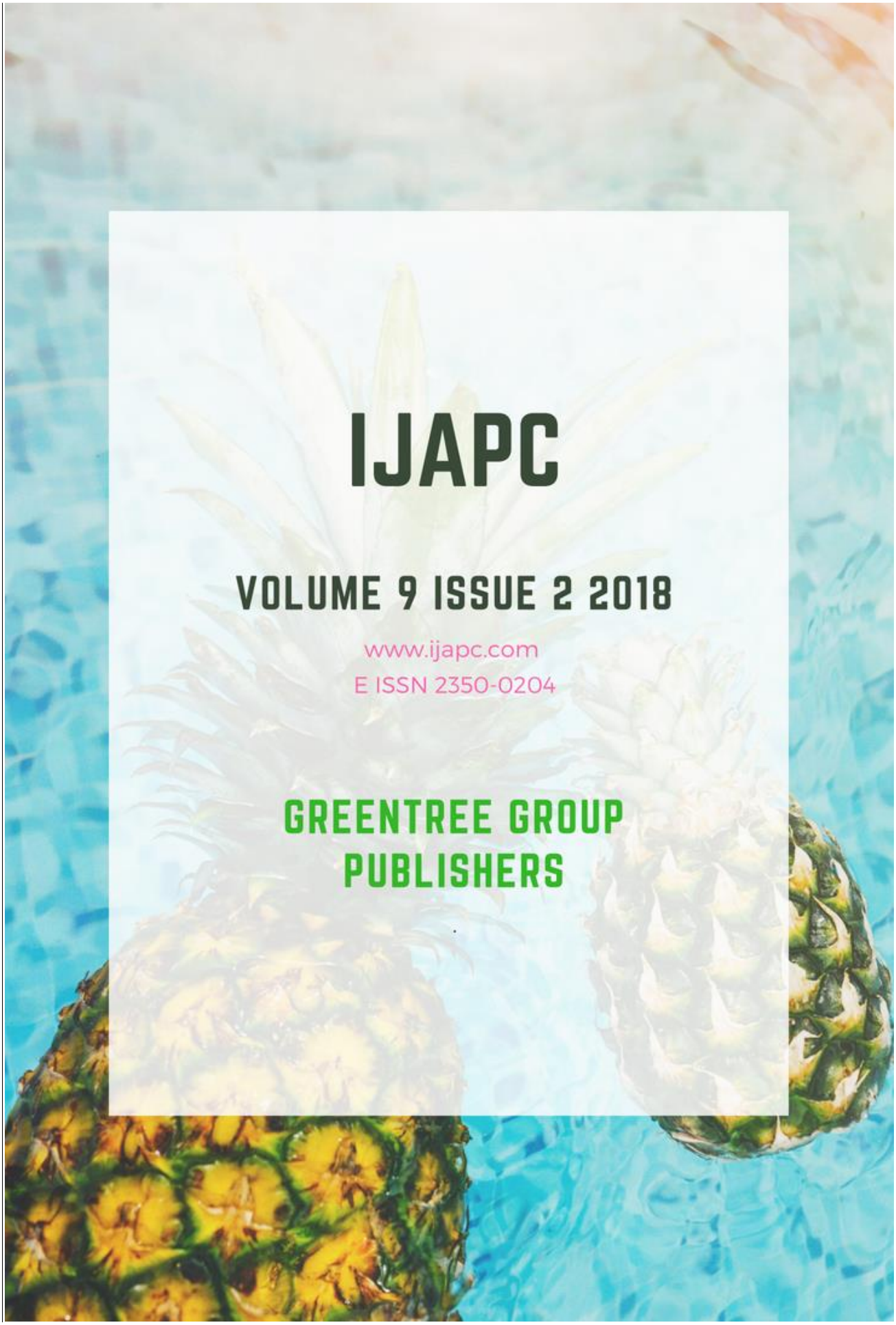

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Pharmaceutical and Analytical Study of *Pama-Dadru-Vicharchikahara Lepa*

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ABSTRACT

Lepa Kalpana is one among the *bahiparimarjana chikitsa* which is gaining calibre in the present era especially in the management of skin ailments. *Pama-Dadru-Vicharchikahara Lepa* is an external medicament containing *Shuddha Hingula, Shuddha Gandhaka, Shuddha Sindura, Chakramarda, Kushta, Vidanga, Hemaksheeri* in equal part. Each drug acts as a *vatakaphahara* and has the quality of *kushtaharatva.* The above ingredients are mixed to form a homogenous mixture and *Bhavana* is given with *dhattura patra, nimba patra* and *Tamboola patra swarasa* for one time each. Then the Physico-chemical analysis of *Pama-Dadru-Vicharchikahara Lepa* before and after *Bhavana* was done in order to know the changes in the chemical composition, nature of the drug & physico-chemical changes in the properties of the drug.

KEYWORDS

Pama-Dadru-Vicharchikahara Lepa, XRD, FTIR, SEM-EDAX, Particle size

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INTRODUCTION

In *Ayurveda* the treatment modality is divided into *Antahparimarjana chikitsa* and *Bahirparimarjana chikitsa*. Among which *bahiparimarjana chikitsa* is intended only for external use. In *Ayurveda* different forms of external applications are described for the convenience of the treatment of different diseases like *lepa, upanaha, malahara* etc. *Lepa* is considered to be the parallel line of management in the skin ailments. *Pama-Dadru-Vicharchikahara Lepa*as the name suggests is helpful in treating the diseases like *Pama, Dadru* & *Vicharchika.*

Now-a-days more health conscious people throughout the globe and increasing the commercialization of pharmaceutical industries have invited the admixing with genuine drugs. The analytical parameters are able to trace out any admixing (if done) with genuine drugs. They also help in ensuring the safety and accuracy of the drug. These genuine check-up are possible with complete analysis of drugs under pharmacognostical and phytochemical investigation. The Physico-chemical analysis of *Pama-Dadru-Vicharchikahara Lepa*[1]*(PDVL)*before *Bhavana(PDVL-BB)*and after *Bhavana (PDVL-AB)* was done in the present study.

MATERIALS & METHODS

PHARMACEUTICAL STEPS INVOLVED IN PREPARATION OF*PAMA-DADRU-VICHARCHIKAHARA LEPA:*

1. Preparation of homogenous mixture of *Pama-Dadru-Vicharchikahara Lepa* ingredients as mentioned in Table No -1.

2. 1 *bhavana* each with *dhattura patra, nimba patra* & *tamboola patra swarasa.*

Procedure:

Table 1 Showing the ingredients and their Quantity of *Pama-Dadru-Vicharchikahara Lepa*

Ingredients	Quantity (in gms)
Shuddha Hingula	1170
Shuddha Gandhaka	1170
Shuddha Girisindura	1170
Chakramarda	1170
Swarnaksheeri	1170
Kushta	1170
Vidanga	1170

Method - *Bhavana*

Equipments - *Khalva Yantra*, Spoon, *Tula yantra.*

Extraction of Dhattura Patra Swarasa:

Fresh and matured leaves of *dhattura* were collected and washed to remove the impurities. Later the leaves were taken in a mixer jar and grinded well into a paste. Then the paste was placed on a two-folded Cora cloth and squeezed to obtain fresh *swarasa.*

Extraction of Nimba Patra Swarasa:

Fresh and matured leaves of *Nimba* were collected and washed to remove the impurities. Later the leaves were taken in

a mixer jar and grinded well into a paste. Then the paste was placed on a two-folded Cora cloth and squeezed to obtain fresh *swarasa.*

Extraction of Tamboola Patra Swarasa:

Fresh and matured leaves of *Tamboola* were collected and washed to remove the impurities. Later the leaves were taken in a mixer jar and grinded well into a paste. Then the paste was placed on a two-folded Cora cloth and squeezed to obtain fresh *swarasa.*

Procedure:

- *Shuddha Gandhaka*[3]as shown in Figure 1,2,3 and *Shuddha Girisindura*[4]as shown in Figure 4,5 was taken in a clean khalwa yantra and then *Shuddha Hingula*[2] as shown in Figure 6,7 was added and *mardana* was done for 2 ½ hours to form a homogenous mixture.

Fig 1 Raw Gandhaka kept on vastra

Fig 2 Kurmaputa given

Fig 3 Shuddha Gandhaka

Fig 4 Girisindura shodhana

Fig 5 Shuddha Girisindura

Fig 6 Hingula shodhana with Nimbu swarasa

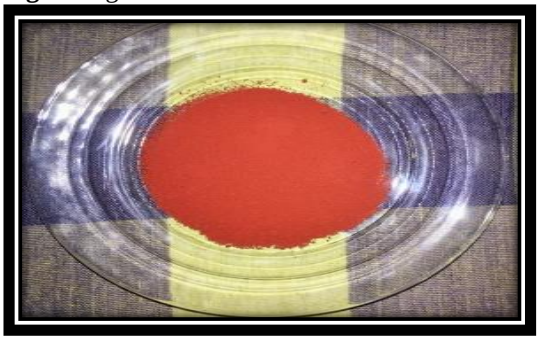


Fig 7 Shuddha Hingula

- To this mixture the *vastragaalita choornas* of *Kushta, Vidanga, Chakramarda and swarnaksheeri* was added and triturated for 2 hours to form a homogenous mixture.
- Then q.s of *Dhattura patra swarasa* was added as shown in Figure 8 in such a way that the whole mixture was immersed in the *swarasa* and trituration was carried out for 4 ½ hours until the mixture dried.
- After complete drying of *dhattura swarasa bhavita* mixture, it was again added with q.s of *nimba patra swarasa* as shown in Figure 9 and trituration was carried out for 4 ½ hours until the mixture dried.
- After complete drying of *Nimba swarasa bhavita* mixture, it was again added with q.s of *Tamboola patra swarasa* and trituration was carried out as shown in Figure 10for 4½ hours until the mixture dried.
- The same procedure was carried out for all the 22 batches by taking 45-60g of each ingredient in each batch.

Observation:

The colour of the *PDVL* mixture before *Bhavana* was light brown which turned into dark brown after *Bhavana* as shown in Table 2 & Figure 8, 9, 10. During trituration characteristic odour of *dhattura, nimba* and *tamboola* was felt respectively.

Table 2 Showing Observations during the Bhavana of PDVL

Bhavana dravya used	Amount of bhavana dravya used	Observations
Dhatturapatra swarasa	13,370 ml	Dhattura Smell was appreciated. Colour Changed to Light brown to dark brown Softness- ++
Nimba patra swarasa	10,225 ml	Nimba Smell was appreciated. Colour Changed to Light brown to dark brown Softness- ++
Tamboola patra swarasa	9,005 ml	Tamboola Smell was appreciated. Colour Changed to Light brown to dark brown Softness- ++

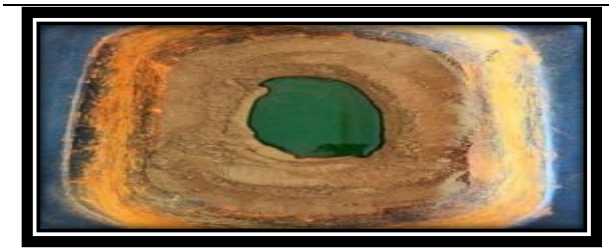


Fig 8 Dhattura swarasa Bhavana for PDVL mixture

Fig 9 Nimba Swarasa Bhavana

Fig 10 Tamboola swarasa Bhavana for PDVL

- During the initial stage of *Bhavana*, trituration was easier which turned to be difficult after an hour of trituration.
- After one hour of *Bhavana* the mixture turned out to be sticky in nature.
- *Bhavana* of *dhattura patra swarasa* was slightly difficult when compared to the other two drugs.
- Each Bhavana was carried out approximately for 4 ½ hours.
- The dried mixture after all the 3 *bhavanas* had a characteristic odour which was slightly irritant in nature.
- The colour of the *Pama-Dadru-Vicharchikahara Lepa* final product was mud colour as shown in Figure 11.

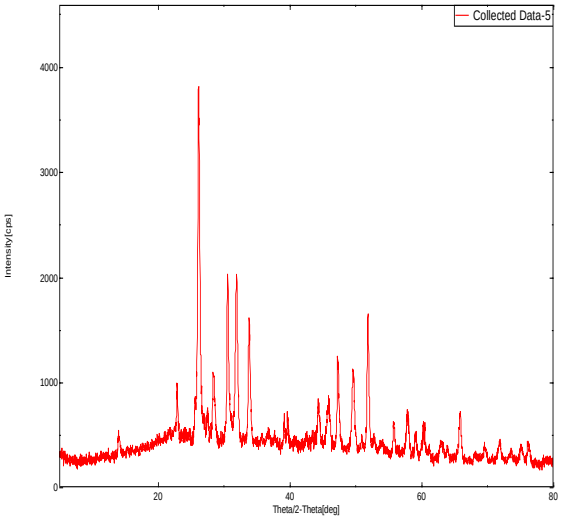
Precautions:

- Clean *Khalva yantra* was used.
- Fresh *Dattura patra, nimba patra* and *tamboola patra* was collected and the *swarasa* extracted was used for each *Bhavana.*
- Fresh *Swarasa* was added daily till the *PDVL* mixture was completely immersed.
- *Bhavana* was done without vigorous movements of *Peshani* to avoid the spilling of the product out of *Khalva.*

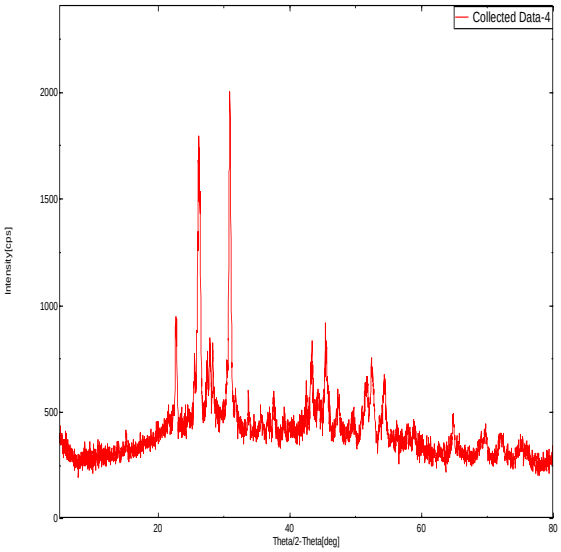
Table 3 Showing Pharmaceutical Results of *PDVL*

Result	Grams
Initial weight of *PDVL* mixture	8,190
Weight of *PDVL* mixture after *Bhavana*	9,136
Total Gain after *bhavana*	1,186

- XRD peaks of *PDVL-BB* &*PDVL-AB* samples which were compared with standard D-space JCPDF values Mercury Oxide (HgO) in Hexagonal, Lithargite (PbO) in Tetragonal, Plattnerite confirmed the presence of Metacinnabar (HgS) in Cubic, Sulfur (S) in Trigonal, (PbO_2) in Tetragonal, Lead Oxide (Pb_2O_2) in Monoclinic, Minimum Low (Pb_2O_4) in Orthorhombic crystal system as shown in Graph No 1 & 2.



Graph 1 Peaks of *PDVL-BB* XRD



Graph 2 Peaks of *PDVL-AB* XRD

DISCUSSION

Pharmaceutical study:

Shuddha Hingula, Shuddha Gandhaka and *Shuddha Girisindura* are added to *khalvayantra* and *mardana* is done to form a homogenous mixture. Then the *choornas* of *Kushta,Vidanga, Chakramarda* and *swarnaksheeri* are added and *mardana* is done. To this prepared mixture *Bhavana* is given with the swarasa of *Dhattura patra, Nimba patra* and *Tamboola patra* each one time.

Table 4 Showing Organoleptic & Physico-chemical analysis of *PDVL*

Parameters	***PDVL-BB***	***PDVL-AB***
Colour	Thick paste like	Mud coloured
Touch	Odourless	Thick paste like
Odour	0.90%	Odourless
Loss on Drying at 105^0c	0.90%	2.50%
pH	5.23	6.47
Spreadability	3.56 gm-cm/s	5.94 gm-cm/s
Viscosity	2.94	3.10
Mercury	2.10	1.91
Free Mercury	Nil	Nil
Mercurous Mercury	00.10%	00.28%
Mercuric Mercury	2.00%	1.63%
Sulphur	4.27%	3.27%
Free Sulphur	00	00
Sulphide	4.21%	2.95%
Sulphate	0.06%	0.32%
Lead	45.90%	38.90%

Girisindura was tested for its composition as its pure form is not available frequently using SEM-EDAX which showed the presence of 89.90% Lead, 6.27% Mercury and 4.33% oxygen. This composition suggests that the taken sample is *nagasindura* which also has a reference of its usage externally. Hence in this study the same sample was taken

These 3 drugs have *Tikta, kashaya rasa, ruksha, teekshna guna, ushna veerya* which helps in alleviating *kapha* and *vata dosha*.This may be the rationale for using these 3 drugs as *Bhavana dravyas.*

Analytical Study:

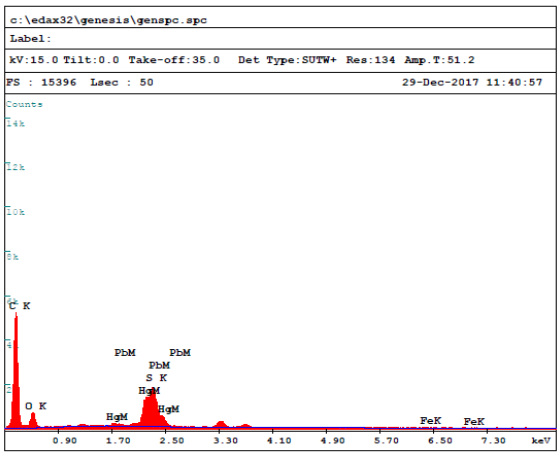
- There was 11.55% gain in the weight during the pharmaceutical preparation of the drug i.e initial weight of the drug before bhavana was 8,190g which was increased to 9,136g after Bhavana as shown in Table 3.
- The pH of *PDVL-BB&PDVL-AB* is found to be 5.23 & 6.47 as shown in Table 4 respectively. Our skin has a thin, protective layer on its surface, referred to as the acid mantle. This acid mantle is made up of sebum excreted from the skin's sebaceous glands, which mixes with lactic and amino acids from sweat to create the skin's pH, ideally should be slightly acidic

at about 5.5.If the drug is too alkaline or too acidic it breaks the acid mantle and results in various skin problems. The pH of *PDVL-AB* is 6.47 indicating it is not harmful for the application on skin as it maintains the acid mantle of the skin.

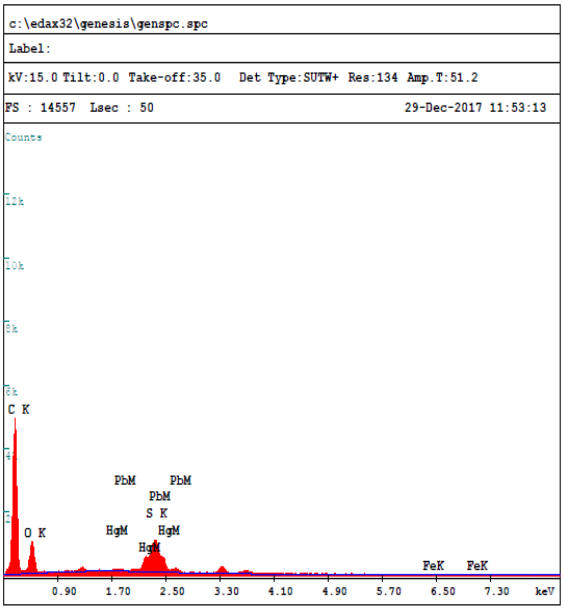
- Viscosity of *PDVL-BB* is 2.94 and *PDVL-AB* is 3.10 as shown in Table 4. Viscosity is the measure of resistance of fluid to gradual deformation of shear stress. Low viscosity means the amount of friction in between the layers is less. In case of oils due to the presence of fatty acids the viscosity is higher. In *PDVL* there are no such fatty acids present and also the bonding between the molecules might be free and not like that of the bondage between fatty acids. Also the media used for mixing is water and even water is having lower viscosity. This might be the reason for low viscosity in *PDVL*.
- Spredability of *PDVL-BB* and *PDVL-AB* is 3.56gm-cm/s & 5.94gm-cm/s as shown in Table 4. The common property of semisolid preparation is the ability to cling to the application surface for a reasonable period of time before they are washed off. This property is known as Spreadability. The spreading nature of *PDVL-AB* is more compared to *PDVL-BB*. This might be because of the Bhavana given which has induced the nature of spreadability into the drug.
- Mercuric mercury and mercurous mercury in *PDVL-BB* & *PDVL-AB* is 0.10% & 2.0%, 0.28% & 1.63% as shown in Table 4. The reduced percentage of Hg shows conversion of element into compound form, because Hg acts as a catalyst and helps in complete conversion of metal into compound form. The % of lead as shown in table 4 in *PDVL-BB* &*PDVL-AB* is 45.90% and 38.90%. This indicates the product confirmation in *PDVL*.
- The SEM-EDX reports shows decrease in the percentage of Mercury, Sulphur and increase in Lead, oxygen, iron & Carbon as shown in Table 5 & Graph 3,4.

Table 5 Showing Comparative SEM EDX[6] results of PDVL-BB & PDVL-AB

PDVL-BB		**PDVL-AB**	
Element	**Mass %**	**Element**	**Mass %**
Hg	16.07	Hg	7.00
S	3.53	S	1.78
Pb	8.55	Pb	12.51
O	8.50	O	14.56
C	62.99	C	63.68
Fe	0.37	Fe	0.47



Graph 3 Depicting EDAX of *PDVL-BB*



Graph 4 Depicting EDAX of *PDVL-AB*

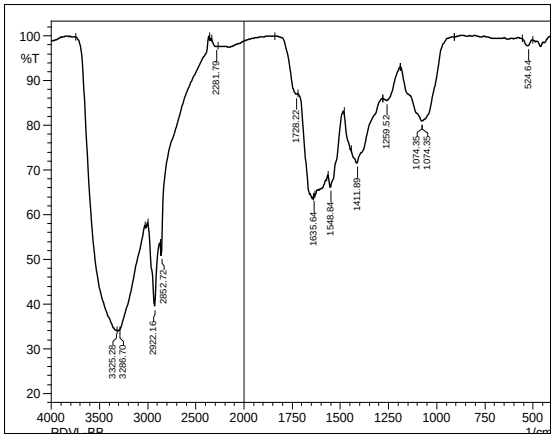
- The drug shows the presence of organic compounds with their functional groups like Alcohol, Amine, Alkene, Alkane, Aromatic, Carbonyl, Alkyne, Alkyl Halide as shown in Table 6, 7 & Graph 5, 6.
- The increase in particle size after Bhavana as shown in the Table 8 may be due to the Bhavana of the drug with the swarasa of organic material as the particles of organic material will not reduce to nanometre scale.
- ***FTIR[7]:***

Table 6 Showing FTIR Peaks of PDVL-BB

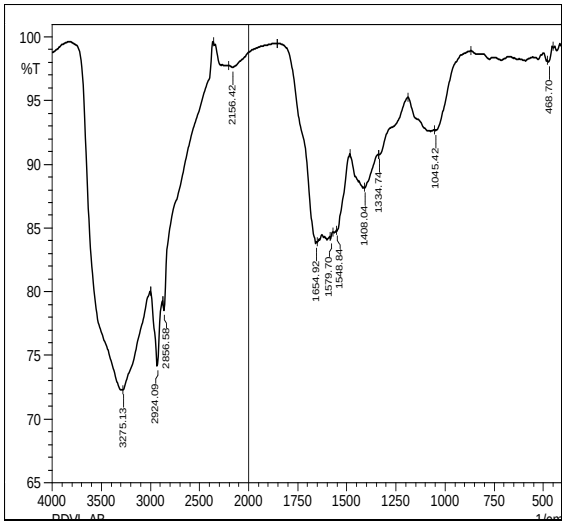
Sample – PDVL-BB				
Sample peaks Cm^{-1}	**Standard Peaks Cm^{-1}**	**Specific type of Bond**	**Bond**	**Functional groups**
3325.28	3200-3600	Strong, Broad	O-H (stretch, H-bonded)	Alcohol
3286.70	3200-3600	Strong, Broad	O-H (stretch, H-bonded)	Alcohol
2922.16	2850-3000	Strong	C-H(stretch)	Alkane
2852.72	2850-3000	Strong	C-H(stretch)	Alkane
1782.22	1670-1820	Strong	C=O(stretch)	Carbonyl
1635.64	1620-1680	Variable	C=C(stretch)	Alkene
1548.84	1400-1600	medium-weak, multiple bands	C=C(stretch)	Aromatic
1411.89	1350-1480	variable	-C-H(bending)	Alkane
1259.52	1080-1360	medium-weak	C-N (stretch)	Amine
1074.35	1000-1400	Strong	C-F(stretch)	Alkyl Halide
524.64	500-600	Strong	C-Br(stretch)	Alkyl Halide

Table 7 Showing FTIR Peaks of PDVL-AB

Sample – PDVL-AB				
Sample peaks Cm^{-1}	**Standard Peaks Cm^{-1}**	**Specific type of Bond**	**Bond**	**Functional groups**
3275.13	3200-3600	Strong, Broad	O-H (stretch, H-bonded)	Alcohol
2924.09	2850-3000	Strong	C-H(stretch)	Alkane
2856.09	2850-3000	Strong	C-H(stretch)	Alkane
2156.42	2100-2260	variable, not present in symmetrical alkynes	–C≡C–	Alkyne
1654.92	1620-1680	Variable	C=C(stretch)	Alkene
1579.70	1400-1600	medium-weak, multiple bands	C=C(stretch)	Aromatic
1548.84	1400-1600	medium-weak, multiple bands	C=C(stretch)	Aromatic
1045.42	1000-1400	Strong	C-F(stretch)	Alkyl Halide



Graph 5 *PDVL-BB*



Graph 6 *PDVL-AB*

- In present study HPTLC as shown in Table 9, 10 & Graph 7, 8, 9 of the drug mixture is compared with the final product. The final product shows the presence of various herbal ingredients present in the formulation and hence shows that the preparation is not adulterated.

CONCLUSION

Pama-dadru-vicharchikahara Lepa is one among the *Lepa Kalpana*. It is also known as *kandvadi lepa* as mentioned by few authors. In total there was 11.55% gain in the weight during the pharmaceutical preparation of the drug.

Chemically *Pama-Dadru-Vicharchikahara Lepa* is considered as a compound of Metacinnabar, Sulfur, Mercury Oxide, Lithargite, Plattnerite, Lead oxide, Minium low with the organic compounds with their functional groups like Alcohol, Amine, Alkene, Alkane, Aromatic, Carbonyl, Alkyne, Alkyl Halide.

Particle Size[8] Results:

Table 8 Showing Particle Size Results of PDVL-BB & PDVL-AB

	Effective Diameter(nm)		
Sample	**Mean diameter (nm)**	**Standard error**	**Effective diameter (nm)**
PDVL-BB	546.6	4.4	542.7
PDVL-AB	1007.8	71.7	981.2

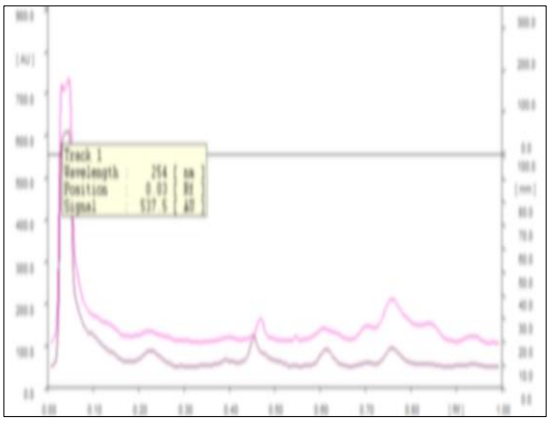
HPTLC[9] results:

Table 9 Showing Rf values of PDVL-BB & PDVL-AB

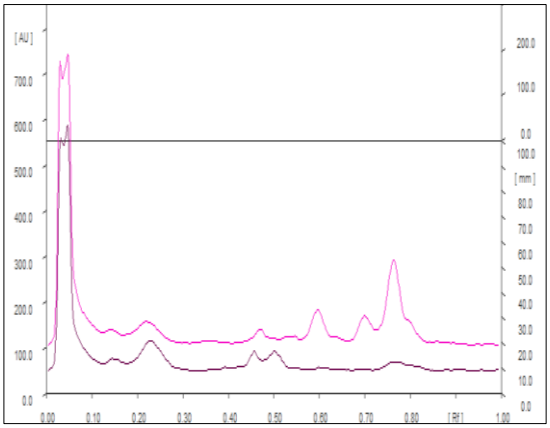
At 254nm		**At 366nm**	
PDVL-BB	**PDVL-AB**	**PDVL-BB**	**PDVL-AB**
-	-	0.12 (F. blue)	0.12 (F. blue)
0.38 (Green)	-	-	-
-	-	-	0.42 (F. red)
-	-	0.45 (F. red)	0.45 (F. red)
-	-	0.50 (F. red)	-
-	-	0.55 F. blue)	0.55 (F. blue)
0.60 (Green)	-	0.60(FL. red)	0.60 (FL. red)
-	-	0.63(F.yellow)	-
0.66 (Green)	-	0.66 (F. pink)	0.66 (F. yellow)
-	-	0.68 (F. red)	-
-	-	0.78 (F.yellow)	0.78 (F. yellow)
-	0.87 (Green)	0.87 (F. yellow)	0.87 F.yellow)

Table 10 Showing Rf values of PDVL-BB & PDVL-AB **post derivatisation**

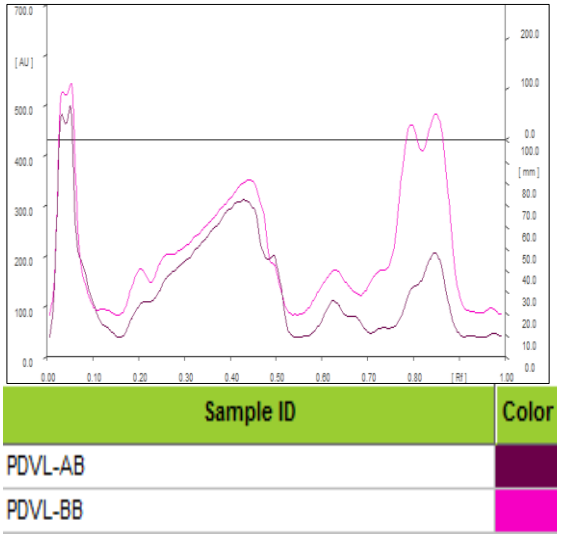
PDVL-BB	PDVL-AB
0.42 (Purple)	0.42 (Purple)
0.52 (Purple)	0.52 (Purple)
0.68 (Purple)	0.68 (Purple)
0.73 (Purple)	0.73 (Purple)



Graph 7 3D Chromatogram at 254nm



Graph 8 3D Chromatogram at 366 nm



Graph 9 3D Chromatogram at 620nm

REFERENCES

1. Acharya Sharangadhara. Sharangadhara Samhita. Annoted with Deepika Commentary by Dr.Brahmanand Tripathi. Varanasi: Published by Chaukambha Surbharti Prakashan; 2013. Uttarakhanda, 11th Chapter, Verses 51 – 53, 262 pp.

2. Pt. Dwiwedi Vishwanath. Rasendra Sambhava. Reprint. Varanasi: Krishnadas Academy; 1997. 2nd Patala, Verse 71, 101 pp

3. SharmaSadananda. Rasa Tarangini. Edited by P. Kashinath Shastri.11th Edition. Varanasi: Motilal, Banarasidas Publication; 2004. 8th Chapter, Verse 13-17, 177pp.

4. Acharya Vaghbata. Rasaratna Samucchaya. Commentary by Prof. Dattatreya Ananta Kulkarni. New Delhi: Meharchand Lachmandas Publications; 1998. 1st Part, 3rd Chapter, Verse 137-138, 67 pp.

5. www.unm.edu/xrd/xrdbasics.pdf.

6. https://en.wikipedia.org/wiki/Energy-dispersive_X-ray_spectroscopy

7. www.wcaslab.com,mmrc.caltech. edu/FTIR/FTIRintro.pdf.

8. www.Zeta potential analysier.pdf.

9. Kasture A.V. Mehadik R. et.al. PharmacopiealAnalysis.Pune: Nirali Prakashan; 2002.vol 5,13-18pp.