IAMJ

Research Article International Ayurvedic Medical Journal ISSN:2320 5091

PHARMACEUTICO – ANALYTICAL STUDY OF SHADANGA GUGGULU

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ABSTRACT

Introduction: The *Aushadha Kalpana* is prepared by different pharmaceutical processing techniques applied to the crude drugs to get the desired therapeutic effect. This processing results in transformation of good pharmacological action to that of substance. These pharmaceutical processes are known as "*Samskaras"*. Before the administration of a drug, it has to be subjected with various types of '*Samskaras*' so as to get the desired therapeutic effect. In context of present study one of the *Guggulu* preparations is selected, which is mentioned in *Chakradatta Netraroga Adhikara*, (Eye disease) namely *Shadanga Guggulu* (SG) prepared with some modifications. Pharmaceutically *Guggulu* is used as binding agent to prepare *Vati* (tablet) apart from its own pharmaceutical properties. Right from the Vedic period *Guggulu* is a well-known drug of Indigenous System of Medicine. Many properties of *Guggulu* are described in our classics. Several clinical and experimental research works on *Guggulu* have been established that *Guggulu* is Cardioprotective, Hypolipidaemic, Hypotensive, Thyroid stimulating agent, Smooth muscle relaxant, Hypoglycaemic, Anti-bacterial and Anti-fungal. **Aims and Objectives:** To developed standard operative procedure for preparation of genuine sample of SG, to find out the cumbersome in the preparation, to analyze the SG for safety, and purity. **Material and Methods:** To full fill the above objectives of the present study all the parameters were taken according to "Protocol of testing ASU medicine published by PLIM, Dept. of AYUSH, Ministry of health and family welfare Govt. of India. Parameters like organoleptic properties, Physico-chemical analysis, HPTLC, Microbial load etc. were used for analysis of sample of test drug which were prepared by using *Kuttana* (pounding) method. **Results and Conclusion:** Presence of low amount of moisture content of SG (5.19%) leads to decrease decomposition and enhance the shelf life and therapeutic value of the same. Low Acid insoluble Ash (0.72%) determines the presence of low adherent dirt as well as sand particles. Microbial load was shown within limit results which refers safety profile of the samples. HPTLC finger print profile was developed for this sample can be used as a marker for later on samples.

Keywords: *Guggulu,* Physico-chemical Analysis, *Sahasra Kuttana*, Standard operative procedure.

INTRODUCTION

Fruitfulness of treatment depends on the good qualities *Cikitsaka* (physician), properly prepared *Aushadha* (drugs), experienced *Paricaraka* (attendant) and treatment tolerable patient. Properly prepared *Aushadha* is second most part

How to cite this URL: M. V. R. Wijayanthamala Et Al: Pharmaceutico – Analytical Study Of Shadanga Guggulu. International Ayurvedic medical Journal {online} 2016 {cited 2016 July} Available from: http://www.iamj.in/posts/images/upload/1095_1101.pdf

among this quadruped. *Generally Guggulu Kalpana* can be prepared by making *Paka* (heating) as well as without making *paka* methods. . As per classical references out of those two methods, without *Paka* method is accepted by Vaidya Kashiram, the commentator of *Sharangdhara Samhita*. He advocates the processing of *Gugglu Vati* by hammering along with Ghee to make the pills good and shining. In context of present study one of the *Guggulu* preparations is selected, which is mentioned in *Chakradatta Netraroga Adhikara*, namely *Shadanga Guggulu*[1] (SG) prepared with some modifications. Pharmaceutically *Guggulu* is used as binding agent to prepare *Vati* apart from its own pharmaceutical properties. Right from the Vedic period *Guggulu* is a well-known drug of Indigenous System of Medicine. Many properties of *Guggulu* are described in our classics. Several clinical and experimental research works on *Guggulu* have been established that *Guggulu* is Cardioprotective, Hypolipidaemic, Hypotensive, Thyroid stimulating agent, Smooth muscle relaxant, Hypoglycaemic, Anti-bacterial and Anti-fungal. Therefore effort has been spent here to establish standard operative procedure for preparation of *Shadanga Guggulu.* Successfulness of pharmaceutical study can be confirmed through assessing results of analytical study. The meaning of the term analysis is the detailed examination, which reveals the minor but important aspects regarding the drug. Analytical chemistry is one of the most important disciplines of the science which deals with qualitative and quantitative analysis of various substances, it is essential to standardize the drug and examine the quality and safety of the drug. Analytical study provides idea about quality of finish product and safety profiles the same on the basis of scientific background. Hence without analytical study of the drug, the research which was related to medicinal field is incomplete. The finish product which was followed standard operative procedure will leads to qualitatively and quantitatively fruitful outcome. The aim of conducted analytical study is to assess chemical configuration and the physico-chemical changes which occurred after *Samskara* in the finish product.

AIM AND OBJECTIVES

1. To developed standard operative procedure for preparation of genuine sample of SG,
2. To find out the cumbersome in the preparation,
3. To analyze the SG for safety and purity.

Raw materials were procured from local market, Jaipur and the pharmaceutical study was carried out in pharmaceutical laboratory of *Rasashastra* and *Bhaishajya Kalpana,* NIA, Jaipur with following steps.

1. Preparation of *Triphala Kwatha* (decoction)
2. *Guggulu Shodhana* (purification of *Guggulu*)
3. Preparation of *Shadanga Curna* (powder)
4. Preparation of *Shadanga Kwatha Ghana* (decoction extract)
5. Preparation of *Shadanga Guggulu*

STANDARD OPERATIVE PROCEDURE FOR PREPARATION OF *SHADANGA GUGGULU*

Practical No 01: Preparation of *Triphala Kwatha*[2]

Visible physical impurities presence in the *Haritaki, Vibhitaki* and *Amalaki* were removed and kept in sunlight for 30 minutes. Prepared coarse powder of *Triphala* separately and weighed 233.33 g each then mixed together and kept in stainless steel vessel. Added 2.8 L of clean water, mixed well-kept for overnight. Next day morning added more 2.8 L of clean water and heat-

ed in *Mandagni* (mild head) till reduced one forth (1.4 L). Filtered and kept in stain less steel vessel.

Practical No 02: *Guggulu Shodana*[3]

Ashuddha (unpurified) *Guggulu* 350 g was taken and removed visible physical impurities manually. *Pottali* (bundle) was prepared and then subjected to *Swedana* (steaming) in *Dolayantra* in the presence of above prepared *Triphala Kwatha* until all the *Guggulu* passes into the liquid through the cotton cloth. After that residue of bundle was dried, weighed and discarded and obtained liquid was filtered through cotton cloth and allowed to stand some times. Heavy micro sand particles etc may get settled down then the supernatant part of liquid was decanted in another stainless steel vessel. It was boiled again to evaporate its water content, till it forms a mass. Continues stirring was carried out through the process to prevent adherent to the vessel. This semi solid mass was taken into a stainless steel tray and dried in sunlight. This dried mass was poured in to an iron mortar ground with adding Ghee in small quantities till it becomes waxy type.

Practical No 03: Preparation of *Shadanga Curna*[4].

TABLE NO 1: INGREDIENTS OF *SHADANGA CURNA*

S. No	Name of drug	Botanical Name	Family	Part use
1	*Haritaki*	*Terminaliya chebula* Retz	Combretaceae	Fruit pericarp
2	*Vibhitaki*	*Terminalia bellerica* Roxb	Combretaceae	Fruit pericarp
3	*Amalaki*	*Emblica officinalis* Gaertn	Euphorbiaceae	Fruit pericarp
4	*Patola*	*Trichosanthes dioica* Roxb.	Cucurbitaceae	Whole part
5	*Nimba*	*Azadirachta indica* A.Juss	Meliaceae	Leaves
6	*Vasa*	*Adhatoda vasika* Nees	Acanthaceae	Leaves

Removed the physical impurities of above drugs by manually then kept in mild sunlight for 30 minutes. Prepared fine powder and filtered through cotton cloth separately. 41.5 g each was taken and mixed properly then stored in a clean closed vessel made of stainless steel.

Practical No 04: Preparation of *Shadanga Kwatha*[5]

Above same 6 drugs were taken and cleaned in same way then reduced into coarse powder form separately. 141.6 g were taken in each drugs and kept in stainless steel vessel added 3.4 L of clean water then kept for overnight. Next day morning again 3.4 L clean water was added to it and heated in *Mandagni* until it reduced ¼ (1.7 L) Filtered *Kwatha* was reduced in water bath into thick consistency and weighed.

Practical No. 05: Preparation of *Shadanaga Guggulu*[6].

TABLE NO 02: INGREDIENTS OF *SHADANGA GUGGULU*

S. No	Ingredient	Quantity
1	*Shuddha Guggulu Commiphora wightii (Arn.)*	250 g
2	*Shadanga Curna*	250 g
3	*Shadanga* concentrated *Kwatha*	250 g
4	Ghee	Q.S

Shuddha Guggulu and concentrated *Shadanga Kwatha* were mixed properly in mortar and pestle then *Shadanga Curna* was added to it little by little and mixed homogenously. After that the mixture was shifted to pounding machine and added 50 g Ghee little by little and pounded in 1000 times. 500 mg pills were prepared by using pill rolling machine from properly pounded *Guggulu* mixture. Prepared pills were dried in shade and stored in a clean dry closed glass jar.

OBSERVATIONS AND RESULTS

TABLE NO 03: OBSERVATIONS OF PREPARATION OF *TRIPHALA* COARSE POWDER.

S. No	Ingredients	Initial weight (g)	After *Yavakuta* wt (g)	Weight of loss (g)	% of loss
2	*Haritaki*	500	480	20	4.0
3	*Vibhitaki*	500	470	30	6.0
4	*Amalaki*	500	467	33	6.6

Here showing the physical impurities as well as handling loss of the preparation of *Triphala* coarse powder.

TABLE NO 04: OBSERVATIONS OF *GUGGUL SHODHANA*

S. No	Ingredients	Initial weight	Discard weight	Obtained final weight
1	*Ashuddha Guggulu*	350 g	*33 g + **12 g = 45 g	***573.8 g
2	*Triphala Kwatha*	1.4 L		

Extractive Value of *Triphala Kwatha* = 19.2 g

* Weight of impurities remaining the cloth which was used to prepare *Pottali.*

**Weight of impurities remaining at the bottom of the vessel.

$$***\text{Weight of obtained } \textit{Shuddha Guggulu} = \left[350 - 45\right] + \left[\frac{19.2}{100} \times 1400\right]$$

$$= 305 + 286.2 = 573.8 \text{ g}$$

TABLE NO. 05: OBSERVATION OF PREPARATION OF *SHADANGA* CONCENTRATED *KWATHA.*

S. No	Quantity of *Kwatha*	Extractive value of *Shadanga Kwatha*	Expected extractive amount from *Kwatha*	Obtained concentrated *Kwatha*
1	1400 g	15.3 % w/w	214.2 g	250 g

TABLE NO. 06: OBSERVATIONS OF PREPARATION OF *SHAGANGA GUGGULU.*

S. No	Ingredients	Quantity	Total out come	Approx. weight of 1 pill	Quantity of prepared pills
1.	*Shadanga Churna*	250 g	720 g	502 mg	1434
2.	*Shadanga* concentrated *Kwatha*	250 g			
3.	*Shuddha Guggulu*	250 g			
4.	*Ghee*	50 g			

ANALYTICAL STUDY OF SHADANGA GUGGUL

Successfulness of pharmaceutical study can be confirmed through assessing effectiveness in clinical study as well as results of Analytical study. The meaning of the term analysis is the detailed examination, which reveals the minor but important aspects regarding the drug. Analytical chemistry is one of the most important disciplines of the science which deals with qualitative and quantitative analysis of various substances, it is essential to standardize the drug and examine the quality and safety of the drug. For that purpose some analytical test are performed and their results are compared with standard parameters. Analytical study provides idea about

quality of finish product and safety profiles the same on the basis of scientific background. Hence without analytical study of the drug, the research which was related to medicinal field is incomplete. The finish product which was followed standard operative procedure will leads to qualitatively and quantitatively fruitful outcome. For that raw drugs of the selected formula should be subjected to different procedure such as Agni *Samskara, Jala Samskara, Bhavana, Shodhana, Marana,* etc. The main aims of conducted analytical study are to assess chemical configuration and the physic-chemical changes which occurred after *Samskara* in the finish product. It is complicated work to analyze and standardize the herbal and herbo-mineral formulations due to presence of poly active principals with them.

In ancient time the Ayurvedic science was developed analytical parameters according to available facilities such as organoleptic test Viz. *Sneha Siddhi Lakshana, Avaleha Paka Lakshana, Guggulu Paka Lakshana, Bhasma Pareeksha*. In the present Analytical study is plan to developed analytical parameters for *Shadanga Guggulu* according to classical and modern methodology.

ANALYTICAL STUDY SHADANGA GUGGULU

AIM AND OBJECTIVES

1. To analyze the *Shadanga Guggulu* for safety and purity.

EVALUATION PARAMETERS

TABLE NO: 7 SHOWING ORGANOLEPTIC CHARACTERS OF *SHADANGA GUGGULU*

S.No	Colour	Odour	Taste	Appearance	Touch
1.	Dark brown	Characteristic of *Guggulu*	*Tikta*, *Kashaya*	Round Pill	Hard & smooth pills

TABLE NO: 8 SHOWING TOTAL SOLID (TS) CONTENTS OF THE *KASHAYA DRAVYA.*[7]

S.No	***Bhavana Dravya***	**Mean Total solid %**
1	*Triphala Kwatha*	19.2 % w/w
2	*Shadanga Kwatha*	15.3 % w/w

TABLE NO: 9 SHOWING PH VALUE OF THE *SHADANGA GUGGULU*[8]

S. No	Sample drug	Parameter	Mean pH
1.	*Shadanga Guggulu*	pH	3.88

TABLE NO: 10 SHOWING ANALYTICAL RESULTS OF SHADANGA GUGGULU ON FOLLOWING PARAMETERS

Parameter	Results
Loss on drying at 105˚c[9]	5.19 % w/w
Total Ash value[10]	6.52 % w/w
Water soluble ash[11]	1.45 % w/w
Acid insoluble ash[12]	0.72%w/w
Alcohol soluble extractive[13]	32.60 % w/w
Water soluble extractive[14]	49.04 % w/w
Uniformity of weight[15]	0.497 g / pill
Friability test[16]	0.12 % w/w
Hardness test[17]	13.5 kg /cm^2
Disintegration time[18]	46.53 min.

Microbial analysis[19]

Total aerobic bacterial count: 884 cfu / g

Total yeast mould coconut: 50 cfu /g

High performance thin layer chromatography[20]

1 g of Sample was extracted with 10 ml of alcohol. 15µl of the above extract was applied on a pre-coated silica gel F254 on aluminum plates to a band width of 8 mm using Linomat 5 TLC applicator. The plate was developed in Methanol. The developed plates were visualized in UV 254, 366, and white light. Retention factor values were recorded.

Wave length	Rf value
254 nm	0.5, 0.56, 0.6, 0.68, 0.72
336 nm	0.5, 0.63, 0.67, 0.71, 0.76, 0.81
White light	0.5, 0.6, 0.62

DISCUSSION AND CONCLUSION

Final weight of *Shodhit Guggulu* depends upon the impurities which were removed from *Shodhana* process as well as extractive solid value of the used *Triphala Kwatha* for *same* process**.** Expected weight of finished product was 800 g according to used raw material. But total outcome of *Guggulu* preparation was 720 g due to evaporation of water content presence in the concentrated *Shadanga Kwatha* and *Shodhita Guggulu* and handling loss because of *Shahasra Kuttana*. Presence of low amount of moisture content of SG (5.19%) leads to delay decomposition and enhance the shelf life and therapeutic value of the same. Uniformity of weight (497g / pill) friability (0.12% w/w), hardness test, (13.5 kg/ cm^2) disintegration time (46.53min) etc are in within limit readings according to *Guggulu Kalpana*. Low Acid insoluble Ash (0.72%) determines the presence of low adherent dirt as well as sand particles. Microbial load was shown within permissible limit which infers safety profile of the samples. HPTLC results were shown 5 spots on 254nm, 6 spots on 336nm and 3 spots on white light which refers the multi polarity index of the ingredients used. HPTLC finger print profile was developed for this sample can be used as a marker for further samples for quality control and standardization purpose.

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Source of Support: Nil
Conflict of Interest: None Declared