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Research Article

PHARMACEUTICO-ANALYTICAL STUDY OF KRIMIGHNA KWATHA AND TAILA PREPARED FROM KRIMIGHNA MAHA KASHAYA CHURNA

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ABSTRACT

Krimighna Mahakashaya Gana (KMG) is a group of ten medicinal plants indicated in mitigation of Krimi. Those ten drugs are Akshiva, Maricha, Gandira, Kebuka, Nirgundi, Vidanga, Kinihi, Swadamshtra, Vrishaparni and Akhuparni. Present study was aimed at preparation of suitable dosage form from these ten drugs and analyzing them to get preliminary standards. The dosage form in which the drugs should be processed to attain the best possible action is not specified. Rather the freedom of selecting suitable dosage form and mode of administration is left to the desecration of physician. Hence kwatha and taila were chosen as two dosage forms.

All the ten drugs were collected, authenticated and processed to make kwatha and taila. The Pharmaceutical data were observed and recorded. Analysis of raw drugs and both prepared medicines were carried out as per the protocols laid down by dept of AYUSH.

The pharmaceutical study revealed that there is no pharmaceutical constraint in obtaining the raw materials, preparing both Kwatha and Taila of KMG. Analytical evaluation including HPTLC could generate preliminary standards of KMG as well as Kwatha and Taila prepared by KMG.

Keywords: Krimighna Mahakashaya, Kwatha, Taila, Krimi.

INTRODUCTION

Krimighna Mahakashaya Gana[1] (KMG) consists of Akshiva (Moringaoleifera)[2], Maricha (Piper nigrum)[3], Gandira (Euphorbia antiquorum)[4], Kebuka (Costusspeciosus)[5], Nirgundi (Vitexnegundo)[6], Vidanga (Embeliaribes)[7], Kinihi (Achyranthesaspera)[8], Swadamshtra (Tribulusterestris)[9], Vrishaparni (Ipomea variety)[10] and Akhuparni (Ipomeareniformis)[11]. It is a group of ten drugs specifically indicated in getting rid of Krimi. The word Krimi is most conspicuous term given in the books of Ayurveda which generally means worms or microbes. The word Krimi is derived from the root word "Kramana[12]"whichmeans attacking, overcoming, surpassing. Krimi is one of the diseasesoriginated from taking unwholesome food, incompatible food. There are 20 varieties of Krimi[13] mentioned which include both Bahya and Abhyantara Krimi. In Ayurveda Krimi can be compared with microorganism and macroorganism. Hence it was considered that these ten drugs of KMG should be useful in treating or mitigating microbes.

As far as different Maha kashayagana mentioned in ancient literatures of Ayurveda are concerned the specific dosage form and mode of administration is not specified. Rather the freedom of selecting suitable pharmaceutical technique to extract the desired results is left to the discretion of Physician. It is said that the physician should select and prepare any one of the dosage forms like Kwatha, Churna, Sneha or other suitable form according to the disease condition, status of dosha & Dushya[14]. Hence it was decided to prepare Kwatha and Taila from the group of KMG in present study.

Kwathakalpana is preparation in which water soluble principles are extracted from drug to liquid media[15]. The drugs (in the formof bark, leaves, fruits, roots etc.) which are to be taken for the preparation of Kwatha should be cut into small pieces and are kept in a vessel along with eight or sixteen parts of water. The drugs are subjected to boiling and reduced to quarter. Obtained liquid is called as Kwatha[16].

Sneha Kalpana is a dosage form wherein the active principles of the drugs are incorporated into lipid media[17]. Sneha is mentioned as basically of four types" viz. Ghrita Taila Vasa and Majja[18]. Taila has its origin from the plant material while the other three are animal products. Specified amount of Kalka and liquid are added to oilbase and Subjected to moderate heat till liquid portion evaporates and medicated Tailais left.

METHODOLOGY

The methods followed in this work are divided in to Pharmaceutical study and Analytical study. In the pharmaceutical study attempts were made to prepare the Krimighna Kwatha, Krimighna Taila and observations were noted. In Analytical study different parameters mentioned for assessment of KrimighnaKashayaChurna, Kwatha and Taila were carried out.

I. Pharmaceutical study:

Collection of the drug:

The total 10 raw drugs were collected among which 7 were dry drugs and 2 were

Wet drugs and instead of Vrishaparni, Akhuparni was taken in double quantity[19] since

Vrishaparni and Akhuparni is of same ipomea variety. The drugs required for the Preparation of medicine were collected from Centre for Indian Medical Heritage (CIMH), Kanjikode Kerala on 27-6-2014

AUTHENTICATION OF THE DRUG

The authentication of the all the raw drugs was done at the Department of Dravyaguna, in Shri Dharmasthala Manjunatheshwara College of Ayurveda, Hassan.

1. **Preparation Of Kwatha**

   Fresh Krimighna Kwatha was prepared. Coarse powder of 7 dry drugs which passed through sieve no 20-40 was taken in quantity of 5 gm and 3 wet drugs were taken in quantity of 10gm. Amount of water added was sixteen parts to that of the total weight of all the ten drugs. To the mixture of all the drugs 1040ml of potable water was added and kept for boiling in stainless steel vessel. The heating was done on LPG stove and it was reduced to one-eighth of the total quantity. Water level for reduction was checked.

2. **Preparation Of Taila**

   a. **Preparation of Kwatha:** Fresh KrimighnaKwatha was prepared. Coarse powder of 7 dry drugs which passed through sieve no 20-40 was taken in quantity of 100 gm and 3 wet drugs were taken in quantity of 200gm. Amount of water added was sixteen parts to that of the total weight of all the ten drugs. To the mixture of all the drugs 8000 ml of potable water was added and kept for boiling in stainless steel vessel. The heating was done on LPG stove and it was reduced to one-fourth of the total quantity. Water level for reduction was checked.

   b. **Preparation of Kalka:** Kalka was prepared from fine powder of 7 dry drugs and 3 wet drugs. All dry drugs were taken in quantity of 44g and coarsely powdered in Khalwayantra and finely powdered in mixer grinder along with wet drugs. The particles of the fine powder were of the sieve size No 100-120. 50 ml of potable Water was used for preparation of Kalka into a bolus. The quantity of the water required for making 83g of Kalka was 46ml.

   c. **Preparation of Taila:** The Kwatha and Kalka prepared as above were used for the TailaPaka. 83g of Kalka,1960ml of Kwatha, and 500ml of Taila was used for TailaPaka. The TailaPakadone in a stainless steel vessel. LPG stove was used for the heating purpose. The mild flame was maintained during the whole process. The changes in the Taila and Kalka along with temperature changes were noted for every 15min. The total time taken for Paka of the Taila was 5hours and 15min. Amount of the Taila obtained was 460 ml.

II. ANALYTICAL STUDY

The samples of kwatha and taila was analysed with the following tests.

Kwatha was analyzed through organoleptic parameters like Colour, Taste, Odour,

Appearance; Physio-chemical assay like Loss on drying at 105^0C, pH, Total ash, Acid Insoluble ash,Water soluble extractive, Alcohol soluble extractive and Chromatographical study, using HPTLC.

Taila was analyzed through organoleptic parameters like Colour, Taste, Odour, Appearance; Physio-chemical assay like Rancidity, Specific gravity, Boiling point, melting point, Refractive index, Viscosity, Iodine value, Saponification value, Unsaponifiable matter, Acid value, Peroxide value Chromatographical study, using HPTLC.

OBSERVATIONS AND RESULTS

1. **Pharmaceutical study**

   a. Dry drugs were found to be floating during kwatha preparation. It took almost 5 minutes to begin the boiling of the mixture. After the boiling started the drugs were completely soaked in the water and were mixed completely. The level of the water before boiling was 7cm.Boiling was stopped when water level reached 1.5cm.Firstkwatha when heated drugs were found floating later when boiling started brown colour appeared with froth, at completion of paka the kwatha was brown in colour with thicker consistency.

   b. During taila paka the kalka was brown in colour which later got mixed with drava dravya on the day one. Onthe second day kalka was found mixed with dravadravya. On third day taila paka was attained.The kalka could be rolled into varti and didn't produce sound when put on fire.

   c. Specific demarcation of oil and Kwatha was seen. Then the liquid became more viscous with oil globuleson first day. On the second day homogenous mixture of taila and kwatha was observed with froth. The colour of taila turned to green. On third day taila separated from the kalka. Its colour changed to greenish blue, frothy in nature. The total time taken for paka was five hours and fifteen minutes. It was completed in three days. After filtering the quantity of residue remaining in the sieve was 68g. The Kalka was soft unctuous, black in colour. The Taila was viscous in nature. It was dark green in colour. It had pungent taste and pleasant odour. The Taila obtained was 460ml.

2. **Analytical study:**

Analytical study provides the objective parameters to fix up the standards for quality ofraw drugs, in process as well as finished products. This will generally help and developfew

parameters by means of which the batch quality can be maintained. In the present study, analytical evaluation of Krimighna Kashya Churna, Krimighna Kashaya and Taila iscarried out to develop preliminary standards.

Table 1: Organoleptic features

Parameters	Kwatha	Taila
Colour	Brown colour	Greenish blue
Odour	Characteristic	Pleasant
Taste	Acrid	Acrid
Consistency	Viscous	Highly Viscous

Table 2: Physico-chemical parameters of kwathachurna

Parameters	Results n=3 %w/w
Loss on drying	5.995
Total ash	10.075
Acid insoluble ash	0.997
Water soluble ash	2.495
Alcohol soluble extractive	2.994
Water soluble extractive	8.053

Table 3: Physico-chemical parameters of kwatha

Parameters Results	n=3 %w/w
Refractive index	1.33669
Specific gravity	1.0105
Viscosity	2.7939

Table 4: Physico-chemical parameters of taila

Parameters Results	n=3 %w/w
Refractive index	1.4697
Specific gravity	0.9177
Viscosity	83.9885
Rancidity	Fat is not oxidized
Acid value	1.9615
Saponification value	154.3718
Unsaponifiable matter	2.1526
Iodine value	92.3921
Peroxide value	7.5908
Boiling point	258ºC

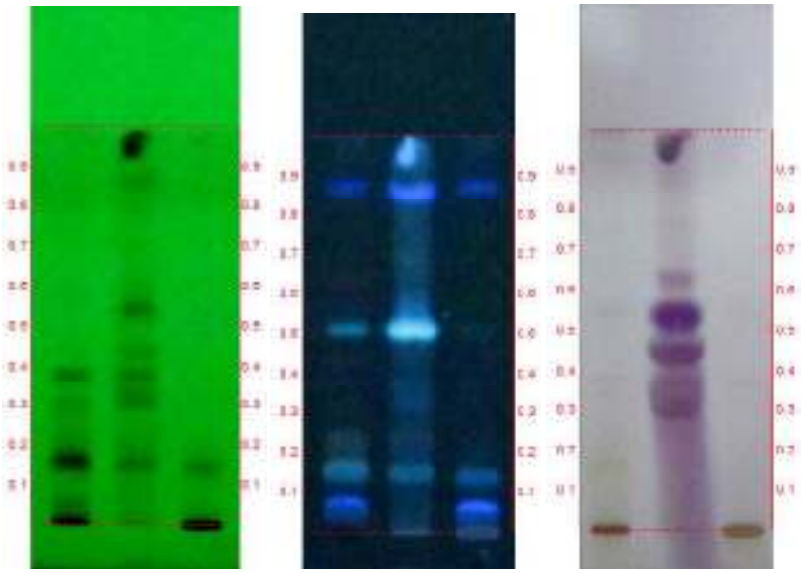

Figure 1: HPTLC photo documentation

Track 1- Alcohol extract **krimighnchurna** **(sample-1)** - 8 µl

Track 2– Chloroform extract of **krimighnataila** **(sample-2)**- 8 µl

Track 3– Chloroform extract of **krimighnakashaya** **(sample-3)**- 8 µl

Solvent system: Toluene: Ethyl acetate (7:1)

DISCUSSION

PHARMACEUTICAL

Out of ten drugs of KMG, 7 were used dry in quantity of 5 gm each and 3 were used wet in quantity of 10gm each. It was done based on rule, if (wet drugs) was used along with Shuska Dravya(dry drugs).It should be taken in double the quantity. Wet drugs do possess large amount of water content in them which adds for their weight. If these drugs are taken in equal quantity to that of dry drugs the real quantity of drug taken excluding water portion will be less.

During the preparation of Kwatha froth started appearing due to slimy nature of wet drugs in Kwatha. Froth disappeared after boiling due to evaporation of water molecules from wet drugs. The colour of the Kwatha was light brown due to presence of the multiple constituents of the drugs. The odour of the Kwatha was characteristic to the presence of the drugs. During the preparation the temperature was maintained from 35- 98 ^{0}C.

The Kalka prepared for preparation of KMG tailawas in a bolus form. It was brown in colour due to multiple constituents of wet anddry drugs and slimy due to presence of wet Drugs. Due to continuous stirring Kalka broke into pieces which made it lighter than before leading to floating on the surface. Also due to increase in temperature and continuous stirring Kalka separated to fine particles which started mixing

with the Drava Dravya. The Taila attained Mrudupaka on third day and Kalka started separating from Taila. The reason being that as Drava Dravya evaporated due to particles of Kalka with a layer of lipid externally will coalesce together and start settling. Kalka was soft to touch with little moisture content. In the stage of Madhyama Paka the particles of Kalka completely coalesced together due to complete evaporation of water that made it possible to roll in to Varti due to its non-sticky nature.

ANALYTICAL

Loss on drying[20]**:** Signifies moisture content in the sample for Krimighna Churna it was 5.995.loss on drying varies according to different churnas and there combinations for churna it will usually exceed. Since wet drugs were used along with dry drugs loss on drying was 5.995.

Total ash[21]**:** Value signifies the inorganic matter in the sample. Total ash of dry churna will not usually exceed more than 11percent here the total ash value was 10.075 use of wet drugs along with dry drugs has increased the total ash value.

Acid insoluble ash[22]**:** It is designed to measure the amount of ash insoluble to diluted hydrochloric acid. In Krimighna Kwatha Churna the value was 0.997 which came in the normal range as per API standards which usually ranges below 3.

Water soluble ash[23]**:** It is designed to measure the amount of ash soluble in water. In Krimighna Kwatha Churna the value was 2.495 which come in normal range for churna per API standards which usually range below 18.

Alcohol soluble extractive[24]: It is applied to drugs which contain alcohol soluble constituents such as tannin, resins and alkaloids. In Krimighna Churna alcohol soluble extractive value was 2.994 which signify the presentsample has only permissible limits as per standards.

Water soluble extractive[25]**:** It is applied to drugs which contain water soluble constituents such as tannin, sugars, plant acids and mucilages. In Krimighna Churna alcohol soluble extractive value was 8.053 which signify the present sample has only permissible limits as per standards.

Refractive index[26]**:** It indicates density of sample compared to air and liquidmedia. The Refractive index of Krimighna Kwatha is 1.33669 and KrimighnaTaila is 1.4697. However there is increase of 0.131 of refractive index in Taila. Since Taila will be always denser than Kwatha.

Specific gravity[27]**:** The specific gravity indicates the presence of solute content in the solvent. Specific gravity of Krimighna Kwatha is 1.0105 and KrimighnaTaila is 0.9177. The specific gravity indicates the presence of solute content in the solvent. Here Kwatha have more specific gravity than taila as water soluble active components of Churna have contributed for increase in specific gravity of Kwatha.

Viscosity[28]: Flow property of a substance viscosity of Kwatha is 2.7939, and of Taila are 83.9885. Viscosity of the oil medium will be always greater than aqueous medium.

Saponification value[29]: It is the amount of Alkali needed for the saponification of given quantity of fat which usually depends upon number of COOH group present. The Saponification value indicates average molecular weight /chain length of all fatty acids present. The long chain fatty acids found in fats have a low saponification value because they have relatively fewer numbers of carboxylic functional groups per unit mass of the fat as compared to short chain fatty acids. Saponification value of Tila Taila lies between (188- 195). The Saponification value of KrimighnaTaila is found to be 154.3718. Saponification value of Krimighna Taila is coming under normal range as per API standards.

Unsaponifiable matter[30]**:** The Unsaponifiable matter indicates the unsaponifiable matter greater the possibility of other substances addition to the Taila, which is usually due to release of particles from Kalka and Drava Dravya the Unsaponifiable matter of KrimighnaTaila is 2.1526.

Acid value[31]**:** Measure of the amount of carboxylic acid groups in a chemical compound. The acid value indicates the presence of free fatty acids in the oil sample. The free fatty acid is responsible for rancidity of the compound. Higher free fatty acid makes them more rancid. Less percentage of free fatty acid or no free fatty acids decreases rancidity of the compound. The Acid value of Krimighna Taila is 1.9615. No set standards for Ayurvedic oils. The Acid value of Taila mentioned in A.P.I comes usually in range between 6 and 11 respectively. Here acid value less than normal indicates that the preparation has very less percentage of free fatty acid.

Iodine value[32]: Indicates the degree of unsaturation, which in turn denotes the rancidity of oils. The more the iodine number, the more the unsaturated fatty acid bonds present. If iodine value is less it indicates degree of saturation. That indicates more number of double bonds in the oil. As Krimighna Taila iodine value was 92.3921.Iodine value of Krimighna Taila is coming under normal range as per API standards.

Peroxide value[33]**:** Detection of peroxide gives the initial evidence of rancidity in unsaturated fats and oils. It gives a measure of the extent to which an oil sample has undergone primary oxidation. The double bonds found in fats and oils play a role in autoxidation. Oils with a high degree of unsaturation are most susceptible to autoxidation. The best test for autoxidation (oxidative rancidity) is determination of the peroxide value. Peroxides are intermediate7.5908 which comes under normal value as per API standards which indicate the Taila has not become rancid.

Boiling point[34]: Temperature in which liquid changes from one form to other. Boiling point of sesame oil is 216^0C and boiling point of Krimighna Taila was 258ºC due to addition of lipid soluble active compounds in it.

HPTLC: In the study, At 254 nm: 3 spots in Sample 1, 6 spots in Sample 2,1 spot in sample 3 were seen. There was one common peak at **Rf** values 0.16in all 3 samples and these are heat stable compound. When Sample 1 and Sample 2 are compared two peaks at 0.32 and 0.39 was common from which itcan be inferred that compounds are added to Sample 2 from Kalka.At 366 nm: 6 spots in Sample 1, 5 spots in Sample 2, 4 spots in Sample 3were seen. There was one common peak at **Rf** values 0.16, 0.52 and 0.87 which are heat stable compound. When Sample 3 and Sample 2 are compared one peak at 0.25 was common, which suggests that these compounds were added to Sample 2from Kalka.

At chromatographic derivatisation: 3 spots in Sample 1, 6 spots in Sample 2,1spot in Sample 3 were seen. There was one common peak at **Rf** values 0.38which is possibly a heat stable compound .There was a common peak at 0.56Sample 2 and Sample 3, which indicate fat soluble active principle of kalka.

CONCLUSION

This study was done to assess the pharmaceutico analytical standards of kwatha and taila prepared from the krimighna mahakashaya. It was found that all the drugs of group were easily available at low cost and are genuine. There were no constraints observed during preparation of kwatha and taila. The method followed can be considered as primary standard operating procedure for these dosage forms. The analytical study along with chromatography could generate preliminary standards for both these formulations.

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