Pharmaceutical Chemistry

Role of media in the preparation of Apamarga Ksharataila

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Abstract

Generally, Tailas and Ghritas have been prepared by using Kalka (paste) and Drava dravya (liquid media usually SwaRasa or Kwatha). However, Apamarga Kshara taila is prepared by using Apamarga Kshara drava (the alkali is obtained after dissolving it in water, after obtaining it by burning, dissolving, and filtration of the same plant). Therefore, to evaluate the role of the media during the preparation, the Taila was prepared in different samples by using the fresh and dry paste of Apamarga along with SwaRasa and Kwatha of Apamarga. All the samples were tested through various analytical parameters, that is, pH, acid value, iodine value, saponification value, and soon. Finally, it was found that Apamarga Kshara taila prepared by using fresh Kalka and Ksharajala was better and it was also an easy pharmaceutical procedure.

Key words: Kalka, Kshara and Drava Dravya, Swarasa, Decoction, taila

Introduction

Apamargakshara taila (AKT) is frequently used in ayurvedic therapeutics for the treatment of karnaroga (ear disorder), especially for Badhirya (deafness) and Karnanada (sound in ears), as karna puran (filling of ears with oil). It is a common treatment principle, advocated by all Acharyas for a maximum number of ear disorders. It is a very simple medicine having ingredients like Apamarga (Acyranthes aspera) and Tila taila (sesame oil), which are very cheap and easily available in their authentic form. Sneha kalpana (Oleaginous preparations) are prepared with Kalka (paste), Sneha (oleaginous material), and Drava (liquid substance) in the ratio of 1:4:16. A verse with regard to the preparation of AKT does not clearly mention the paste. Either the paste of kshara (water soluble ash after complete burning of organic matter – alkali) or Apamarga Panchanga (paste of whole fresh plant) should be taken. Apamargakshara is difficult to prepare, and is also a time-consuming process and expensive, while the fresh drug paste is easy to prepare. During the preparation of AKT, oil and alkali (as a paste and alkali water in sesame oil) are mixed together. Therefore, the fats are hydrolyzed by the alkali, yielding glycerol and crude soap, which is a problem during preparation. Considering these points, the study is designed to prepare AKT with different paste drugs, that is, fresh plant paste and dried plant paste instead of / and Apamargakshara (water soluble ash after complete burning of organic matter – alkali). Also liquid media is changed, that is, Apamarga swaRasa (fresh juice of Apamarga) and Apamarga Kwatha (decocition of Apamarga) instead of Apamargakshara jala (water of Apamarga alkali).

Aims and Objectives

1. To compare the different samples of Apamargakshara taila, which were prepared with different forms of kalka dravya (paste) and drava dravya (liquid).
2. To decide the suitable drava / kalka in the preparation of AKT.

Materials and Methods

Apamargakshara taila was prepared in five different samples changing the kalka dravya and drava dravya. The samples were designated as,

AKT-KK Apamarga Kshara Taila with Apamarga Kshara Drava plus Kshara Kalka
AKT-KF Apamarga Kshara Taila with Apamarga Kshara Drava plus Fresh Plant Kalka
AKT-SF Apamarga Kshara Taila with Apamarga Fresh Plant SwaRasa plus Fresh Plant Kalka
AKT-FF Apamarga Kshara Taila with Decocition and Kalka of fresh material of Apamarga.
AKT-DD Apamarga Kshara Taila with Decocition and Kalka of dry material of Apamarga.

To prepare Apamargakshara taila, the raw material, that is,
Apsmarga and taila were procured from the pharmacy attached to I.P.G.T. and R.A., G.A.U, Jamnagar. Soft water was used, where needed. It was processed as per the reference from Ayurvedic Formulary of India.\(^9\)

**Preparation method**

Apamargakshara taila was prepared with the intermediate processes similar to those used for preparing Apamarga Kshara, Apamarga Kshara Jala (water of Achyranthus aspera linn), Apamarga swaRasa (fresh juice of Achyranthus aspera linn), and Apamarga kwatha (decoction of fresh or / and dry Achyranthus aspera linn). Apamarga Kshara was prepared by burning dry apamarga till it attained a white color; the ash was strained and four times (v/v) water was added. It was soaked and kept overnight and again strained thrice. After evaporation of the water portion, the white color powder was collected.\(^9\) Apamargakshara drava was prepared by adding four times (w/v) water into Kshara. Apamarga kwatha (dry and fresh) was prepared by adding four times (w/v) water and reduced upto one-fourth and strained. For Apamarga swaRasa, it was crushed in the Edge runner and squeezed.

For the preparation of Apamargakshara taila, four parts of Tila taila was taken in a wide mouthed stainless steel utensil and heated till fumes emerged from the oil. The taila was warmed, and one part of kalka drava (paste) and sixteen parts of drava dravya (liquid substance) were added. It was continuously stirred. Cooking was done on moderate heat. When the entire watery portion had evaporated (Sneha Siddhi Lakshana), the oil was strained in a warm condition. It was collected in a glass bottle. The whole procedure was completed within three days. The procedure was the same for all samples; only the paste material and liquid substances were changed.

Analysis of Apamargakshara taila was carried out after the taila (final product) was prepared by using different media. Organoleptic characteristics like Sparsh (consistency), Rupa (color), Rasa (taste), and Gandha (odor) of the samples were perceived by the Jnanendriya (sensory organs). However, the physicochemical parameters, such as, pH, specific gravity, total solid content, ash value, refractive index, acid value, free fatty acid as oleic acid, saponification value, iodine value, ester value, unsaponifiable matter, rancidity test, and so on, were conducted as per pharmacopoeial standards.\(^10\)

**Observation and Results**

- Apamarga of 30 KF was taken initially to prepare kshara; it yielded 3.9 KF of Kshara, which means 11.58%.
- Six liters of Kshara drava was obtained after adding 8 L of water into 2 L of kshara.
- Six liters of SwaRasa was obtained from 40 KF of fresh Apamarga after adding 2 L of water.
- Yield of prepared oil is summarized in Table 1.

During the preparation of AKT, the stages observed are: Initiation of boiling of liquid, stage of mixing, stages of separation of oil, stages of boiling of oil, completion of snehataka.

**Specific observation for Kshara Taila**

**Specification of Kalpa (paste)**

- Initially, the paste was soaked in the mixture of oil and liquid.
- The paste was separated; it started rising during heating and showed on the surface of the mixture of oil and liquid.
- The paste got mixed with the emulsion.
- At the end of the process, the paste separated from the emulsion and set at bottom of the vessel.
- The color of paste became darker and is more viscid.

**Specification of Drava (liquid media)**

- Slight boiling starts when the temperature reaches 80°C.
- Boiling starts from the center of the liquid and then reaches the periphery and bubbles appear at the boundary.
- Liquid becomes thicker during the mid stage of the heating.
- Color of liquid changes and becomes darker.
- At the end of the stage, more bubbles emerge from the mixture.

**Specification of Taila (oil)**

- Initially, scattered oil was seen on the surface of the liquid.
- Oil and liquid mixed when the temperature started increasing.
- The color of the oil changed.
- At the final stage of cooking, the oil also escaped out by bubbling along with the liquid.
- Oil and liquid separated at end of the final stage, when the liquid part evaporated.
- Froth rose and came up from the oil at the end of the final stage.
- When it is prepared with Apamargakshar kalka and Apamargakshar jala, then at the last stage, the spoiled milk like appearance was observed and kshar and oil were separated. This may be counted as a specific sign for the particular preparation.

The observation and comparison of the yield [Table 1], the organoleptic characters of different batches of AKT, [Table 2] and the physicochemical properties of the finished product AKT [Table 3] are summarized in these three tables.

**Discussion**

Oleaginous preparations (Taila and Ghrita Kalpana) are widely used in Ayurvedic therapeutics since ages back and it is the only form frequently used internally as well as externally for all routes. The ingredients of Sneha kalpana comprises of Sneha (oleaginous substances), which are glycerides of fatty acids, Kalka (paste), which contains many potent therapeutically effective bioconstituents and Drava (liquid substance), which is the prime source of the hydroxyl group, and also helps in the dissolution of active principles into the oil, thereby enhancing the therapeutic value.\(^11\) The oil interacts with the liquid and undergoes hydrolysis. Some of hydrolyzed lipids (Tila taila) are amphipathic in nature, and comprise of a hydrophilic exterior and hydrophobic interior. The agitation process breaks the oil in the form of globules. These globules get exposed to the paste drugs, and may be helpful in the extraction of fat-soluble material from the paste drugs. The water-soluble constituents in the paste interact with the hydrophobic end, that is, these amphipathic lipids get oriented at the oil–water interface, with the polar groups in water phase and the non-polar groups in the oil phase. When a critical concentration of these amphipathic lipids is present in an aqueous media, they form micelles. The driving force for micelle formation is hydrophobic,
as the tail end cannot break the hydrogen bonds between the water molecules and as a result cluster together in close proximity. This may be the reason that the stage when oil and liquid mix together, cannot be separated and appears as a vicious cluster. When triglycerides (Tila taila) are hydrolyzed by an alkali (Kshara jala), the process is known as saponification. The products are glycerol and soaps. It may be the reason for more foaming during the mixing of oil and alkali (Kshara). The percentage of lye (saponifiable constituent, mainly Potassium hydroxide or and Sodium hydroxide, may be taken as Kshara) and the percentage of water are not at the correct amount, also the Kshara is not entirely only hydroxides, and this may be the reason that the finished product could not form into a soap.

Continuous heating energized the hydrolyzing of fatty acids into crude soap, but continuous stirring and addition of water avoided the preparation of soaps. Continuous heating and agitation during the oleaginous preparations also enhanced the extraction process by weakening the bonds, thereby, separating the hydrophobic substance from hydrophilic substance. This hydrophobic matter would act as a surface active agent, which gets solubilized in fatty material after the evaporation of water. Hence, due to micellization the finished Sneha may contain both oil-soluble as well as water-soluble active principles.

The reference of Apamargakshara taila is taken from the Chakradutta, although Acharya Chakrapani mentioned the ingredients of the Apamargakshara taila, but the paste of Kshara or Apamarga is not clarified. Therefore, different paste and liquid media are taken.

For the preparation of Kshara, the dry plant material should be burnt in an open pan till it becomes a white powder. All the organic matter should be burnt, to get the white color kshara. It is prepared in a stainless steel vessel to prevent reaction between the vessel and Kshara. Kshara is the water-soluble ash left after the burning of organic substances. Kshara is mainly the Potassium and Sodium portion of the plant along with the chlorides, sulfates, sulfides, phosphates, magnesium, an

| Name of the samples | Duration of Paka (in hours) | Color of Sample | Initial volume (in ml) | Final yield (in ml) | Initial wt. (in g) | Final yield (in g) | (%) loss in v/v | (%) loss in w/w |
|---------------------|-----------------------------|-----------------|-----------------------|--------------------|------------------|------------------|----------------|----------------|
| AKT (KK)            | 5                           | Pale yellow     | 500                   | 435                | 458              | 372.65           | 13             | 11.90          |
| AKT (KF)            | 6.30                        | Dark yellow     | 500                   | 450                | 458              | 414.56           | 10             | 9.45           |
| AKT (SF)            | 9                           | Green           | 500                   | 470                | 458              | 425              | 5              | 7.2            |
| AKT (FF)            | 6.30                        | Green           | 500                   | 470                | 458              | 411.9523         | 6              | 6.5            |
| AKT (DD)            | 6.45                        | Brownish Green  | 500                   | 453                | 458              | 916.77           | 9.2            | 9.0            |

| Table 1: The yield of Apamarga Kshara Taila |

| Samples       | Color of Sample | Initial volume (in ml) | Final yield (in ml) | Initial wt. (in g) | Final yield (in g) | (%) loss in v/v | (%) loss in w/w |
|---------------|-----------------|------------------------|---------------------|--------------------|-------------------|----------------|----------------|
| AKT (KK)      | Pale yellow     | 500                    | 435                 | 458                | 372.65            | 13             | 11.90          |
| AKT (KF)      | Dark yellow     | 500                    | 450                 | 458                | 414.56            | 10             | 9.45           |
| AKT (SF)      | Green           | 500                    | 470                 | 458                | 425               | 5              | 7.2            |
| AKT (FF)      | Green           | 500                    | 470                 | 458                | 411.9523          | 6              | 6.5            |
| AKT (DD)      | Brownish Green  | 500                    | 453                 | 458                | 916.77            | 9.2            | 9.0            |

| Table 2: Organoleptic characteristics of Apamarga Kshara Taila |

| Samples       | Color of Tila Taila | Color of Tila | Odor of Tila Taila | Odor of Tila | Taste of Tila Taila | Taste of Tila | Appearance of Tila Taila | Appearance of Tila | Clarity of Tila Taila | Clarity of Tila | Opalescence of Tila Taila | Opalescence of Tila |
|---------------|---------------------|---------------|-------------------|-------------|---------------------|---------------|--------------------------|-------------------|------------------------|----------------|--------------------------|-------------------|
| AKT (KK)      | Pale Yellow         | Dark yellow   | Characteristic     | Slightly saline taste | Characteristic | Characteristic | Liquidy oily            | Liquidy oily       | Clear                  | Clear         | Translucent              | Translucent         |
| AKT (KF)      | Dark yellow         | Green         | Bitter            | Bitter pungent | Bitter pungent     | Bitter        | Liquidy oily            | Liquidy oily       | Slightly clear         | Slightly clear | Translucent              | Translucent         |
| AKT (SF)      | Green               | Green         | Characteristic     | Characteristic | Characteristic     | Characteristic | Liquidy oily            | Liquidy oily       | Clear                  | Clear         | Translucent              | Translucent         |
| AKT (FF)      | Brownish green      | Brownish green| Bitter            | Bitter       | Bitter             | Bitter        | Liquidy oily            | Liquidy oily       | Not clear              | Not clear     | Translucent              | Translucent         |

| Table 3: Physicochemical parameters for finished products Apamarga Kshara Taila |

| Samples       | Loss on drying % w/w | Specific gravity at RT. | Total Ash % w/w | pH by pH paper | Refractive index at RT. | Acid value | Free fatty acid as oleic acid | Saponification value | Iodine value | Ester value | Unsaponifiable matter | Rancidity test |
|---------------|-----------------------|-------------------------|-----------------|----------------|------------------------|------------|-------------------------------|---------------------|--------------|-------------|-----------------------|----------------|
| AKT (KK)      | 0.03651               | 0.9200                  | 0.06505         | 7.50           | 1.4640                 | 0.3559     | 0.1779                        | 226.84              | 59.99        | 226.48      | 2.1852                | -ve            |
| AKT (KF)      | 0.03361               | 0.9196                  | 0.05490         | 7.30           | 1.4640                 | 0.5920     | 0.2960                        | 203.88              | 74.65        | 203.208     | 2.9968                | -ve            |
| AKT (SF)      | 0.03700               | 0.9188                  | 0.02266         | 4.77           | 1.4650                 | 3.2380     | 1.8190                        | 213.04              | 91.88        | 209.802     | 2.972                 | -ve            |
| AKT (FF)      | 0.03175               | 0.9190                  | 0.03203         | 6.53           | 1.4645                 | 4.8587     | 2.4293                        | 231.44              | 61.56        | 216.5813    | 2.5588                | -ve            |
| AKT (DD)      | 0.03593               | 0.9180                  | 0.03593         | 4.82           | 1.4645                 | 4.2438     | 2.1219                        | 229.70              | 61.68        | 225.4562    | 2.5930                | -ve            |

| AKT: Apamarga kshara taila |

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Conclusion

Apamarga Kshara taila prepared with Apamarga Kshara kalka and Apamarga Kshara jala (AKT-KK), and Apamarga Kshara taila prepared with Apamarga fresh drug kalka and Apamarga Kshara jala (AKT-KF) showed almost equal and better results. Therefore, it may be concluded that Apamarga Kshara taila prepared with Apamarga fresh drug kalka and Apamarga Kshara jala (AKT-KF) should be taken for pharmaceutical preparation.

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