VARIOUS EXTRACTION TECHNIQUES IN ANCIENT PHARMACOLOGY
(BHAISHJYA KALPANA)

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ABSTRACT
Ancient extraction techniques has been practice in Ayurveda under Bhaishjya kalpana, a medicinal branch deals mainly with herbal pharmaceutics. With the evolution of five basic primary dosage form (Panchvida kashaya kalpana) in Samhita kala, most of the other secondary extraction techniques have been came into practice. The choice of these dosage forms are according to consistency and availability of raw drugs, Agni (Digestion capacity) Prakriti (Nature), Bala of patient (physical and mental capacity), Kala (season) and Vaya (age) etc. Present paper aimed to highlight the importance of ancient extraction techniques so that basic concept behind these techniques is understood. Decoction is the most important primary dosage from panchvida kashaya kalpana on the basis of it other dosage form have been prepared such as Pramathya, Laksharasa, Kshirpaka, Aushadsiddha paniya, Ghanasar, Arka kalpana and Asavaarishta. Cold infusion and hot infusion are other extractions techniques which are mainly used for volatile drugs with less potency. Mantha, Panak and Sharkara are the other secondary dosage forms which are practiced frequently. All the dosage forms have their own importance due to its specific therapeutic value, easy palatability, increased shelf life and convenient dispensing.

Keywords: Bhaishjya Kalpana, Decoction, Mantha, Dispensing

INTRODUCTION
Ayurveda the oldest medical tradition is mostly relies on plant based medicines. The use of natural products with therapeutic properties is as ancient as human civilization and for a long time plants products were the main sources of drugs. Bheshaj (Drug) has given prime importance in Ayurveda as it is the tool for curing diseases
and maintaining the wellbeing. The various Kalpana (various dosage form) of these drugs according to Vaya (age), Kala (season), Bala (Physical and mental strength), Prakruti (Nature) etc came into practice in Bhaishiya kalpana, a medicine branch deal with pharmaceutics. It is the science of manufacturing and dispensing the medicines. Various medicinal preparation such as Somarasa, sura, Madhya etc. were in practice since Vedic kala,¹ however exact nature of pharmaceutical processing was not clearly mentioned.

Extraction of crude drugs came into light with evolution of panchvidha kashaya kalpana in Samhita kala.² Swarasa, Kalka, Kwath, Heema and Fanta are the five basic and primary dosage form accepted by Ayurveda and hence paved foundation for various Upkalpanas (secondary dosage form)³ These kalpanas are highly potent and concentrated. Choice and dose of these Kalpana are according to the consistency and availability of raw drugs, Prakruti (Nature), Bala of patient (mental and physical capacity), Kala (season) and Vaya (age) etc.⁴ In modern pharmacology extraction is done by using various solvent other than water. Extraction mimics Kwatha (Decoction), Fanta (Hot Infusion) and Hima (Cold Infusion) in Ayurvedic pharmacology. There are various extraction techniques from simple traditional extraction to advance extraction technologies. The purpose of standardized extraction procedures for crude drugs (medicinal plant parts) is to attain the therapeutically desired portions and to eliminate unwanted material by treatment with a selective solvent known as menstruum⁵

In Ayurveda extraction (kwatha) of raw drugs is done in various ways so as to get maximum extract of that drug especially for direct therapeutic use and to increase shelf life. Although various new advances in extraction technologies are on rise, having good advantages and limitations also, conventional extraction techniques have their own advantages. The present paper aimed to focus what are the various ways of extraction to enhance their therapeutic properties, for extension of its expiry date, increase palatability etc. so that we can understand its importance and applicability in various field of pharmaceutical area.

**Various extraction techniques**

**Kwatha (Decoction)**

In this process, the crude drug is boiled in a specified volume (i.e. 1:16 or 1:8) of water for a definite time; it is then cooled and strained or filtered. The initial ratio of crude drug to water is fixed according to the consistency (soft, medium and hard) of drugs; the volume is then brought down to one-fourth or one eighth of original volume by boiling during the extraction procedure. The concentrated extract thus obtained is filtered and used as such or processed further.⁶ Use of Mriticapatra (Earthen vessel) and Mandagni (Less temperature) are mandatory things for conventional method of Kwathkalpana. Addition of water is also according to the consistency of drugs i.e. Mrudu (Soft), Madhyam (Less hard) and Kathin (Hard) and proportion of raw drugs taken for kwatha.⁷⁻⁸ This is to get maximum extraction. However, it is been suggested that addition of water and how much it should be remained at the end of extraction is according to the judgment of Vaidhyas.⁹ As earthen pot is impractical now a days so coated copper or iron vessels can be used.¹⁰ Keeping lid on the
vessel while preparation of Kwatha is strictly avoided as it may spoil the quality of kwath.\textsuperscript{11}

\textbf{Pramthya}
It’s a type of decoction. Fine paste of raw drugs to be boiled with eight part of water and to be kept up to one fourth, filtered.\textsuperscript{12} Its therapeutic use is different than Kwath as it is used in median stage of disease.\textsuperscript{13} Raw drug taken for Pramthya is fine powder hence it is more potent than decoction.

\textbf{Laksharasa}
Laksha is red colored type of gum found on big trees. It is used in its extract form called Laksharasa. There are various methods of Laksharasa preparations.
1) When Laksha is in fresh form then it is extracted with six part of water keeping it overnight and next day it is rinse properly and then filtered with cloth at 21 times.\textsuperscript{14}
2) When Laksha is in its dried form, one part of Laksha boiled with eight part of water up to one fourth. It is also filtered at 21 times.\textsuperscript{15}
3) In Dolayantra technique, one part Laksha is taken in soft cloth and it is tightly knot and then keep in middle of Dolayantra having six part of water to be boiled up to one fourth, filtered at 21 times. This technique can be done with other drugs such as Lodhra, Badaripatra kalka and Swarjika Kshar. So as to increase efficacy of Laksharasa.\textsuperscript{16}

\textbf{Kshirpaka (Medicated milk)}
Kshirpaka is one of the dosage forms includes use of milk along with water for extraction. The principle behind Kshirpaka is to enhance properties of milk by adding the drugs so that the bitterness and pungent qualities of raw drugs gets milder. With addition of milk nutritional value also increases.
One part raw drug with eight part milk and thirty two part of water to be boiled until to remain only milk and then filtered.\textsuperscript{17} It is especially mentioned in chronic fever.
Another method of Kshirpaka is mentioned in which one part of raw drug along with fifteen part of milk and fifteen part of water to be boiled up to remain milk only.\textsuperscript{18} It is a Laghu (Easy to digest) Kshirpaka as compare to previous one.
Some pharmacist practices Kshirpaka with direct addition of respective decoction in the milk so that whole extract of raw drug can be obtained in water which is not possible in previous technique due to the presence of milk.\textsuperscript{19} Kshirpaka is usually practice with pungent drugs.

\textbf{Aushadsiddha paniya (Medicated water)}
In Aushad siddha paniya kalpana one part of raw drug is taken with sixty four times of water to be boiled up to half i.e. thirty two part of water, is then used for various purposes such as to drink and to make Peya, Vilepi etc. (various dietary dosage forms used especially in disease condition).\textsuperscript{20} The principle behind this dosage form is that one can use medicated water for drinking purpose and making various dietary form instead of using plain water.

\textbf{Heema Kalpana (Cold Infusion)}
Raw drug is infused in cold water throughout night is termed as Heema or Shrutshita jala. The concept behind Heema kalpanais to save active principles of volatile drugs. One part of raw drug is infused in six part of cold water to be kept whole night (8 to 10 hrs.) and in the
next morning marc is squeezed mashed properly and filtered.\textsuperscript{21} \textit{Heema} mostly used for those drugs having active principle in volatile form.

\textbf{Fanta Kalpana (Hot Infusion)}

In \textit{Fanta kalpana} raw drug is infused with boiling water for few minutes (up to it become lukewarm) then mashed and filtered. It is \textit{laghu kalpana} (Easy to digest) in \textit{Panchvidha kashaya kalpana}. It is very easy and less time consuming process among all other dosage form. Due to very less extraction, it is used in patients having very poor digestion capacity.

In \textit{Fanta kalpana} one part of drug is infused with four part of boiling water for few minutes.\textsuperscript{22} Its therapeutic use is instant as compare to other extraction techniques.

\textbf{Mantha Kalpana}

The term \textit{Mantha} refers to churning. One part of raw drug is triturated with four part of water and filtered.\textsuperscript{23} Instead of hot water cold water is also used in the process.

\textit{Mantha} is also prepared by mashing \textit{Sakktu} (A dietary form) with \textit{Ghrit} (ghee) and then infused with cold water and filtered. It should not be too thick or too thin in consistency.\textsuperscript{24}

\textbf{Panak Kalpana}

It is also called \textit{Panha} in local language, mostly prepared from juicy fruits. Pulp of fruit is taken with sixteen part of water to be kept for some time and filtered.\textsuperscript{25} Addition of sugar, salt, cardamom powder etc. is optional. Its use is especially mentioned in summer season.

\textbf{Sharkara (syrup)}

It a type of syrup from sugar to be flavored with scented flowers such as Rose, \textit{Kewada} etc. or with addition of fruit juices. One part coarse raw drug is infused with eight part of water in the night, it is then boiled in next morning up to one eighth, filtered, further it is mixed with same quantity of sugar to make a syrup form.\textsuperscript{26} In other technique cold or hot infusion of raw drug or distilled liquids are boiled with twice sugar to get a syrup.\textsuperscript{27}

\textbf{Arka Kalpana (Distilled formulations)}

The process is meant for heat sensitive volatile drugs. Extract is obtained by distillation of that plant material. For this purpose distillation apparatus (\textit{Arkapatana yantras}) is used. one part of raw drug powder is distilled with 10 times of water up to ½ of water taken.\textsuperscript{28} In distilled formulations the shelf life of that drug is increased.

\textbf{Aasava and Aristas (Fermented Preparations)}

Here the extracts are obtained by fermentation of plant materials. It is called as \textit{Sandhan Kalpana}.\textsuperscript{29} Alcohol generated in the process is act as preservative. Decoction or express juice of medicinal plants, sugar or jiggery, \textit{sandhaniya dravya} (ferments) along with \textit{Prakshepdravya} (powdered drugs usually flavored) is allowed to ferment in a close container.\textsuperscript{30} This facilitates the extraction of active principles of drugs. This dosage form has no shelf life hence can to preserve for long duration as it is more effective therapeutically over a period of time. Generally heat sensitive and flavored drugs are subjected for \textit{Aasava} preparation with its expressed juices or cold infusions and other those are thermo stable drugs are subjected for
Arista preparations with its decoction. This facilitates the extraction of the active principles contained in the drugs.

**Rasakriya and Ghanasaar (Concentrated decoction)**

It is solid extract prepared by evaporation of the decoction constantly on low temperature. When it becomes semisolid it is called as Rasakriya. When it is further dried to form solid mass it is called as Ghanasaar. This dosage form is also called as Avaleha or leha. It has longer shelf life.

**DISCUSSION**

Kwath Kalpana is the main dosage form in Ayurvedic pharmaceutical industry. Basic aim of it to get maximum active constituents, hence, quantity of water differs according to the constituency and proportion of raw drug to get maximum yield. Also active principles of it are saved by mild heating and use of earthen pot as mentioned in ancient method of Kwatha. Pramthya is second most important dosage form as it has maximum extraction due to use of fine powder of raw drug for kwatha. As per therapeutic value is concern Pramthya has been use to those having good digestive capacity as it has more potency than Kwatha. Laksharasa is prepared from Sticky Laksha with the aim to get its extract only but not its sticky particles so it is stained twenty one times. In Kshirpak kalpana, milk is used along with water for extraction of raw drugs especially with bitter and pungent taste with the aim to mild its astringent properties and bitterness. Milk itself is a complete food hence Kshirpaka become high therapeutic and diet value. Aushad-siddha paniya is the extraction technique which is mainly aimed to get medicinal water to the patients instead of plain water with respective therapeutic properties. Cold infusion and hot infusion has various advantages as cold infusion is used especially for cooling effect on body and is prepare mainly with volatile drugs so as to save active constituent. Hot infusion is the quick extraction with less potency hence used for those with minimal digestive capacity. Mantha kalpana is triturated extraction instead of direct heating with nutritional value. Panak Kalpana is meant to get benefits of sugar syrup and juicy fruits with added flavors to enhance its taste in order to provide relief from excessive water loss from body. Sharkara or syrup form of extraction is mainly for long shelf life. Arka Kalpana is the distillation of various volatile raw drugs with water having good therapeutic value with less dosage and long shelf life. Alcoholic fermentations are the extraction having high therapeutic value with no shelf life due to self-preservation. Ghanasar is the repeated boiling of decoction to get it concentrated and dry to increase its shelf life and decrease its dose.

**CONCLUSION**

Panchavidha kashaya kalpana are the basic and primary dosage form. All the other secondary dosage form have its own importance; for its therapeutic value, enhancement of properties due to special pharmaceutical techniques, easy palatability as compare to basic dosage forms, increased shelf life and easier dispensing.
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