REVIEW ARTICLE

Kwatha Kalpana: It's Versatility with Probable Advancement

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Abstract

Gigantic mushroomic bloom of Ayurvedic pharmaceutical industries has raised a big question mark on standardization parameters at each stage of manufacturing process. Kwatha Kalpana being the most considerable and extensively used dosage form in Ayurvedic pharmaceutics has some disadvantages in certifying the quality control of the herbal ingredients, time duration, and inconvenience required in preparation, transportation, and storage. This hindrance diminishes compliance and may hamper with the management of processing of drugs. Various pharmaceutical factors are needed to be monitored such as vessel's dimension, temperature, proportion of water, particle size of crude drug, duration, and quantum of heat. Due to globalization, development in its different dosage form is needed without compromising the therapeutic efficacy. The dosage form is being modified and improved from decoction (liquid) to kashaya powder, rasakriya, ghana, tablets, capsules, syrup, and Pravahi kwatha. This conversion has many advantages over kwatha preparation, i.e., acceptability and prolong shelf life. Hence, the present paper discusses necessitate and proper advancement for pharmaceutical standardization of kwatha to optimize the regulating factors to maintain uniformity in pharmaceutical industries for universal acceptance.

Key words: Dosage form, Kalpana, Kwatha, standardization

INTRODUCTION

Bhaishajya Kalpana (Ayurvedic Herbal Pharmaceutics) endorses the five fundamental dosage forms, namely, Swarasa (Fresh juice), Kalka (Herbal paste), Kwatha (Herbal decoction), Hima (Cold water infusion), and Phant (Hot water infusion).[1] Among them, Kwatha Kalpana is the most significant and widely used dosage form in Ayurvedic pharmaceutics. This dosage form is acquired by boiling of herbal drug(s) with water in a specific proportion and is reduced to desired quantity provided the heat is moderate. While formulating it as per Ayurvedic principles, stresses on various clauses where the quantity of water, nature of drug, intervention of heat, and addition of Prakshepa Dravya play a major role in developing the effectiveness of the preparation.[2] Decoctions also form the base of various Ayurvedic formulations such as Asava, Arishta, Taila, Gutika, and Avaleha in various pharmaceutical process. It is used internally for drinking purpose, medicated enemas, and externally for eyewash. Kwatha Kalpana is having upper hand because of their many unique qualities, namely, easy availability of raw materials, single drug-herb decoction, good adaptability, better absorption, and assimilation in body system and retains many of the water-soluble portions present in raw materials.

Kwatha is very effective and widely used dosage form but has some disadvantages such as difficulties in ensuring quality control of the herbal ingredients, time and inconvenience required in preparation, transportation, and storage, and probable loss of active ingredient, and is difficult to prescribe in accurate dose. These obstacles reduce compliance and may interfere with treatment. Due to globalization, there is a need of advancement in its dosage forms and other parameters. In this circumstance relevance of modern processing methods,

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advanced machinery and packaging technologies had given the opportunities to prepare consumer-friendly dosage forms of Kwatha. Administration of the drug in various dosage forms provides a prospect to the physician to prefer better options. This Kalpana with its relevancy to modern technology should be implemented to achieve increased shelf life, increased potency, and greater palatability.

PERCEPTION OF KWATHA IN AYURVEDIC PHARMACEUTICS/ SCIENCES

Kwatha, Shruta, Kashayam, etc., are the various synonyms of Kwatha. However, this dosage form stands next to Swarasa, and Kalka Kalpana, one of the most used dosage forms among all primary pharmaceutical preparation of Ayurvedic pharmaceutics with a wide range of therapeutic usage. Various types of Kwatha had been practised by most of the leading practitioners in India. Moreover, there is necessitate in adopting some standard guideline.

STANDARDS FOR KWATHA PREPARATION[3]

Pharmaceutical factors are needed to be controlled such as: Vessel, temperature, proportion of water, particle size of crude drug, duration of heating, and quantity of Prakshepa Dravyas.

Vessel used should be non-reactive to the drugs. Earthen pots as mentioned in classics are practically difficult to handle, so it can be replaced with stainless steel vessel with narrow opening which can save active phytoconstituents up to some extent.

Different proportion of water (4, 8 and 16) mentioned in classic depends on the hardness as well as on quantity of the drug used, for example, 4 times for soft herbs (herbs whose leaves and flowers are used), 8 times for medium hardness herbs (includes soft barks of plants, roots of shrubs and plants, soft roots, tubers, and medium tubers), while 16 times for too hard plants (Hard barks of trees, root bark of trees and creeper).[4] Acharya Yadavji has mentioned that the proportion of water may be decided on the basis of the quantity of drug taken.[5] However, most of the times, it is difficult to judge the consistency of drugs, especially when the contents are poly herbal. Hence, an emergence need is required for qualitative and quantitative study to standardized quantum of heat and time duration.

Regulation of temperature protects heat labile phytoconstituents. Madhyamagni is the term used to denote mild-to-moderate heat in preparation of kwath. Temperature holds the significant factor in preserving thermolabile active constituents. Therefore, during the preparation of decoction, temperature should be maintained between 85 and 90°C.[6]

Particle size reduction is another important factor for kwatha. Less the size of particles, more will be the surface area which ultimately encourages phytoconstituents to enter in the solvent (water) and vice versa. Particle size determination with the repetitive study of Kwatha Kalpana on different particle size will help to set the standard parameters. The concentration of Kwatha (less or more) usually depends on its therapeutic value and patients' digestive capacity, so the extent of boiling should be standardized. Qualitative and quantitative estimation of phytoconstituents by physicochemical and chromatographic studies by controlling above variables is the need of the hour to achieve uniformity in pharmaceutical preparation of Kwatha.

Ayurveda emphasizes to add some adjuvant to increase potency and palatability of kwatha such as honey, sugar, and cumin powder. Sugar may be added to the decoction in doses of 1/4, 1/8, and 1/16th part, respectively, for vata, pitta, and kapha disorders. If honey is to be added, it should be in the reverse order of proportion. Jiraka, guggulu, kshara, lavana, silajit, hingu, and trikatu are to be added in proportion of one Sana (4 g) each. Milk, ghee, jaggery, oil, cows urine, or any other liquid are to be added in one karsa (12 g) each.[7]

KWATH IN DIFFERENT DISEASE CONDITION[8]

Kwatha Manimala describes about 394 kwatha preparation used in various disease conditions. Table 1 shows probably all type of kwatha preparations:

Kwatha preparations in Ayurvedic Formulary of India (AFI):[9]

AFI mentions 25 Kwatha churna depicted in Table 2.

LOGICAL SCIENTIFIC CRITERIA FOR DOSAGE FORMS SELECTION

Ayurveda pharmaceutics elucidate numerous dosage forms. Dosage form means form of medicine which is suitable to administer to patient. In the presence of various dosage forms, selection of superlative dosage form is a difficult task to handle. The dosage form selection depends on several factors including yukti (judgmental knowledge) of physician. Factors which are responsible for dosage form selection are as follows requirement of particular chemical constituents, patient's comfort, choice based on patient's disease and stage

Table 1: Kwatha preparation used in various disease conditions

Formulation	Rogadhikara	Reference
Angamardaprasamana kasaya churna	Angamarda (Body ache)	Cha.smh. 4/44
Arkadi kwatha churna	Jvarachikitsa	Vaidyajivanam jvaracikitsa 42
Asmarihara kasaya churna	Asmari, Mutrakrcchra	Siddhayogasangraha
Kutajastaka kwatha churna	Atisara	Yogaratnakara
Krimighna kasaya churna	Krimi roga	Cha. Smt. 4/15
Guducyadi kwatha churna		Sha. Smt. M.k. 2/8
Gojihvadi kwatha churna	Jvarachikitsa	Siddhayogasangraha
Trnapanchamula kwatha churan	Mutrakrcch	B.R. mutrakrcchrogadhikars/10
Triphala kwatha churna	Sotha roga	B.R. Sotharoga/64
Pathyadi kwatha churna		Sha. Smt. M.k. 2/35-36
Triphala kasaya churna		Bharat Bhaisajyaratnakara Kasaya Prakarana
Darvyadi kwatha churna	Strirog	B.R. Strirogadhikara 4
Devadarvadi kwatha churna	Strirog	B.R. Strirogadhikara 380-384
Dhanyapancaka kwatha churna	Atisarog	B.R. Atisaragadhikara 12
Nimbadi kwatha churna	Masurika	B.R.Masurika rogadhikara 143-144
Phalatrikadi kwatha churna	Amlapittacikitsa	Chakradatta Amlapittacikitsa 12
Pathyadi kwatha churna		S.S.M.K.2
Masabaladi kwatha churna	Vatavyadhi	B.R.Vatavayadhi 62-63
Mutravirecaniya kwatha churna		Cha.Smth. sut, stn. 4/35
Mutrasangrahaniya kwatha churna		Cha.Smth. sut, stn. 4/33
Rasnasaptaka kwatha churna	Amavata	B.R. Amavatadhikara 9
Vatsakadi kwatha churna	Atisara	Cakradatta, Atisarachikitsa 63
Varunadi kwatha churna	Asmari	Cakradatta Asmarichikitsa 29
Svasahara kasaya churna	Swasa	Cha.Smth. sut, stn. 4/37
Stanyajanana kasaya churna		Cha.Smth. sut, stn. 4/17
Stanya Shodhana Kasaya churna		Cha.Smth. sut, stn. 4/18

of disease, digestive strength, and dosha dominance in the individual.

Based on requirement of particular chemical constituents

If water extracts are needed in a disease, then usually, Kashaya is preferred. In ancient text like Charaka Samhita, more than 160 such dosage forms are mentioned. If fat soluble principles of herbs are needed, then Taila/Ghrita is preferred. If volatile oils are to be used, then Churna/Hima (cold infusions) is opted.

Choice of dosage form based on patient's comfort

Depending on the particular choice of the patient, certain dosage forms like Swarasa (fresh juice) are not suitable to patients, so kwatha can be preferred as psychological factors do have impact on the efficacy of the medicine.

Choice based on patient's disease

Problem arises for diabetic patient; we cannot administer Asava and Arishta in large doses, or for long period of time, because these dosage forms have sugar content. In such a condition, Kwatha or tablet can be chosen.

Choice based on the stage of disease

Ayurveda sees digestive strength as a primary consideration point. When the digestive strength is low in early stages of disease, patient might not be able to digest heavier dosage forms such as avaleha or ghrita causing aushadha ajirna. Here, medicine itself causes indigestion and may lead to increase in morbidity (imbalance in dosha) and eventually becomes difficult to cure. In initial stages of disease, Kwatha (herbal decoction) is preferred naturally and has capacity to digest.

Table 2: Kwatha preparations in Ayurvedic formulary of India

Disease Condition	Number of Kwatha	Disease condition	Number of Kwatha	Disease condition	Number of Kwatha
Garbhini Roga	12	Pandu Roga	7	Apasmar	1
Prasuti Roga	8	Raktapitta	6	Vata Roga	16
Garbha Shula	16	Rajyakshama	7	Vatarakta	4
Stanya Roga	2	Kasa	7	Urusthambha	2
Pradar Roga	4	Swasa	3	Amavatta	4
Atisrava Roga	3	Hicca	3	Shula	5
Rakta- gulma	2	Swara Bheda	3	Udavarta	3
Kumar Roga	14	Klom Roga	1	Gulma	2
Jwara Roga	95	Arochak	4	Hridya Roga	3
Atisara	18	Chardi	5	Mutrakraccha	7
Grahni	3	Trishana	3	Ashmari	4
Arsa	6	Murcha	3	Prameha	14
Agnimandhya	4	Panatayaya	2	Medo Roga	2
Ajirna	7	Daha	3	Udar Roga	4
Krimi Roga	2	Unmada	2	Shotha	6
Vradhi Roga	8	Bhagandar	2	Visphota	1
Galganda/Galmala	6	Updansha	1	Masurika	1
Shleepad	2	Kustha	2	Mukha Roga	3
Vidradhi	3	Shitapitta	1	Nasa Roga	5
Vrana Roga	2	Amlapitta	2	Netra Roga	2
Bhagna Roga	3	Visarpa	2	Shiro Roga	2
Visha Vikar	5	Jwara-Atisara	4		

Based on dosha dominance

Whenever Kapha is dominant, Churna is preferred. Whenever vata dosha is dominant, Taila or Ghrita is preferred, and when pitta is dominant, Hima kalpana (cold infusion) or Phanta Kalpana (hot infusion) is preparation of choice.

PROBABLE ADVANCEMENT IN KWATHA *KALPNA* WITH THEIR EFFECTIVENESS

Ayurveda emphasized that a high-quality medicine always alters in other dosage forms. In contemporary science, a single compound is available in different dosage forms, for example, paracetamol is a substance which is available in tablet as well as in syrup form. On proper investigative search, it has been seen that kwatha becomes base material for most of the available dosage forms among Ayurvedic medicaments. Hence, to establish our assumption, literature and research papers with probable possible dosage forms were searched where Kwatha acts as base material and it was thoroughly explored with the advantage of these dosage forms in the context of their effectiveness and safety.

Ghana Kalpana

Rasakriya and Ghana are concentrated dosage form, which is a modification of Kwatha Kalpana. It is prepared by boiling the Kwatha till semisolid form is attained and then drying it to solid state.[10] Many researches were carried out on the same issue that quality of drug is not compromised after changing the dosage form from Kwatha to Ghana or Rasakriya.[11-13]

Granules

Freshly prepared decoction was taken and subjected to mild heat for further boiling. Reduction was done up to semisolid stage with continuous stirring without covering the mouth of vessel.[14,15] Homogeneous mixing was done by continuous stirring to get uniform mass. This mass was prepared for granules and passed from sieve no 20. Granules were prepared and dried at room temperature, and then, oven dried at 60°C.[16]

One study reported that five batches of dashmoola kwatha and dashmoola dipping bag kwatha were prepared and systematically findings were recorded. Comparative organoleptic screening of dashmoola kwatha fresh and dipping bag kwatha showed no major differences in

organoleptic parameters, and dashmoola dipping bag Kwatha and findings were systematically recorded. Comparative organoleptic screening of DKF and DKI (dashmoola Kwatha Fresh and dipping bag Kwatha) showed no major differences in organoleptic parameters. Instant prepared form of Kwatha, i.e., dip bags is more convenient in terms of dosage, maintenance the purity for instant preparation in fast moving lifestyle.[17] Granular preparations can be recommended for clinical use as they are safe, effective, and certainly simpler to control, produce, and manage as a consistent medical product than decoctions.[18]

Powder/tablets/capsules

The decoction is dried by draining the liquid from the drugs. For this progression, the liquid is evaporated (using heat and vacuum) to form a semisolid paste, then it is poured into a spray-drier along with a powder carrier (usually starch or the dried, powdered, herb dregs), and the remaining water is evaporated, eventually leaving a dry powder. The addition of a carrier is very important because dried extracted herb materials will turn into a gummy solid or even a hard mass when exposed to even a small amount of moisture. Starch or other material present in it prevents this from happening. Some of the above methods of dried decoction is firstly prepared into powder, then granules and then is prescribed in the form of tablets.[19]

In one of the studies, it has been quoted that Guduchyadi Kwatha fresh (GKF) and Guduchyadi Kwatha for instant use (GKI) and compared their effectiveness. On comparing Rf values in high-performance thin-layer chromatography study, it was found that maximum active phytoconstituents in GKI were found similar to GKF, which indicated that the quality of drug did not malformed even after changing the dosage form from Kwatha form to instant use form (tablet and capsule).[20]

Syrup

For preparation of syrup, initially, decoction is prepared by taking drug and adding 8 times water and boiled until total volume becomes one-fourth of the initial volume. Then, the decoction was cooled and filtered. Filtrate was taken to prepare final herbal syrup and adding sugar in the concentration of 66.7% and the mixture is boiled up to 1–2 thread consistency.[21]

A recent study reported that JHD (*Jwaraharadi*) Kwatha and JHD syrup were compared for effectiveness. Qualitative tests were procured to detect the presence of functional groups, which play a significant role in the expression of biological activity. The present study reveals the presence of tannin, sterols, saponins, starch, flavonoids, glycosides, amino acids, and tertiary amines in both the batches of the formulations. One of the important advancements in syrup was that there was the absence of microbial load and can be preserved for a long duration. This form is advanced in terms of shelf life because decoction can be kept only for 24 h.

Pravahi kwatha/aristha

It is formulated by fermentation process and can be understood as the secondary formulation of decoction prepared by adding sweetening and fermenting agent. Ayurveda Sara Samgraha mentions about a "Pravahi Kwatha," but no direct references is observed, and Aristhas (fermented preparation) acquire self-generated alcohol which acts as natural preservative attained through conventional process.[22]

DISCUSSION

Ayurvedic pharmaceutical companies are booming with the demand of herbal drugs. In ancient times, physicians used to formulate medicines themselves for patients with great sincerity and authenticity without any commercial interest. Now, the commercialization of medicines demands standardization at every footstep of pharmaceutical processing. Time-dependent improvement in dosage form has been a requisite to stay in aggressive marketplace and to offer ease of administration to the patients. In the present lifestyle due to inadequate time, Kwatha preparation has been losing its utility, so there is a need to develop more stable and convenient secondary preparations which could be accepted by consumers as well as pharmaceutical companies. The classical formulation techniques and preparatory methods exhibit a high degree of sophistication.

In Kwath Kalpana, standardization of pharmaceutical factors plays an important role. Vessels to be used should be nonreactive to the drugs and should be with narrow opening which can save important phytoconstituents up to some extent. Different proportion of water (4, 8, and 16) is mentioned in ancient preparation of Kwath. Usually, water is added according to the judgment of physician and consistency of raw drugs. Most of the times, judgement becomes difficult regarding consistency of drugs, especially in polyherbal content. Hence, there is a need of qualitative and quantitative study according to the amount of water so that water, heat, and time can be managed properly. Regulation of temperature is also important to preserve heat labile phytoconstituents. Various studies on Kwath Kalpana suggest temperature between 95 and 100°C proving that very mild heat is required for the preparation. Particle size reduction is important for kwatha as less is the size of particles more will be the surface area ultimately enabling phytoconstituents to enter in the solvent (water) and vice versa. Hence, to get good quality, Kwatha exact size is to be standardized. Repeated study of on different particle size will help to decide proper particle size. Concentration usually depends on its therapeutic value and

on patient's digestive capacity, so here is the need to decide the extent of boiling.

Apart from all these merits, kwatha has some demerits too. These are prepared in aqueous media, and this decreases the stability of the product. In case of hot water, starch gets dissolved providing favorable media for the growth of molds and bacteria or bring about the decomposition of the product. The presence of sugars or other carbohydrates results in alcoholic fermentation with the evolution of CO_2, while the presence of protein leads to nitrogenous fermentation with the liberation of ammonia. Exposure to atmosphere and light accelerates spontaneous oxidation of the preparation which results in unpleasant odor and taste and it becomes rancid. Moisture accelerates the oxidation of volatile oils producing changes in quality of the odor and increasing viscosity. High humidity in tropical regions leads to effortless rotting of contents, contamination as well as mold and fungal growth. Hence, for a good result, freshly prepared kwatha should be used to get intended efficacy. Another demerit is that a part of volatile contents present in the raw materials are lost in the course of preparation of kwatha. Moreover, alcohol and fat-soluble contents cannot be extracted by these methods. Hence, standardization of finished drug should be done to ensure the quality, to assure reproducibility, and to flourish a data that can be utilized to limit batch to batch variation. The modification and improvement are continuously going on and dosage form is being modified from decoction (liquid) to kashaya powder, rasakriya, ghana, tablets, capsules, syrup, and pravahi kwatha. Conversion of dosage form from kwatha to powder/granules/Ghana/rasakriya has many advantage over kwatha preparation, i.e., these are less time-consuming, feasible during travelling, more stable than liquid dosage form, accurate dosing is possible, easy to administer, acceptability, masking of unpleasant taste, and longer shelf life.

Syrup possesses the capacity to disguise bad flavor of medication, thick character of syrup has soothing effect on irritated tissues of throat, and easy to adjust the dose for child weight. Pravahi kwatha has better ability to maintain both water-soluble and alcohol-soluble components in solution prolonging shelf life for about 10 years. Due to palatability, accelerated therapeutic action, and enhanced drug concentration, these formulations are superior over other Kalpanas. Qualitative and quantitative estimation of phytoconstituent by physicochemical and chromatographic studies by controlling above variables is the need of the hour to achieve uniformity in pharmaceutical preparation of kwatha up to some extent. With the advent of more efficient methods, attempt has been made to formulate the dosage form of dashmoola Kwatha into more concentrated and instant use granule form. Syrup and tablet are widely acceptable dosage forms in the present scenario due to their palatability, shelf life, easy administration, etc. Kwath is the liquid dosage form which is always questioned for stability as it has to be taken fresh in Ayurvedic classics. Extraction of plant material Ayurvedic preparations is now being formulated with more potent to make it convenient in dosage forms. Techniques such as Supercritical extraction, Solvent extraction, and Vacuum evaporation methods have facilitated the commercial feasibility to attain better quality Ayurvedic formulations keeping its holistic nature intact yet providing standardized more stable and efficacious products. Application of modern processing methods, advanced machinery, and packaging technologies has given the opportunities to make consumer-friendly dosage forms without compromising its quality, efficacy, and safety.

CONCLUSION

This paper concludes that Kwatha Kalpana is one of the most significant and efficacious dosage forms in Ayurvedic pharmaceutics. Acharyas have indicated this particular dosage form in almost all sort of disease. This review emphasizes on the essentiality to maintain standard operative procedure for Kwatha Kalpana to get maximum therapeutic effect. Due to certain demerits in preparation of Kwatha Kalpana, advancement in dosage form of kwatha is need of the hour to address the problems of quality control, preparation, and administration. Advancement can be in the terms of granules, syrup, rasakriya, tablet, capsule with extract form, and pravahi kwatha to provide an opportunity to the physician to choose better options. The various Kalpana explained above in the context is formulated to achieve increased shelf life, increased potency, and greater palatability along with the application of modern technology. Hence, in this case, advancement is required as per the consumers demand and market need.

REFERENCES

1. Charak A, Samhita C. Sutrasthna. Ch. 4. Varanasi: Chokhambha Bharati Academy; 2008. p. 67.
2. Sharangdhar A. Sharangdhar samhita. Madhyam Khanda. Ch. 2. Varanasi: Choukhambha Surbharti Publication; 2004. p. 133.
3. Dongre S, Pandey S. Need and approach of pharmaceutical standardization of kwath kalpana in present scenario-A critique. Int J Ayurveda Pharm Res 2016;4:57-60.
4. Sharangdhar A. Sharangdhar samhita. Madhyam Khanda. Ch. 9/3. Varanasi: Choukhambha Surbharti Publication; 2001. p. 218.
5. Vyas M, Yadav P, Shukla VJ, Patgiri BJ, Prajapati PK. Pharmaceutical evaluation of brihatpanchamoola kwatha prepared by root bark and stem bark. Int J Pharm Biol Arch 2010;1:436-41.
6. Patil S, Chaudhary AK. Quantitative estimation of Guduchi Ghana obtained from different amount of water used for Kwatha. Int J Pharm Arch 2013;2:160-4.
7. Sharangdhar A. Sharangdhar samhita. Madhyama Khanda. Ch. 1. Varanasi: Chaukhamba Sanskrita

Seereeja Office; 2010. p. 235.
8. Singh MK. Kwatha Manimala with Vidyotini Hindi Commentary by Sastri K. 2nd ed. Varanasi: Published by Chowkhamba Sanskrit Series Office; 1970.
9. Anonymous. The Ayurvedic Formulary of India. Part I, Part A, Kwatha Churna Prakaran. 1st ed. New Delhi: The Ministry of Health and Family Welfare, Dept. of Indian systems of Medicine & Homoeopathy; 2000.
10. Acharya YT, Siddha Yoga Sangraha. 13th ed., Vol. 1-6. Nagpur, Jwaradhikara: Baidyanath Ayurveda Bhavan Ltd; 2008. p. 4.
11. Prajapati PK. Physico-chemical evaluation of guduchyadi kwatha for instant use: An ayurvedic herbal formulation. Br J Pharm Res 2014;4:2599-613.
12. Prashant M. Anti-pyretic activity of madhukadi kwatha and madhukadi ghana-an experimental study. Int J Pharm Biol Arch 2011;2:572-6.
13. Singh V, Reddy KR. Standardization of modified dosage form of lodhradi kashaya. Asian J Pharm 2016;10:S134.
14. Sharma R, Amin H, Galib PK, Prajapati PK. Quality control evaluation of Guduchi Ghana (dried aqueous extract of *Tinospora cordifolia* (Willd.) (Miers)-An herbal formulation. Sri Lankan J Indig Med 2013;3:174-9.
15. Sharma R, Amin H, Galib PK, Prajapati PK. Validation of standard manufacturing procedure of Guduchi Ghana [dried aqueous extract of *Tinospora cordifolia* (Willd.) Miers] and its tablets. Ayurpharm Int J Ayurveda Allied Sci 2013;2:224-32.
16. Lachman L, Herbert A, Kanig JL. The Theory and Practice of Industrial Pharmacy. 3rd ed. Bombay: Varghese Publishing House; 2008. p. 134.
17. Pandya H. Standardization and quality control parameters of dashmoola kwatha Granules for instant use: An ayurvedic formulation. Am Int J Contemp Sci Res 2014;1:10-6.
18. Luo H. Comparison of effectiveness and safety between granules and decoction of Chinese herbal medicine: A systematic review of randomized clinical trials. J Ethnopharmacol 2012;140:555-67.
19. Gennaro A. The Science and Practice of Pharmacy. 21st ed. Remington: Lippincott Williams & Wilkins; 2005.
20. Prajapat R. Physico-chemical evaluation of guduchyadi kwatha for instant use: An ayurvedic herbal formulation. Br J Pharm Res 2014;4:2599-613.
21. Kalsariya BD, Patgiri BJ, Prajapati PK. Standard manufacturing procedure for syrup and tablet forms of Jwarahara Dashemani. Int Q J Res Ayurveda 2010;31:255-9.
22. Ayurved Sara Samgraha. Pravahi Kwatha Prakarana. Varanasi: Choukhambha Surbharti Publication; 2013. p. 718-25.

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