observed in track one, 8 peaks in track 2 and 7 peaks in track 3. Maximum area were

found in 4 peaks of track 1 having RF values 0.02,0.06, 0.19 and 0.33. In track2 the rf values 0.03, 0.06, 0.18, 0.32 had maximum area and in track 3 rf values 0.02, 0.14, 0.29, 0.38 had maximum peak area. For MVS At 510 nm 10 peaks were observed in track one, 11 peaks in track 2 and 12 peaks in track 3. Maximum area were found in 2peaks of track 1 having RF values 0.03, and 0.19. In track2 the rf values 0.03, 0.17 had maximum area and in track 3 rf values 0.02, 0.14, 0.29, 0.38 had maximum peak area.

CONCLUSION

Percentage yield of *Guduchi satva* of three batches were 2.4%, 1.8% and 0.61% respectively. In the present study more yield of *Guduchi satva* was obtained in the experiment which was carried out in the month of February. The next two batches prepared in the month of March, April yielded less starch. Physico chemical analysis of MVS showed an average moisture content of 9.26% and 8.2%, Ash value 17.60% and 17.78%, Acid insoluble ash 6.83% and 5.87, Alcohol soluble extractive value 8.57% and 10.15%, water soluble extractive value 5.73% and 14.97 %, pH 5.63 and 5.83, Hardness 6, DT 45 minutes and 30 minutes respectively.

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