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PHARMACEUTICAL STANDARDISATION OF BHALLATAKADI YOGA

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ABSTRACT
The drug *Bhallatakadi Yoga* was described by Rasatarangini in the context of *Dushivishajanya Shwasa*. The formulation contains four drugs i.e. *Bhallataka, Haritaki, Tila, Guda* respectively. Among which *Bhallataka* is considered as a poisonous drug (Gada). Proper purification (shodhana) of the drug is required in order to remove the toxic substances. Standardisation of the formulation is essential to find out the outcome result. As in Ayurveda texts it is mentioned that intake any of drug having poisonous property may be fatal but if purification is done properly then it acts as a nectar.

KEYWORDS: *Bhallatakadi Yoga, Dushivishajanya Shwasa, Gada, Shodhana*, Standardisation, Ayurveda.

INTRODUCTION

Ayurveda is a "science of life." It is an ancient religio-vedic science originated from the ancient Vedic civilization. Eventually, *Ayurveda* was organized into its own compact system of health and considered under a branch of Atharva Veda. The power of regeneration is the greatest gift endowed by God upon mankind. It has vivid scope in 8 branches among which *Agada tantra*. The term *Gada* is synonymous with disease and interestingly to note; it is not just another name of a disease but the disease caused by multi-factorial etiology, *(Aneka kaaranajanyatvaat ...)*. Thus, the *Tantra* which brings forth the absence of diseases (A – absence; + *gada*) caused by varied etiology is to be understood as *Agada tantra.*

Bhallatakadi Yoga[1] is an important *churna* (powder) formulation described in *Rastarangini* for the treatment of *Dushivishjanya Shwasa*.

Besides *Shwasa* it is also beneficial in *Pandu, Kasa* and *Jwara*.

Ingredients of *Bhallatakadi Yoga* as per *Rasatrangini*

Drugs	Parts used	Quantity
Bhallataka	Dry fruit	125 mg
Haritaki	Fruit	125 mg
Tila	Seeds	125 mg
Guda	Whole	125 mg

AIM AND OBJECTIVES

To develop standard product (Bhallatakadi Yoga) as per classical parameters.

MATERIALS AND METHODS

The Methodology has been grouped in following sections:

1. Collection of Drug.
2. Identification and Authentication of Drug.
3. Pharmacognositical Study.
4. Phytochemical Analysis.

Collection of Drug

All the drugs were collected from Hans pharmacy, Sidcul, Haridwar.

Identification and Authentication of Drug

All the drugs were identified and authenticated by the dignitaries of Dravyaguna Department, Rishikul campus, Haridwar with reference no. DG/RAC/UAU-24.

- **Pharmaceutical Process**

Practical 1. Sodhana of *Bhallataka*
Practical 2. Preparation of test sample

PRACTICAL NO.1

Sodhana/purification of *Ashuddha Bhallataka*[2]
Object - *Bhallataka shodhana* to prepare *Bhallatakadi Yoga.*
Reference - *Rasamritam* (8/147)
Date of starting - 10th april 2018

Date of completion - 26th April 2018
Place - Hans pharmacy, Sidcul, Haridwar, UK

Necessary materials

Ingredients	**Weight**
AshudhaBhallataka	200gm
Gomutra	1 litre/day
Godugdha	1 litre/day
IstikaChurna	As per required
Warm Water	As per required

Apparatus and utensils
- Stainless steel pot
- Muslain cloth
- Knife
- Stainless steel tray
- Surgical gloves
- Mask

Method
After the identification of drug *Bhallataka* from the respective department/pharmacy, 200 gm of freshly collected *Bhallataka* was taken. Attachment of thalamus was removed from the fruit by the help of knife.

First of all, the drug was soaked in 1 lit. of freshly collected *Gomutra* (Cow's urine) for 24 hrs. On the next day the *Gomutra* was drained and the material was washed properly in warm water. Again this process continued for next 7 days.

After 7 days, the drug was soaked in 1 lit. of freshly collected *Godugdha* (Cow's milk) for 24 hrs. On the next day the *Godugdha* was drained and the material washed properly in warm water. Again this same process was repeated for next 7 days.

The washed fruits were cut into pieces and left to dry. Later on, fruits were dipped into the coarse brick powder for next 24 hours, after that drug was rubbed properly with brick powder that's why all the toxic oil content of the drug was absorbed.

Observation
1. When the drug was removed from *Gomutra* on the 7th day, it's colour was seen changed from black to pale black colour.
2. After removing from *Godugdha* (on 7th day) drug *Bhallataka* was softened as compared to before.
3. Washed with warm water and dried to prevent foul smelling due to milk content.

Precautions
1. Surgical gloves and mask were worn to prevent from local bruises caused by the toxic oil content of the drug.
2. Oileation of coconut oil was done all over the body and coconut prepared laddus (coconut sweet) were taken as; coconut is a good antidote of *Bhallataka.*

Result
Wt. of *Bhallataka* taken = 200gm
Wt. of purified *Bhallataka* = 175gm
Loss wt. during process = 25gm

PRACTICAL NO.2
Object - Preparation of test sample i.e. *Bhallatakadi Yoga*.
Reference - *Rasatarangini* – 24/483
Date of starting - 27/04/2018
Date of completion - 30/04/2018.
Place - Hans pharmacy, Sidcul, Haridwar, UK

Essential ingredients
Bhallatakadi Yoga which contains *shodhit Bhallataka, Haritaki, Tila, Guda*. As per the reference mentioned in the text, all the ingredients of this drug are taken equally i.e. 200 gm each.

Drug	**Weight**
Shodhit Bhallataka	175gm
Haritaki	175gm
Tila	175gm
Guda	175gm

Apparatus and Utensils
- Mortar
- Surgical gloves and mask
- Sieve size no. 60
- Surgical Bouffant Caps
- Air tight container

Method
- First of all, *Haritaki, Tila, Guda* were taken in the above said amount and were cleaned with running water properly and left for dry in sunlight for 2 days.
- Then dried drugs along with *shodhit* (purified) *Bhallataka* were taken and churned in the motor separately to form a fine powder.
- By the help of sieve no. 60, it was filtered to form a fine powder.
- Later on, the powder was stored in a closed air tight container.

Observation
The test sample was turned into fine powder.
The colour of the test sample was black in colour.

Result
Wt. of *Bhallatakadi Yoga* before powder = 700 gm
Wt. of *Bhallatakadi Yoga* after powder = 650 gm
Loss wt. during process = 50 g

RESULTS

Macroscopic

Tests	*Bhallataka*	*Haritaki*	*Tila*	*Guda*	*Bhallatakadi Yoga*
Taste	NA	Sour and slightly bitter	Black	Light Brown	NA
Odour	Faintly smell	Characteristics	Characteristics	Sweet	Faintly smell
Colour	Black	Green	Characteristics	Sweet	Black

Powder Microscopy

1. Fibers, Tracheid, Oil Globules and Calcium Oxalate were found in *Bhallataka.*
2. Trichomes, Calcium Oxalate, Starch Grain, Fibres and Tracheid were found in *Haritaki.*
3. Oil Globules, Fibers and Cork Cells were found in *Tila.*
4. Calcium Oxalate, Cork Cells, Fibers, Tracheid were found in *Bhallatakadi Yoga.*

Physio-chemical Analysis

S. No.	Test	*Bhallataka*	*Haritaki*	*Tila*	*Guda*	*Bhallatakadi Yoga*
1	**Moisture Content (%)**	5.68	4.65	6.84	19.65	10.25
2	**pH**	6.1	4.9	5.9	5.6	5.8
3	**Total Ash (%)**	3.19	4.21	7.36	2.35	4.58
4	**Acid Insoluble Ash (%)**	0.02	3.21	0.98	0.13	1.15
5	**Water Soluble Ash (%)**	2.68	2.14	5.11	1.25	3.21
6	**Aqueous Extractive Value (%)**	15.68	32.24	11.25	80.25	35.48
7	**Alcoholic Extractive Value (%)**	13.58	20.14	21.68	56.25	28.97
8	**Petroleum Ether Extractive Value (%)**	4.68	1.08	3.24	2.15	5.48

Phytochemical Analysis

Bhallataka		
Name of Test	**Aqueous Extract**	**Ethanol Extract**
Carbohydrate		
Molish test	+ ve	+ ve
Benedict test	+ ve	- *ve*
Fehling test	+ ve	- *ve*
Alkaloids		
Dragendorff test	+ ve	- *ve*
Wagner's test	+ ve	+ ve
Hager's test	- *ve*	- *ve*
Amino acids		
Ninhydrine	+ ve	- *ve*
Protein		
Biuret test	+ ve	- *ve*
Xenthoprotic test	- *ve*	+ ve
Millon test	- *ve*	+ ve
Saponin		
Foam test	+ ve	- *ve*
Glycosides		
Borntrager's test	+ ve	+ ve
Phenolic compound		
Phenolic test	+ ve	+ ve
Steroids		
Salkowaski	+ ve	- *ve*
Tannins		
$Fecl_3$	+ ve	+ ve
Lead acetate	+ ve	- *ve*
Pot. Dichromate	- *ve*	- *ve*

Haritaki		
Name of Test	**Aqueous Extract**	**Ethanol Extract**
Carbohydrate		
Molish test	+ ve	+ ve
Benedict test	+ ve	+ ve
Fehling test	+ ve	- *ve*
Alkaloids		
Dragendorff test	+ ve	- *ve*
Wagner's test	- *ve*	+ ve
Hager's test	- *ve*	+ ve
Amino acids		
Ninhydrine	+ ve	- *ve*
Protein		
Biuret test	+ ve	- *ve*
Xenthoprotic test	- *ve*	+ ve
Millon test	- *ve*	- *ve*
Saponin		
Foam test	+ ve	- *ve*
Glycosides		
Borntrager's test	+ ve	- *ve*
Phenolic compound		
Phenolic test	+ ve	- *ve*
Steroids		
Salkowaski	+ ve	+ ve
Tannins		
$Fecl_3$	+ ve	+ ve
Lead acetate	+ ve	- *ve*
Pot. Dichromate	+ ve	- *ve*

Tila		
Name of Test	**Aqueous Extract**	**Ethanol Extract**
Carbohydrate		
Molish test	+ ve	- *ve*
Benedict test	- *ve*	- *ve*
Fehling test	+ ve	- *ve*
Alkaloids		
Dragendorff test	+ ve	- *ve*
Wagner's test	- *ve*	- *ve*
Hager's test	- *ve*	- *ve*
Amino acids		
Ninhydrine	+ ve	- *ve*
Protein		
Biuret test	+ ve	- *ve*
Xenthoprotic test	- *ve*	+ ve
Millon test	- *ve*	- *ve*
Saponin		
Foam test	+ ve	- *ve*
Glycosides		
Borntrager's test	- *ve*	- *ve*
Phenolic compound		
Phenolic test	+ ve	- *ve*
Steroids		
Salkowaski	- *ve*	- *ve*
Tannins		
$Fecl_3$	+ ve	- *ve*
Lead acetate	+ ve	+ ve
Pot. Dichromate	- *ve*	- *ve*

Guda		
Name of Test	**Aqueous Extract**	**Ethanol Extract**
Carbohydrate		
Molish test	+ ve	+ ve
Benedict test	+ ve	+ ve
Fehling test	+ ve	+ ve
Alkaloids		
Dragendorff test	- *ve*	- *ve*
Wagner's test	- *ve*	- *ve*
Hager's test	- *ve*	- *ve*
Amino acids		
Ninhydrine	+ ve	- *ve*
Protein		
Biuret test	- *ve*	- *ve*
Xenthoprotic test	- *ve*	- *ve*
Millon test	- *ve*	- *ve*
Saponin		
Foam test	+ ve	- *ve*
Glycosides		
Borntrager's test	- *ve*	- *ve*
Phenolic compound		
Phenolic test	- *ve*	- *ve*
Steroids		
Salkowaski	- *ve*	- *ve*
Tannins		
$Fecl_3$	- *ve*	- *ve*
Lead acetate	- *ve*	- *ve*
Pot. Dichromate	- *ve*	- *ve*

Bhallatakadi Yoga		
Name of Test	**Aqueous Extract**	**Ethanol Extract**
Carbohydrate		
Molish test	+ ve	+ ve
Benedict test	+ ve	+ ve
Fehling test	+ ve	+ ve
Alkaloids		
Dragendorff test	+ ve	- *ve*
Wagner's test	+ ve	+ ve
Hager's test	- *ve*	+ ve
Amino acids		
Ninhydrine	+ ve	+ ve
Protein		
Biuret test	+ ve	- *ve*
Xenthoprotic test	- *ve*	+ ve
Millon test	- *ve*	+ ve
Saponin		
Foam test	+ ve	- *ve*
Glycosides		
Borntrager's test	+ ve	+ ve
Phenolic compound		
Phenolic test	+ ve	+ ve
Steroids		
Salkowaski	+ ve	+ ve
Tannins		
$Fecl_3$	+ ve	+ ve
Lead acetate	+ ve	+ ve
Pot. Dichromate	+ ve	- *ve*

Thin Layer Chromatography

It establishes phytochemical fingerprint profiling in drug for identity.

- Alcoholic extract of *Bhallatakadi Yoga* having R_f Value **0.23, 0.31, 0.38, 0.40, 0.45, 0.56, 0.63, 0.68, 0.71, 0.77, 0.81, 0.88, 0.94** were found.
- Alcoholic extract of *Bhallataka* having R_f Value **0.31, 0.45, 0.54, 0.61, 0.68, 0.71, 0.78, 0.88, 0.92** were found.
- Alcoholic extract of *Haritaki* having R_f Value **0.23, 0.58, 0.64, 0.71, 0.76, 0.85, 0.94** were found.
- Alcoholic extract of *Tila* having R_f Value **0.66, 0.74, 0.77, 0.93** were found.
- Alcoholic extract of *Guda* having R_f Value **0.38, 0.4, 0.78, 0.81, 9.92** were found.

DISCUSSION

Pharmaceutical Discussion

As per *Rasatarangini*, in *Bhallatakadi Yoga* all the four ingredients i.e. *Bhallataka, Haritaki, Tila, Guda* were taken in equal dose and churned into fine powder. But before proceeding, *shodhana* of *Bhallataka* was done to eradicate all the toxic contents from the drug. Many purificatory processes have been described in different *rasgranthas* but the process mentioned in ***Rasamrita*** is authenticated as it is a standardised method of *shodhana* by the government found in API. 200gm of *Bhallataka* was taken and was dipped in freshly collected 1 litre of cow's urine for 24 hours. After 24 hours it was drained and again soaked in cow's urine, this process continued for 7 days.

On 7th day cow's urine was drained and washed with warm water properly and was soaked in 1 litre of freshly collected cow's milk for 24 hours. After 24 hours it was drained and again soaked in cow's milk, this process continued for 7 days. All the fruits of *Bhallataka* were washed and cut into pieces and dipped in ***istika churna*** (brick powder) for one day. After that it was rubbed to remove all the toxic oil contents of the drug.

During this, **87.5%** was obtained where **12.5** was the processing loss i.e., **175gm** was obtained.

After purification, as per above said reference all the four ingredients were taken in equal quantity i.e., **175gm** each or **700gm** in total. All these were churned into fine powder separately in mortar and were sieved in no. **60**. At last all were mixed together to form *Bhallatakadi Yoga* (test sample).

During this process of preparation, **92.85%** was obtained where **7.2%** was the processing loss i.e. **650gm** was obtained.

Analytical Discussion

The main aim of the analysis is to check the quality for obtaining desired therapeutic effect. So, it is necessary to control batch to batch variation, which is possible only through standardization protocols. The present analytical study has been carried out to establish the standard quality parameters like organoleptic features, physico-chemical, phyto-chemical, etc., for the finished formulation.

Organoleptic parameters

Tests	***Bhallataka***	***Haritaki***	***Tila***	***Guda***	***Bhallatakadi Yoga***
Taste	NA	Sour and slightly bitter	Black	Light Brown	NA
Odour	Faintly smell	Characteristics	Characteristics	Sweet	Faintly smell
Colour	Black	Green	Characteristics	Sweet	Black

Data pertaining to Table no. shows colour of the formulation was black, faintly smell in odour.

pH value of different values

The pH value is one of the main factors influencing the quality of the medicines. It always controls many chemical and microbiological reactions. These pH values may be taken for quality control measures at various level of processing and may be an important marker as well as early indicator in case of any gross variation or spoiling of the formulation. Low pH restrict the growth of microbes while high pH facilitates their growth.

Above mentioned values suggested acidic in nature that means it restrict the growth of microbes.

Moisture contain

The test determines both water and volatile matter in the formulation. Loss on drying is the loss of mass expressed as w/w. Any excess of water in the formulation will encourage microbial growth, the presence of fungi or insects, and cause deterioration following hydrolysis.

Moisture contain was found highest because it might have been prepared during monsoon or rainy season or may be due to improper storage may lead to increase in moisture.

Total ash & Acid insoluble ash

Ash is the name given to all non-aqueous residue that remains after a sample is burned, which consists mostly of metal oxides. It includes metal salts which are important for processes requiring ions such as Na^+ (Sodium), K^+ (Potassium) and Ca^{2+} (Calcium). It also includes trace minerals which are required for unique molecules.

Acid insoluble ash is designed to measure the amount of ash insoluble to diluted hydrochloric acid.

Water soluble extractives and Alcohol soluble extractives

The water extractive content is the proportion of the biomass that is lost as a result of extraction with water. The value plays an important role in evaluation of drugs. Less extractive value indicates addition of exhausted material, adulteration or incorrect processing during drying or storage or formulating.

Alcohol extractive content is considered to be the total mass proportion of the biomass that is lost as a result of extraction with 95% ethanol. It is also indicative for the same purpose as the water-soluble extractive value. Less extractive value indicates addition of exhausted material, adulteration or incorrect processing during drying, or storage or formulating.

Qualitative phytochemical test indicates the identification of primary metabolites (Carbohydrate, protein, fat etc) and secondary metabolites (alkaloids, glycosides tannin etc).

In *Bhallataka, Haritaki, Bhallatakadi Yoga* found both type of primary and secondary metabolites like Carbohydrate, Alkaloids, Amino acid, Protein, Phenolic compound, Glycosides, Saponin, Steroids and Tannin was present in samples.

In *Tila* Carbohydrate, Alkaloids, Amino acid, Protein, Phenolic compound, Saponin and Tannin was present in samples.

In *Guda* Carbohydrate, Amino acid and Saponin were found in the samples.

Thin layer chromatography established in phytochemical fingerprint profiling in drug for identity.

Alcoholic extract of *Bhallatakadi Yoga* have R_f Value 0.23, 0.31, 0.38, 0.40, 0.45, 0.56, 0.63, 0.68, 0.71, 0.77, 0.81, 0.88, 0.94.

Alcoholic extract of *Bhallataka*, have R_f Value 0.31, 0.45, 0.54, 0.61, 0.68, 0.71, 0.78, 0.88, 0.92.

Alcoholic extract of *Haritaki* have R_f Value 0.23, 0.58, 0.64, 0.71, 0.76, 0.85, 0.94.

Alcoholic extract of *Tila* have R_f Value 0.66, 0.74, 0.77, 0.93.

Alcoholic extract of *Guda* have R_f Value 0.38, 0.4, 0.78, 0.81, 9.92.

CONCLUSION

The above said method for the shodhana of Bhallataka is found better because the Bhallatakadi yoga prepared by it is having good quality, so it is validated qualitatively and quantitatively.

The Bhallatakadi yoga prepared by above said method stands economical, less time consuming and give best results in terms of reproducibility.

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