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HARMONIC AND NON-COMPETITIVE TOTAL DISSOLUTION OF JRK'S KABASURA KUDINEER AND ASSOCIATED SUPERIOR THERAPEUTIC VALUE

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ABSTRACT

Kabasura kudineer is a Sastric Siddha Medicine indicated for respiratory infections with fever. During pandemic it gained lot of importance as a prophylactic and treatment medicine. This is proven to reduce the viral multiplication and also boosts immunity there by reduces the infections. It contains 15 herbs in which various plant parts are used. By co-milling and extracting from the combination may result in loss of certain actives due to density variation, co-dissolution disturbances respectively. In the present study Dr.JRK's Kabasura kudineer choornam and tablet was studied by improving the extraction process to achieve the complete phyto-actives in the final formulation as per siddha formulary. The complete details and the process involved are discussed in the article.

KEYWORDS: Kabasura Kudineer, Pandemic, Immunity, Respiratory infections, Extraction of kabasura kudineer.

INTRODUCTION

Dr.JRK's Research and Pharmaceuticals is a forerunner organization in conducting extensive research and introducing research based siddha products with superior therapeutic value, ease of use, high compliance scope and also such products would fits into the modern portfolio. The company also takes pride in introducing the Siddha system of healing practices to the world by offering complete solace to Psoriasis in the form of a product called Dr.JRK's 777 oil.

Kabasura kudineer (KSK) has gained global attention due to its effect against COVID pandemic that plagues mankind all over the world and humanity at large have started to take KSK for preventing the viral attack.[1]

We have done extensive research in KSK in order to make its acceptance high by people at large and at the same time we also want to ensure the superior therapeutic delivery and higher compliance at minimal effort in preparing the medicine.

The KSK is comprised of 15 herbs wherein some herbs are leafy, some are seeds, some are rhizomes, some are fruits etc. the water soluble nature of different herbs in a given volume of water at given time will vary vastly due to the structural and functional aspects of the phyto-constituents.[2] This may be the reason why the ancient Siddha system of healing has apostles boiling of the herbal conglomerate of KSK powder, initially in 3000 milliliters of water and then to reduce the same to 250 ml by further continuous boiling. 30ml of the decoction from the above is the dose recommended for consumption.[3]

The time required to achieve complete extraction may be quite high and hence the Siddha system would have recommended 3000ml of water to start with and to achieve 'near equal' concentration of the extracts of all 15 herbs may require the evaporation of nearly 91.7% of water from the above. We have employed the above cardinal principle of ancient healing practice called Siddha in formulating JRK's KSK either in tablet and ready to drink dosage forms.

We have ensured the complete dissolution of the phyto-actives from each herb and the dissolution was not affected by the solubility nature of different phyto-actives present in individual herbs and or the conglomerate.

The term dissolution in chemistry is nothing but the phyto-actives occupying the intra molecular space of the solvent reaching a colloidal equilibrium.[4] In the given volume of a given solvent, the intra molecular space will be constant and therefore the intra-molecular space filling is always achieved by the phyto-actives based on both the size and solubility.

The phyto-actives with least particle size and or the phyto-actives which are highly soluble can hinder the subsequent dissolution of the phyto-actives of the same herb or of different herb (s) in the polyherbal formulation

due to non-availability of space. This extra-ordinary science has been well understood by the ancient siddha system of medicine and that is why a special method of preparation of KSK has been recommended.

To catapult the huge commercial advantage, many companies are introducing KSK after milling the 15 herbs with or without particle size reduction through fine sieving. Further the partially sieved powders have been introduced by some companies in the market as instant drink where the potential therapeutic benefit of all 15 herbs in the instant preparation in the given time is quite dubious. The scientific meticulous-ness and therapeutic superiority of JRK's KSK both the instant (ready to drink) and tablet dosage form are presented in the paper.

MATERIALS AND METHODS

Composition of KSK and parts of herbs used

Chukku	(*Zingiber officinale)*	Rhizome	: 1 part (6.67%)
Tippili	(*Piper longum)*	seed	: 1 part (6.67%)
Ilavangam	(*Syzygium aromaticum*)	Flower bud	: 1 part (6.67%)
Cirukancori	(*Tragia involucrate)*	Root	: 1 part (6.67%)
Akkirakaram	(*Anacyclus pyrethrum)*	*Root*	: 1 part (6.67%)
Mulli ver	(*Hygrophilia auriculata)*	*Root*	: 1 part (6.67%)
Kadukkaithol	(*Terminalia chebula)*	Pericarp	: 1 part (6.67%)
Adathodai	(*Adathoda vasica)*	Leaf	: 1 part (6.67%)
Karpooravalli	(*Anisochilus carnosus)*	Leaf	: 1 part (6.67%)
Kostam	(*Costus speciosus)*	Root	: 1 part (6.67%)
Seenthil	(*Tinosporia cordifolia)*	*Stem*	: 1 part (6.67%)
Siru thekku	(*Clerodendrum serratum)*	Root	: 1 part (6.67%)
Nilavembu	(*Andrographis paniculata)*	Whole plant	: 1 part (6.67%)
Vattathiruppi	(*Sida acuta)*	Root	: 1 part (6.67%)
Koraikizhangu	(*Cyperus rotundus)*	Rhizome	: 1 part (6.67%)

Testing of dissolution

Five gram of the respective herbal powder was weighed and dissolved in 50 of water separately and then it was heated to 60 C for different time points. The water was then evaporated through lyophilization. Prior to lyophilization[5], the volume of the extract was filtered, weighed and then dosed into a pre-weighed container. The weight difference from initial to final value was calculated and the % of extractable matter was thus arrived.

Co-dissolution

Two or more herbal materials were dissolved in water simultaneously as described above and the samples were fine filtered and % of extractable matter was calculated as per the method described above. The difference in value from the value obtained from prolonged dissolution condition was used for final calculation.

Effect of pH on dissolution

The above dissolution experiment was conducted in water adjusted to three different pH conditions and then the rate of dissolution was calculated as described above.

RESULT

The rate of dissolution of the phyto-actives from 15 plants is given in the table 1

The rate of dissolution of phyto-actives from seed / fruit was higher when compared to rhizome, in 30minutes time point. Next is the order was the whole plant or stem which yielded quick dissolution than rhizome. But to achieve complete dissolution of the constituents, it took 2hrs Table 1.

Table 1: Rate of dissolution of herbs Vs time (5 gm of herb used in water at 60^0C).

Herbs	Dissolution time /percentage/50 ml water			Complete extraction time(2 hrs) /percentage in 100ml of water
	30 min	60 min	90min	
Chukku	0.1	0.2	0.4	0.8
Tippili	0.2	0.3	0.35	0.4
Ilavangam	0.1	0.12	0.18	0.2
Cirukancori	0.02	0.06	0.08	0.1
Akkirakaram	0.2	0.2	0.2	0.2
Mulli ver	0.02	0.06	0.07	0.1
Kadukkaithol	0.2	0.23	0.25	0.3
Adathodai	0.2	0.3	0.32	0.4

Karpooravalli	0.1	0.15	0.18	0.2
Kostam	0.02	0.03	0.04	0.1
Seenthil	0.1	0.15	0.16	0.2
Siru thekku	0.1	0.12	0.15	0.2
Nilavembu	0.1	0.12	0.13	0.2
Vattathiruppi	0.02	0.03	0.2	0.3
Koraikizhangu	0.02	0.04	0.06	0.1

Table 2: Co dissolution to ascertain interference (5 gm of herb used in 100ml of water at 60^0C).

Herbs	Dissolution time (90 min)/percentage	Complete extraction time (3 hrs) /percentage
Chukku +Kadukkai	0.8	1.1
Tippili+Nilavembu	0.4	0.6
Ilavangam+ Siru thekku	0.2	0.4
Akkirakaram+seendil	0.21	0.4
Mulli ver+Adathodai	0.32	0.5
Kostam+ Vattathiruppi	0.26	0.4
Koraikizhangu+ Karpooravalli+ Cirukancori	0.20	0.4

Co-dissolution method has shown high interference of phyto-actives between herbs which resulted in poor yield. When the number of herbs was increased to three instead of 2, the dissolution competition was even higher as the yield of phyto-actives was lower than the total value present. Table 2.

Table 3: pH linked dissolution of phyto-actives.

Herbs	Dissolution time /percentage/50 ml water /90min			Complete extraction time(2 hrs) /percentage in 100ml of water(pH 7)
	pH 3	pH 5	pH 7	
Chukku	0.1	0.1	0.6	0.8
Tippili	0.02	0.03	0.35	0.4
Ilavangam	0.15	0.12	0.1	0.2
Cirukancori	-	0.01	0.02	0.1
Akkirakaram	0.1	0.2	0.03	0.2
Mulli ver	-	-	0.05	0.1
Kadukkaithol	0.1	0.2	0.2	0.3
Adathodai	0.2	0.3	0.4	0.4
Karpooravalli	-	-	0.1	0.2
Kostam	-	0.02	-	0.1
Seenthil	-	-	0.1	0.2
Siru thekku	-	-	0.1	0.2
Nilavembu	0.02	0.03	0.1	0.2
Vattathiruppi	0.1	0.1	0.2	0.3
Koraikizhangu	0.01	0.02	0.05	0.1

Most of the phyto-actives showed greater affinity towards neutral pH than extremely acidic. Therefore the effect of pH as one of the determining factors of dissolution does not seem possible

DISCUSSION

Converting polyherbal herbal kudineer or churna to instant drink or tablet dosage form requires great level of scientific understanding starting from biotyping of the individual plants used in the formulation, part of the plant used, nature of the phyto-actives present in each herb, dissolution rate, pH sensitivity etc.

The conventional kudineer preparation follows stringent doctrine which is often cumbersome in preparing the kudineer but when we consider multitude factors that could influence the dissolution rate, the procedure laid out in the ancient Siddha scriptures clearly confirms to absolute chemistry and associated science of modern day which was well known to the ancient Siddha system of healing.

In our present investigation, we observed that the phyto-actives of several plants in the conglomerate of KSK have different levels of dissolution and time kinetics. The above findings we obtained by subjecting the herbs in KSK individually by checking the dissolution kinetics

of the phyto-actives. The dissolution in simple term refers to the separation and filling of phyto-actives[4] from the herb when dispersed in water after powdering the dried herbal material, to the intramolecular space of the solvent- water. When the rate of dissolution of one of the two herbs in a conglomerate is if high, the space available in the solvent system for other phyto-active to occupy their position would naturally decrease and hence such constituents may not be present in the solvent system in colloidal form. Perhaps such constituents may present in the solvent system as particulate matter and may sink to the bottom when the solvent is rested for a while. When filtration procedure is applied, the chance of losing out of all such phyto-phamaceuticals is quite high. Further the phyto-pharmaceuticals at the size of occupying the intramolecular space of the solvent system will have greater absorption through cellular and intracellular space in our intestinal system and such phyto-actives can exhibit high therapeutic effect.

The competitive dissolution quotient of various phytochemicals within the same plant and between plants in a polyherbal formulation we have established through co-dissolution method where the absolute value of the extractable matter was already established so was the time kinetics. During co-dissolution, significant competition was observed when one herb has high dissolution phyto-pharmaceutical over other was present. Instead of two herbs, when we incorporated three herbs in co-dissolution system, we observed further noise in the dissolution kinetics.

Due to the global want for KSK to treat the global pandemic COVID, several AYUSH product manufacturers are just milling the herbs and admixing and then selling them in the market. Even if all the 15 herbs are made into even particle size, still the phyto-medicine availability will not be equal because of the change in dissolution rate.[6] The compromise of therapeutic will be higher in instant or ready to drink of KSK.

Dr JRK has formulated both ready to drink KSK and the tablet dosage form by extracting the complete phyto-pharmaceuticals individually and then the conglomeration has been made in accordance with the formulary of KSU as per siddha literature.

We have ensured the harmonious and near equal presence/required level of presence of the phytoconstituents in the dosage form. Further we have also judiciously reduced the particle size to the level of intramolecular space of the solvent – water and hence the absorption of the same through intestinal villi is aided better. Further the atomized size of the phyto-constituents also may not affect the bitter taste of the formulation severely.

Considering the in-depth science employed in the formulation of KSK of Dr JRK's either the ready to drink or tablet dosage form, we believe the formulation of Dr JRK's will be superior over most of the KSK available in the market. It is not just convenience and compliance scope we have increased but also have made earnest attempt to increase the therapeutic value of KSK of Dr JRKs.

The metabolism based study (data submitted elsewhere for publication) of KSK has revealed that in Dr JRK's KSK of, the herbal constituents has been stacked based of metabolism susceptibility vis-à-vis particle size and hence better absorption is aided for each of such constituents much before their metabolism to take place.

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