

COMPARATIVE PHARMACEUTICO ANALYTICAL STUDY OF *MADHUTAILIKA BASTI* FORMULATION PREPARED BY CLASSICAL AND MODIFIED METHODS

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ABSTRACT

Context: The formulation of *MadhutailikaBasti* comprises of *Madhu* (honey), *Lavana* (salt), *Taila*(oil), *Kalka*(paste) & *Quatha* (decoction). These ingredients are not easily miscible with each other. As per classics they are made miscible by adding the ingredients in sequence and mixing with the help of churner. But in large scale work it is replaced by mixer or edge runner mill. **Aim and objectives:** To do the preparation of *Madhutailikabasti* formulation by using classical and modified methods. To do physico-chemical analysis and stability study of *Madhutailikabasti* formulation prepared by classical and modified methods and to compare their results. **Methodology:** 6 samples of *Madhutailikabasti* formulation were prepared and subjected for physico-chemical and stability study. **Results:** Physico chemical analysis show that better rate of absorption in samples prepared with classical method than modified methods. Based on rate of sedimentation it was observed that classical method of *Madhutailikabasti* formulation is having more stability than modified methods. **Conclusion:** Classical method of preparation of *Madhutailikabasti* with serial order of mixing the ingredients using churner is more stable and would be better absorbed compared to other modified methods.

Keywords: *MadhutailikaBasti*, Classical method, Modified method, Stability study.

INTRODUCTION

'*MadhutailikaBasti*', a type of '*Aasthapanabasti*' also termed as '*NiruhaBasti*'. The formulation of *MadhutailikaBasti* comprises of *Madhu*, *Lavana*, *Taila*, *Kalka* & *Quatha*¹. These ingredients are not easily miscible with each other. But to get the optimum therapeutic action from the formulation homogeneous mixture of ingredients is necessary. References regarding serial order of mixing the ingredients are available in classics as *madhu* and *saindhava* followed by *taila*, then *kalka* after that *kashaya*². Homogeneity of final mixture is assessed with certain features known as *su-yojithaniruhalakshanas*. They are, non-spreading, not remain smeared, not retaining its markings when it is placed on the palm³. Importance towards methodology of mixing might be to maintain these features i.e. Physical stability of the mixture for a longer duration. Manual method of mixing is adopted during the addition of each ingredient to get the homogeneous mixture. As this process needs creation of vigorous shear force within the mass material, usage of sophisticated equipment for mixing may make the preparation processing easier and convenient, especially in large scale work. Hence the study was conducted on *Madhutailika-Basti* formulation prepared through classical and modified methods. Samples were subjected for physico chemical analysis and stability study.

AIMS & OBJECTIVES:

a) To do the preparation of *Madhutailika-Basti* formulation by using classical and modified methods.

- b) To do physico-chemical analysis and stability study of *Madhutailikabasti* formulation prepared by classical and modified methods.
- c) To compare the results of physico-chemical analysis and stability study of *MadhutailikaBasti* formulation prepared by classical and modified methods.

MATERIALS AND METHODS:

Source of Data:

- a) Medicinal source:
- Raw drugs required for preparation collected from SDM Ayurveda Pharmacy Udupi
 - Preparation of *MadhutailikaBasti* formulation was carried out in-Rasashastra and Bhaishajyakalpana Practical Hall, SDM college of Ayurveda Udupi.
- b) Analytical source:
- Formulation was subjected to physico-chemical analysis and stability study in SDM Centre for research in Ayurveda and Allied sciences Udupi.

METHODOLOGY:

In the present study 6 samples of *MadhutailikaBasti* are prepared with same ingredients taken in same quantity but with different methods.

Reference for the study is taken from *Bhavaprakasha*⁴, which include following ingredients:

- *Madhu*: 50ml
- *Saindhavalavana*: 3.125g
- *Tilataila(Sesamumindicum DC)*: 50ml

- *Shathapushpakalka (AnethumsowaKuruz)* : 6.25g
- *Erاندamulaquatha (Ricinuscommunis Linn.)*: 200ml

Preparation of *MadhutailikaBasti* formulation with following instruments as mentioned below:

- Sample 1: Mixing the ingredients in sequence using mixer
- Sample 2: Mixing the ingredients all together using mixer
- Sample 3: Mixing the ingredients all together using edge runner mill.
- Sample 4: Mixing the ingredients in sequence using edge runner mill.
- Sample 5: Mixing the ingredients in sequence using churner
- Sample 6: Mixing the ingredients all together using churner

Among the above samples 5th and 6th samples were prepared using classical method while first 4 samples are the modified methods.

Modified methods:

Sample 1: Mixing the ingredients in sequence using mixer

Procedure involved:

- Initially *madhu* and *saindhavalavana* are taken in the mixer.
- Mixing is continued until *lavana* is completely dissolved.
- Then *tilaitaila* is added and again mixed for specific time period. Here oil layer should become minute globules, mixture should become homogeneous.

- It is followed by adding of *shatapushpakalka*. Mixing is done so that *kalka* particles remain uniformly distributed and do not settle down at the base of the vessel.
- At last *erاندamulakwatha* is added, mixing is continued until it properly mixes with oil globules and homogeneous features are seen.
- Homogeneity of final mixture is assessed with certain features under the heading *su-yojithaniruhalakshana*.
- Finally quantity of *basti* formulation is measured.

2nd Sample: Mixing the ingredients all together using mixer

Procedure involved:

- All ingredients are taken together in the mixer jar.
- Mixer is turned on until all the ingredients get properly mixed with each other. i.e There is no sedimentation of *kalkadravya*, *saindhava* is properly dissolved, *taila* and *kashaya* should not be a separate layer instead they should look like a single entity.
- Finally mixing is continued until *su-yojithaniruhalakshanas* are seen.
- At last quantity of *basti* formulation is measured.

Sample 3: Mixing the ingredients all together using edge runner mill

Procedure involved:

- All ingredients are taken together in the edge runner mill and mixed until *su-yojithaniruhalakshanas* are seen.

Sample 4: Mixing the ingredients in sequence using edge runner mill

Procedure involved:

- Ingredients are mixed in sequence as mentioned in classics until it become homogeneous.

Classical method:

Sample 5: Mixing the ingredients in sequence using churner

Procedure involved:

- Initially ingredients like *madhu* and *lavana* are taken in a steel vessel and mixed until *lavana* dissolves completely.
- Then *tilataila* is added and churned until it gets distributed into fine globules.
- It is followed by *kalka* which is churned until its particle gets uniformly suspended.
- At last *kashaya* is added and churned until *su-yojithaniruhalakshana* are seen.

Sample 6: Mixing the ingredients all together using churner

Procedure involved :

- All ingredients are added together and churned until *su-yojithaniruhalakshana* are seen.

Features of different mixing methods which were observed is explained in table no.1

The parameters used for the analysis has been mentioned below:

A. Organoleptic Characteristics:

- Colour
- Taste
- Smell
- Consistency

B. Physico-chemical analysis

- Acid value
- Saponification value
- Iodine value
- Refractive Index at 25⁰C
- Specific Gravity
- Viscosity
- p^H

C. Physical stability test

- Dilution Test
- Conductivity Test
- Dye Test

RESULTS:

A. Organoleptic Characteristics:

The drug is examined by means of the sense organs and the difference in the drugs which are observable at a macroscopic level is appreciated and listed in table no.2

B.Physico-chemical Analysis:

Results of physico-chemical analysis are enlisted in table no.3.

For comparison and better understanding few tests were done to *taila* and *kashaya* along with samples.

C.Physical stability test:

There are two types of emulsions namely O/W type and W/O type. Since both the emulsions are similar in appearance it is very difficult to differentiate them with naked eye.They cannot be identified with single tests hence confirmed with 2-3 tests.It mainly includes dilution test ⁵, conductivity test ⁶ and dye-solubility test ⁷.

Sedimentation rate:

Stability is also assessed with rate of sedimentation.

Results of Physical stability test:

Dilution test, conductivity test and dye test are used for identification of type of emulsion whether it is oil in water type (O/W) or water in oil type (W/O). In oil in water type emulsion the oil is the dispersed phase whereas water is the continuous phase. This type is generally preferred for internal use because the unpleasant taste and odour is masked by emulsification and oil being in finely dispersed state is more quickly assimilated in the body⁸. In water in oil type emulsion the water is the dispersed phase whereas oil is the continuous phase. These types of emulsions are mainly used externally as lotions or creams.

Dilution test:

Dilution test was carried out on all 6 samples; they are identified as O/W type of emulsion.

Conductivity test:

Conductivity test was carried out on *taila* and *kashaya* which were considered as standard. *Kashaya* being water media easily conducts electricity while *taila* did not allow the electricity to pass through it. Later the test was done on 6 samples and all of them conducted electricity. So it was identified as O/W type of emulsion.

Dye test:

Dye test was initially done on *taila* and *kashaya* which were considered as standard. On treating Amaranth (water soluble dye) with *taila* drop and when observed under microscope continuous phase appeared colorless and on adding Sudan III (oil soluble dye) with *taila* it showed continuous phase red. On adding Amaranth to the *kashaya* and observing under microscope showed conti-

nuous phase red and it was colourless with Sudan III. Later 6 samples were treated with Amaranth and Sudan III Dye separately and observed under microscope. All the samples gave continuous phase red with Amaranth and droplets appeared colorless, continuous phase colorless with Sudan III and droplets showing reddish pink colour. All were categorized as O/W type emulsion.

Rate of sedimentation:

For a *basti* formulation to yield better result the ingredients should be a homogeneous mixture and a single entity. If all the ingredients getting separated then the purpose will not be served hence rate of sedimentation is given importance.

Based on onset and rate of separation along with total time taken for separation, samples can be rated from less stable to highly stable sample as mentioned in table no. 4

DISCUSSION

- Mechanism adopted having a great influence on mixing of immiscible ingredients. This can be understood by the time taken by each sample to get mixed with each other.
- Merits and demerits of method adopted for the study is described in table no.5
- Organoleptic examination reveal difference in colour, taste, consistency among all samples which indicate some chemical changes in each method while smell of all samples being the same.
- Acid value⁹ is increased in sample 6th, followed by 2nd, 1st, 3rd, 5th and 4th sample. It indicates short shelf life in 6th sample followed by other samples. Hence early chances of rancidity in 6th

sample followed by 2nd sample, 1st sample, 3rd sample, 5th sample, 4th sample with delayed chances of rancidity.

- Highest rate of absorption to lowest rate is seen among samples in following order: sample 6th followed by 1st sample, 2nd sample, 5th sample, 3rd sample, and last 4th sample which is indicated by saponification value.
- Level of unsaturation is indicated by iodine value which is more in 4th sample followed by 6th sample, 5th sample, 1st sample, 3rd sample, least value in 2nd sample
- 4th sample is said be more viscous, followed by 5th sample, 2nd sample, 1st sample, 6th sample and 3rd sample in decreasing order respectively based on viscosity value.
- All the samples are identified as O/W type of Emulsion.
- Based on rate of sedimentation it can be understood that classical method of *MadhutailikaBasti* formulation is having more stability than modified methods.
- Better action will be seen with the formulation which is prepared using churner than mixer or edge runner mill.

CONCLUSION

After comparing results of physico chemical analysis and stability study it was concluded that classical method of preparation of *Madhutailikabasti* with serial order of mixing the ingredients using churner is more stable and would be better absorbed compared to other modified methods

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Table 1: Time taken by different samples to get mixed

Samples	Time consumed for the ingredients to get mixed				
	<i>Madhu+ Lavana</i>	<i>+tilataila</i>	<i>+shatapushpa kalka</i>	<i>+ErandaMula quatha</i>	Total time taken
1 st sample (mixer –serial order)	6 min	2 min	5 min	2 min	15min
2 nd sample (mixer-all together)	-				13min
3 rd sample (edge runner mill -all together)	-				40min
4 th sample (edge runner mill- serial order)	11 min	13 min	4 min	20min	48min
5 th sample (churner- serial order)	15 min	15 min	11 min	10min	51min
6 th sample (churner-all together)	-				66min

Table 2: Organoleptic Characteristics of all samples

Features	1 st sample	2 nd sample	3 rd sample	4 th sample	5 th sample	6 th sample
Colour	Dull brown	Dull brown	Dark brown	Dull brown	Dark brown	Dark brown
Taste	<i>Lavana kashaya</i>	<i>Kashaya lavana</i>	<i>Madhura Lavana Kashaya</i>	<i>Madhura Lavana Kashaya</i>	<i>Madhura Lavana Kashaya</i>	<i>Lavana Madhura Kashaya</i>
Smell	<i>Taila gandha</i>	<i>Taila gandha</i>	<i>Taila gandha</i>	<i>Taila gandha</i>	<i>Taila gandha</i>	<i>Taila gandha</i>
Consistency	Viscous liquid	Moderate viscous liquid	Less viscous liquid	Less viscous liquid	Moderate viscous liquid	Moderate viscous liquid

Table 3: Results of standardization parameters

Samples	Parameter						
	Acid value	Saponification value	Iodine value	Refractive index	Specific gravity	Viscosity	pH
I	3.29	78.30	16.16	1.38717	1.1171	7.0740	6.0
II	3.73	76.22	11.43	1.3886	1.1258	9.7898	5.0
III	2.7855	71.22	13.30	1.3895	1.1245	5.4127	5.0
IV	2.6562	61.5601	44.6132	1.38606	1.1191	11.7834	6.0
V	2.7690	71.8168	22.51	1.38830	1.1406	10.8502	5.0
VI	4.2357	91.5578	23.7473	1.39794	1.1428	6.3360	6.0
Taila	1.0989	21.5980	45.4567	-	0.9422	75.7795	6.0
Kashaya	-	-	-	-	1.0286	1.2083	6.8

Table 4: Rate of sedimentation

Samples	Sedimentation Rate	Stability
3 rd sample	Quick onset and rapid separation	Less stable/not stable
4 th sample	Rapid onset and rapid separation	Less stable/not stable
2 nd sample	Mild onset but rapid separation	Less stable/not stable
1 st sample	Slow onset, mild rate of separation	Stable
6 th sample	Mild rate of onset, mild separation	Stable
5 th sample	Very slow onset, very slow separation	Highly stable

Table 5: Merits and demerits of methods adopted

Method	Merits	Demerits
Mixer method:	1.Easy to prepare 2.Requires less time	1.Early separation of ingredients
Edge runnermill method	1.Easy to prepare	1.Separation is rapid due to positive and negative mixture mechanism 2.More time is required to prepare
Churner method	1.Material remain mixed for long time	2.Depends on manual pressure

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