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Review Article

NEED AND APPROACH OF PHARMACEUTICAL STANDARDIZATION OF *KWATH KALPANA* IN PRESENT SCENARIO- A CRITIQUE

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ABSTRACT

Ayurvedic pharmaceutical industries are flourishing now a day's demands standardization at every step of pharmaceutical processing. *Kwatha* (Decoction) is the basic dosage form for most of other important dosage form such as *Avaleha* (Linctus), *Snehapaka* (medicated oils and *Ghruta*), *Sandhankalpana* (Alcoholic fermentations) etc, hence need standardization at various steps of pharmaceutical processing. Due to difference of opinion among Ancient *Acharyas* (Faculties) for various pharmaceutical factors such as proportion of water, particle size of raw drugs, duration of heating etc. of *kwatha kalpana*, large scale manufacturing and polyherbal content of *Kwatha,* some factors need to be controlled to get standard quality of *kwatha*. Various pharmaceutical factors affect quality of *Kwatha* such as Vessel (Earthen, Copper, Stainless still) to be used, temperature(High or Low flame), proportion of water(4, 8, 16 part) to be added, particle size of crude drug(fine or coarse) to be used for *Kwatha*, duration of heating(1/4 or1/8) and its qualitative and quantitative estimation of phyto constituents using appropriate analytical techniques is the need of Hour, hence the paper discussed need and proper approach for pharmaceutical standardization of *Kwatha* to optimize the said factors for practicing uniformity in pharmaceutical industries for universal acceptance.

KEYWORDS: *Kwatha Kalpana*, Vessel, Particle size, Temperature, Uniformity.

INTRODUCTION

Ayurvedic pharmaceutical companies are flourishing with growing demand of herbal drugs. In ancient Ayurvedic system of medicine physicians used to make medicines themselves for patients with great faculty and authenticity lacking commercial interest. Now the commercialization of medicines demands standardization at every step of pharmaceutical processing.

The classical formulation techniques and preparatory methods exhibit high degree of sophistication. However, unfortunately many improvisations and changes are being affected in the name of modernization without assessing the impact of such modifications. This may have great adverse impact on their therapeutic efficacy. Thus sincere research and developmental efforts are required to optimize the formulation aspects to ensure consistency in composition, standardized quality products and efficacy.[1]

Ayurveda has also given utmost importance to quality of drug, maturity of plant, season and time of collection; standard preparation methods and its mode of usage in logical manner.[2] Therefore in this era of standardization it's quite challenging to get up to date standard of drugs of herbal origin due to high variability of seasonal and ecological factor which cannot be controlled but the pharmaceutical processing can be controlled by bringing the uniformity at all stages of processing. Various Ayurvedic pharmaceutical preparations need to be controlled in this context.

Among them *Kwath kalpana* (Decoction) is important dosage form. It is one among basic *Panchvida Kashaya Kalpana* (Five types of dosage forms)of *Bhaishjya Kalpana* (Pharmaceutical dosage).[3] It is a basis of preparative method of other secondary dosage form such as *Avaleha* (Linctus), *Snehapaka* (Medicated oil and *Ghrut*), *Sandhan kalpana* (Alcoholic preparations) etc. So to get good quality of these dosage form, *Kwath* should be of standard quality and to obtain good quality of *Kwath* its very important to concentrate on its Pharmaceutical factors such as temperature, vessels for preparation, quantity of water, particle size of utilized raw drugs, Duration of heating.

According to Ayurvedic pharmacy *Kwath* is one part of raw drug to be boiled with sixteen part of water to be reduced up to one eighth.[4] But there is difference of opinion among Acharyas about addition of water, vessels to be used and duration of heating. Use of earthen pot is discarded now a day as it is not suitable for large scale preparation. Temperature is the important factor to be taken into consideration in order to save thermo sensitive constituent of *Kwath* drugs. Particle size of raw drugs also contributes in maintaining the quality of *Kwath*. Duration of heating also has to decide to get maximum active principles in prepared *Kwath*. These are the various factors which need to optimize in order to get standardized *Kwath*. So there is urgent need to fix few criteria to obtain optimum standard of *Kwath kalpana*. Present paper will discuss the various factors affecting quality of *Kwath* and need of standardization.

Methods and Materials

Ayurvedic literature from *Samhitas* and other texts on *Kwath kalpana* has been studied and recent paper

published in national and international journal has been reviewed for the purpose.

Pharmaceutical Factors to be considered while *Kwath kalpana*

1) Vessel for *Kwatha*

2) Proportion of water

3) Temperature

4) Particle size of *Kwathya Dravyas* (Drugs used for decoction)

5) Duration of heating

6)Analytical study of *Kwatha*

1). Vessel to be used for *Kwath*

Vessel imparts a specific role in *Kwath* preparation. In ancient time earthen pot[5] was used having qualities such temp regulation, alkaline in nature, doesn't take part with chemical reaction with ingredients which are under processing. Also due to its narrow opening it can control vapors within hence the important active principles can be saved. But due to its porous nature and size restriction it is quite impossible for large scale industries hence not suitable for large scale drug manufacturing.

Metallic coated copper vessels and vessels with coating with wet soil from outside are used instead. [6] Now a day stainless steel vessels are used due to easy availability, less costly and easy for maintenance hence preferred often. The size and shape of vessels can also affect the quality of *Kwath* as shallow vessel likely to fast evaporate the content of *Kwath* while vessels with high length and narrow opening can help in saving important phyto constituents in *Kwatha*.

2). Proportion of water to be added for *kwath* preparation

In *Kwath kalpana* proportion of water is important factor. In conventional technique of *Kwatha* sixteen part water is added and one eight is kept remained. Some opined to add eight or sixteen part of water and heating is advised to be done till one fourth remains.[7] It is also stated that proportion of water in *Kwath* is up to the judgment of pharmacist.[8] Different quantity of water is taken when *Kwath* is used for different therapeutics purpose.[9] During *Snehapaka*, quantity of water is according to the consistency (Hard, medium and Mild) and weight of raw drugs.[10] So the right proportion of water needs to be decided.

3). Temperature

During processing, the application of mild heat is required with occasional stirring to avoid destruction of the components sensitive to the higher temperature.[11] Temperature is an important factor because there are chances that can decompose some of the thermo-labile active constituents. Therefore, during the preparation of decoction, temperature should be maintained between 85-90^{0}C. [12] Mitra shuchi et al (2015) referred *Mandagni* at 30-40^{0}c. in preparation of *Shankhapushpi kwatha* in the study on comparative pharmaceutical study on different *Kalpana* of *Shankhapushpi* and its Microbial analysis.[13] Effect of high and low temperature on various phytoconstituents is needed to be studied.

4). Particle size

In conventional method of *Kwath* exact particle size of raw drugs is not mentioned. Most of the scholars use powder of raw drugs as *Yavkut churna* (Coarse powder). The degree of coarseness or fineness of a powder is expressed with reference to the nominal mesh aperture size of the sieves for measuring the size of the powders. [14] Mostly 60-100 size is preferred for *Kwath* purpose. Particle size analyzer and sieving for distribution of raw drugs are used. The exact mesh size has to be decided after pharmaceutico-analytical study on *Kwath* prepared from various particle sizes.

5). Duration of heating

One fourth and one eighth of original volume of water are the terms used in ancient methods of *Kwath* preparation. The degree of heating depends on *Laghutwa* (Easy to digest) and *Gurutwa* (Hard to digest) of *Kwath*, thereby more or less active constituents can be extracted in *Kwath*. When extra heat is given there are likely the chances of unwanted phytoconstituents to come in *Kwath* and reduce active constituents due to thermo sensitivity. The rate of mass transfer decreases as the concentration of active principle in the solvent increases, until equilibrium is reached, i.e. the concentrations of active principle in the solid material and the solvent are the same. Thereafter, there will no longer be a mass transfer of the active principle from plant material to the solvent. [15]

6). Analytical study of *Kwatha*

Qualitative and Quantitative analysis is important aspect of standardization of *Kwatha*. Standardization of *Kwatha churnas* were achieved by physico-chemical analysis, qualitative inorganic and organic analysis, thin layer chromatography (TLC), UV- visible spectrophotometry and high performance liquid chromatographic (HPLC) fingerprint studies.[16] Qualitative tests are used to detect the presence of functional group, which plays important role in the expression of biological activity such as presence of tannins, mucilage, ascorbic acid, saponins etc.[17] HPTLC is a more convenient and simple procedure in which finger printing profile is available in the form of graph and densitogram.[18] Rohit et al (2015)in the study on pharmaceutico analytical study of *Krimighna Kwatha*, added sixteen part of water that of *Kwath dravyas* (sieves no 20-40) to be reduced upto one eighth in stainless steel container keeping temperature between 35-98^{0}c helps to develop few analytical parameters.[19] Vyas palak et al (2013) in the study on ointment prepared from *Panchvalkal* and *Nimba kwatha* used coarse powder(sieve no 10)and sixteen part water to be reduced upto one eighth tested on physicochemical and HPTLC study. [20] Hence qualitative and quantitative analysis can be done on the basis of different variables such as type of vessels, proportion of water to be added for making *Kwatha*, effect of different degree of temperature on phytoconstituents, particle size of *Kwath churnas* and duration of heating to achieve standard quality of *Kwatha* in terms of phytoconstituents to substantiate the clinical efficacy.

DISCUSSION

In *Kwath kalpana* standardization of pharmaceutical factors plays important role. Vessels to be used

should be less reactive or nonreactive to the drugs used. Although due to practical difficulty it is quit not possible to use earthen pot, it should be replace with thick base vessels with narrow opening which can save important phyto-constituents up to some extent. Different proportion of water (4, 8 and16) is mentioned in ancient method of *Kwath*. Usually water is added according to the judgment of pharmacist and consistency of raw drugs. Most of the time, it is difficult to judge the consistency of drugs especially in poly-herbal content of *Kwath*. Hence there is a need of qualitative and quantitative study according to the proportion of water so that water, heat and time can be saved. Regulation of temperature is also important to save heat labile phytoconstituents. *Mandagni* (Less heat) is the term used to denote less heat while preparing *Kwatha*. With the use of thermometer it is possible to count exact temperature now a day. Various previous studies on *Kwath kalpana* suggest temperature between 95-100^{0}C which proves very mild heat is required for *Kwath*.

Particle size reduction is important for *kwath*. Less the size of particles more will be the surface area ultimately encouraging phyto-constituents to enter in the solvent (water) and vice versa. Therefore exact size of particles (*Churna*) for *Kwath* needs to be standardized in order to get good quality *Kwatha*. Repeated study of *Kwath kalpana* on different particle size will help to decide proper particle size. Heating up to one forth or one eighth is mentioned in Ayurvedic pharmacy.

Concentration of *Kwath* (less or more) is usually depends on its therapeutic value and patients digestive capacity, So here is need to decide up to what extent it should be boiled. Qualitative and quantitative estimation of phyto constituent by physicochemical and chromato-graphic studies by controlling above variables is the need of hour in order to achieve uniformity in pharmaceutical preparation of *Kwatha* up to some extent.

CONCLUSION

Kwath kalpana is utmost important in Ayurvedic pharmacy due to the basis of other important dosage forms. Although Standard parameters for *Kwath kalpana* for particular drug is mentioned in Ayurvedic pharmacopeia of India, but pharmaceutical factors are not controlled. Study on various pharmaceutical factors such as vessel, temperature, water to be added, particle size, duration of heating *Kwath* and its standardization in terms of respective active phyto constituents need to optimize in present scenario for universal acceptance so that uniformity can be achieved.

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