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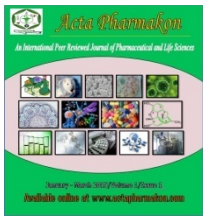
ACTA PHARMAKON

Acta Pharmakon

Issue 1, Vol. (2), Mar. 2016, 11-16
ISSN: 2455-8508



Research Article

Pharmaceutico - Comparative Study of Gojihwadi Kwatha with Different Water Ratio

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ARTICLE INFO

Received Feb 25, 2016
Revised Mar 14, 2016
Accepted Mar 22, 2016

Key Words:
- *Gojihwadi kwath*
- Pharmaceutical study
- Different water ratio

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ABSTRACT

Bhaishajya Kalpana is a specialized branch of *Ayurveda* which deals with the procurement, processing and right application of a drug to cure any diseases. Simply it is an art of preparing and dispensing of medicine. In *Bhaishajya kalpana, Kwatha* (decoction) is one of the basic procedure, but in literature of *bhaishajya kalpana* there are lots of *kwatha* explained in different water ratio. Water ratio in *kwatha* based on many factors such as nature of drug, amount of drug etc. This study has been carried out to find the pharmaceutical difference between selected two samples i.e. *kwatha* prepared as per the guideline of *Siddha yoga sangraha* and *Sharangdhar samhita.*

1. INTRODUCTION

Bhaishajya Kalpana is a specialized branch of *Ayurveda* which deals with the procurement, processing and right application of a drug to cure any diseases. Simply it is an art of preparing and dispensing of medicine. The main and functionalized aim of this branch is to constantly researching and development of the formulations useful to resolve the complexity of diseases, having multidirectional action.[1]

Among the various available classical formulations it is decided to opt for the formulations designed and developed by familiar physicians of this era instead of going for the formulations described in classical texts. Among the latest formulations the *Gojihwadi Kwatha* which was designed and developed by none other than the famous

physician of this era the great ***Vaidya Yadavji Trikamji Acharya*** has been selected for the study.[2] The other reason for selecting this formulation is because of its inclusion in the official **Ayurvedic formulary of India vol-2** and also because of its wide spread use in respiratory tract infection and the condition of pyrexia.

Bhaishajya Kalpana simply means the science of pharmacy. According to Remington pharmacy is "The art and science of preparing and dispensing medications and the provision of drug related information to the public".[3]

Because of constant use and un-palatability, a wholesome regimen may become repulsive. Such wholesome but repulsive regimens may again be made palatable by processing them through different modes of preparation.

In pharmaceutical study, our main aim was to introduce an innovative S.O.P. (Standard Operative Procedure) for the preparation of *Gojihwadi Kwatha*. Standards are living documents, which reflect science, technology & system. To maintain their value they should be first decided, achieved, set and then periodically, reviewed to maintain their currency. While actually testing the utility of any pharmaceutical process, it should be viewed with two aspects.

- The first is inherent in the process and the materials it involves. They are such that they actually do not much alter the results.
- The other aspect is of handling this process & materials. If the process along with the materials involved is very vulnerable to time, space, season, gravitational pull, heat man handling etc. then there is every possibility that it will not yield constant & persistently uniform results over a period variation or place variation.
  - Raw drug
  - Process followed
  - Finished products

A right product is the combination of the two essential things.

- ✓ Right quality of raw material.
- ✓ Accuracy in the process.

The aims and objectives of the study was to prepare the medicine & laid down the Standard operating procedure, another one to analyze the samples following standard parameters and to comparison of *kwatha Ghana* prepared in different water ratio.

1 To validate the standard method of preparation of *Gojihwadi Kwatha.*
2 To know difference in *Gojihwadi Kwatha* prepared in two batches at pharmaceutical grounds.
   a. *Gojihwadi Kwatha* prepared with 16 times water proportion according to general guideline for preparation of Kwatha
   b. *Gojihwadi Kwatha* prepared with 10 times water proportion as per mentioned in *Siddha Yoga Sangraha.*
3 Preparation of *Ghana* from *Kwatha.*

For the above aims and objectives, different samples of *Gojihwadi kwatha* were prepared, as follows with their codes:-

GKG10- kwatha prepared as per the guideline of *Siddha yoga sangraha.*

GKG16- kwatha prepared as per the general guideline and procedure mentioned in *Sharangdhar samhita.*

2. MATERIALS AND METHODS

Materials and methods used in this preparation are based on availability, feasibility in classical indication of *Bhaishajya kalpana*, traditional value and expert opinions. All the raw materials were procured from the National institute of Ayurveda pharmacy, Pharmaceutical processes carried out during the study are as follows –

- Removing foreign matter from crude drug.
- Powdering of raw drug.
- Preparation of *Gojihwadi Kwatha*.

Table 1: Composition of Gojihwadi Kwatha

S.N.	Name	Latin Name	Part	Proportion
1.	Gojihwa	*Onosma bractiata*	Leaves	1
2.	Yasthimadhu	*Glycerrhiza glabra*	Stem	1
3.	Sonf	*Foeniculum vulgare*	Fruit	1
4.	Draksha	*Vitis vinefera*	Fruit	1
5.	Anjeera	*Ficus carica Linn.*	Fruit	1
6.	Badar	*Zizyphus jujube*	Fruit	1
7.	Vasa	*Adathoda vasaca*	Leaves	1
8.	Jhupha	*Hyssop officinalis Linn.*	Flowers	1
9.	Khubkala	*Sisymbrium irio Linn.*	Seeds	1
10.	Hansaraj	*Adiantum lunulatum Linn.*	Panchang	1
11.	Banapsa	*Viola odorata Linn.*	Flowers	1
12.	Khatmi	*Althoea officinalis*	Stem	1
13.	Kantakari	*Solanum xanthocarpum*	Panchang	1
14.	Atasi	*Linum usitatissimum Linn.*	Seeds	1
15.	Sleshmatak	*Cordia dichotoma Forst.*	Fruit	1
16.	Maricha	*Piper nigrum*	Fruit	½

2.1 Preparation of *Gojihwadi Kwatha* (GK16)[4]:-

- **Reference: -** General method of Kwatha preparation *(Sha.Sm.M.K.2/1)*
- **Material Required:** Stainless steel vessels (40 lit capacity), Gas stove, Clean cotton cloth, Measuring jar, Ladle etc.
- **Ingredients:**
  1) Gojihwadi kwatha coarse powder - 1.55 kg. (Each Ingredient 100 gm)
  2) Water 16 times - 24.8 liter
- **Procedure:**
  1) *Gojihwadi Kwatha* drugs coarse powder was kept soaked in water for overnight. Soaked in one quarter of total volume = 6.2 lit
  2) Next day it was boiled on *mandagni* without covering its mouth after adding the remaining water 18.6 lts.
  3) Water was evaporated slowly and reduced till the quantity became 1/8th.
  4) It was filtered with clean cotton cloth and filtered liquid was measured and it was 3 lts.
  5) Experiment was repeated in the same identical conditions thrice and average values were taken.

2.2 Preparation of *Gojihwadi Ghan* from *Kwatha* (GKG16*)*:-

- **Material Required:** Stainless steel vessels (Capacity-5 lit & Circumference-1.5m), Gas stove, clean cotton cloth, Measuring jar, Ladle etc.
- **Ingredients:**
  1) *Gojihwadi kwatha* - 3 lit.
- **Procedure:**
  1) *Gojihwadi Kwatha* was boiled on *mandagni* without covering its mouth.
  2) Water was evaporated slowly, while stirring in between and reduced till became semi solid form.
  3) This semisolid material was transferred to petri dishes and dried to complete dryness in hot air oven at 60^0c.

4) The Experiment was repeated with other two samples and average values were taken.

Table 2- Showing average Results of Gojihwadi Kwatha (GKG16):

Name	Trial 1a	Trial 1b	Trial 1c	Mean
Raw drug	1.5kg	1.5kg	1.5kg	1.5kg
Water	24.8 lit	24.8 lit	24.8 lit	24.8 lit
Time taken to reduce 1/8	11 hrs 40 mins	11 hrs 15 mins	12 hrs	11 hrs
Temp range	35-100^0 C	39-100^0 C	30-100^0 C	35-100^0 C
Color	Dark brown	Dark brown	Dark brown	Dark brown
pH	5.4	4.9	5	5.2
Yield (Lit.)	3.1	3.0	3.2	3.0

2.3 Preparation of *Gojihwadi Kwatha* (GK10)[5] :-

- **Reference: -** General method of Kwatha preparation *(Sha.Sm.M.K.9/3)*
- **Material Required:** Stainless steel vessels (40 lit capacity), Gas stove, Clean cotton cloth, Measuring jar, Spatula etc.
- **Ingredients:**
  1) Gojihwadi kwatha coarse powder - 1.55 kg.
  2) Water - 15.5 liter
- **Procedure:**
  1) *Gojihwadi Kwatha* drugs coarse powder was kept soaked in water for overnight. Total water soaked = 5.5 lit
  2) Next day it was boiled on *mandagni* without covering its mouth.
  3) Water was evaporated slowly and reduced till the quantity became ¼th.
  4) It was filtered with clean cotton cloth and filtered liquid was collected as *kwatha.*
  5) Experiment repeated at thrice and average values were taken.
- **Precautions:**
  1) Coarse powder of *Gojihwadi Kwatha* should be taken for Kwatha preparation.
  2) Boiling should be done on *mandagni*.
  3) Utensils, vessels and filtering cloth should be clean.
  4) Stirring should be carried out time to time.

2.4 Preparation of *Gojihwadi Ghan* from *Kwatha* (GK10):-

- **Material Required:** Stainless steel vessels (5 lit capacity), Gas stove, Clean cotton cloth, Measuring jar, Spatula etc.
- **Ingredients:**
  1) *Gojihwadi kwatha* - 4 lit.
- **Procedure:**
  1) *Gojihwadi Kwatha* was boiled on *mandagni* without covering its mouth.
  2) Water was evaporated slowly and reduced till became semi solid form.
  3) After that semisolid Kwatha kept in dryer at 40^{0}c.
  4) Experiment repeated at thrice and average values were taken.

Table 3: Showing average Results of Gojihwadi Kwatha (GK10)

Name	Trial 2a	Trial 2b	Trial 2c	Mean
Raw drug	1.5kg	1.5kg	1.5kg	1.5kg
Water	15.5lit	15.5 lit	15.5lit	15.5lit
Time taken to reduce ¼	7 hrs 20 mins	7 hrs 15 mins	7 hrs	7 hrs
Temp range	30-100^0 C	34-100^0 C	35-100^0 C	32-100^0 C
Color	Dark brown	Dark brown	Dark brown	Dark brown
pH	5.3	4.9	5	5
Yield (Lit.)	4.1	4.3	3.8	4.0

Table 4: Showing comparative study of Gojihwadi kwatha GK10 & GK16

Sample name	Drug	Water for Kwatha	Obtained Kwatha	Colour	Odour	Rasa	pH	Total time
GKG 16	1.55 kg	24.8 lit	3 lit	Dark brown	Specific Sweet	*Kashaya, Madhura*	5.20	11hours
GKG 10	1.55 kg	15.5 lit	4 lit	Dark brown	Specific	*Kashaya, Madhura*	5.34	7 hours

Table 5: Showing comparative study of Ghana of both Gojihwadi kwatha samples GK10 & GK16

Sample name	Kwatha	Obtained Ghan	Colour	Odour	Rasa	Total time	% Yield
GK 16	3 lit	Aprox. 298 gms	Dark brown	Specific	*Kashaya, Madhura*	6 hours 45 min.	19.22
GK 10	4 lit	Aprox. 233 gms	Dark brown	Specific	*Kashaya, Madhura*	6 hours	15.03

3. RESULT AND DISCUSSION:

As such the textual reference advises to prepare the decoction using 10 times of water and reducing to one quarter. However it was planned to prepare the decoction using the 16 times following the general procedure as some of the ingredients are hard in nature and the quantity of the liquid becomes less after soaking by the herbal raw materials.

The coarse powder of the total raw materials was soaked in one quarter amount of water to be used overnight not only to soften the cell walls but also to expedite the extract on boiling. The trials were repeated for three times in each case to establish the SOP's. The trial 1a-c , where 16 times of water was used, took 11 hours on an average for reducing to $1/8^{th}$ i.e. 3 liters where as the trial no. 2a-c where 10 times of water was added took 7 hours to reduce to one quarter i.e. 4 liters. Thus in the given dimensions of the vessel, the temperature applied and the laboratory condition where experiments were conducted indicates that to reduce the specified volume requires the mentioned time.

In trial 1a-c (Table 2, 4 & 5) indicates that it require 11 hours to reduce from 24 liters to 3 liters. Therefore enough time was taken for boiling of the materials in good amount of polar solvent water. Whereas in trial 2a-c (Table 3, 4 & 5), took more of less same time for reduction from 15 liters (10 times) of water and the quantity of water reduced was also little less, 4 liters, in comparison to earlier trials. Therefore it can be expected that the percentage of extraction will be more in case of 16 times of water. The reason was the extraction of the materials will depend upon the availability of quantum of water, duration of boiling and reduction of water. Here in the trial no. 2a-c the water quantity was more and reduced quantity is also more in comparison to the experiments no 1a-c.

The color observed in both the decoctions was dark brown which is normal to all aqueous plant extracts. The odor observed was sweet smell. The selected drug contains a good number of

sweetened ingredients like *draksha, anjeer, mulethi* etc.

The taste of the decoction was *kashaya rasa pradhan* with *madhura* as *anurasa* and it might be due to majority of ingredients are of astringent and sweet nature. This is indicative of the extraction of active principles present in the materials into the decoction.

4. CONCLUSION:

In present study, there is no marked difference found in organoleptic properties & pH of GK10 & GK16. But in GK16 Ghana more yield (19.22%) obtained with excess consumption of fuel and time as compare to GK10 Ghana. The study provided a well developed SOP for the preparation of Gojihwadi Kwatha (Decoction) and its Ghana (Dry Extract) preparation helpful for further formulation development.

CONFLICT OF INTEREST:

The author declare no conflict of interest.

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