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# A STUDY ON STANDARDIZATION OF TRIPHALA SODHITA GUGGULU (*COMMIPHORA MUKUL* HOOK)

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## ABSTRACT

The medicinal plants are widely used by the traditional medical practitioners for curing various diseases. In traditional systems of medicine, gum resin part of Guggulu (*Commiphora mukul* Hook) (Burseraceae) is used. Out of five varieties only two varieties, mahishaksha (black) and kanaka (yellow) are usually preferred for medicinal preparations. The tree grows in rocky and rough land types in warm and semiarid areas in India. Oleo gum resin is used as hypoglycemic, antidiabetic, and anti-inflammatory. Guggulu is also used in arthritis and medoroga (obesity). Till date there is no detail of standardization work is reported for the *Tripala sodhita guggulu.* In present study evaluation of various physicochemical parameters, toxic heavy metals, phytochemical parameters and microbial contamination analysis was carried out. The study revealed different parameters of the crude drug which will be helpful to control the quality of *Tripala sodhita guggulu*.

**Keywords: -** Physico-chemical parameters, Chemical constituent, *Triphala sodhita guggulu*.

## INTRODUCTION

Plants are one of the most important sources of medicines. Today the large number of drugs used derived from plants, like morphine from *Papaver somniferum*, aswagandha from *Withania somnifera*, ephedrine from *Ephedra vulgaris*, atropine from *Atropa belladonna*, and reserpine from *Rauwolfia serpentina* etc. The medicinal plants are rich in secondary

metabolites and essential oils of therapeutic importance. The important advantage of medicinal plants is their safety as well as being economical, effective and their easy availability [1, 2]. Because of these advantages the medicinal plants have been widely used by the traditional medical practitioners. According to a survey in 1993 by World Health Organization (WHO), the practitioners of traditional system of medicine treat about 80% of patients in India, 85% in Burma and 90% in Bangladesh [3]. In traditional systems of medicine the Indian medicinal plants have been used in successful management of various disease conditions like bronchial asthma, chronic fever, cold, cough, malaria, dysentery, convulsions, diabetes, diarrhoea, arthritis, emetic syndrome, skin diseases, insect bites and also in treatment of gastric, hepatic, cardiovascular & immunological disorders [1, 4-7].

In India, however, earliest references of use of plants as medicine appear in Rigveda which is said to be written between 3500-1600 B.C. Later the properties and therapeutic uses of medicinal plants were studied in detail and recorded empirically by the ancient physicians in Ayurveda (an indigenous system of medicine) which is a basic foundation of ancient medical science in India [8]. Guggulu (*Commiphora mukul* Hook) (Burseraceae) is commonly known as Indian bedelium (English), gugal (Hindi), guggulu (Kannada), kukkulu, guggulu (Tamil), gukkulu, guggulu (Telugu), guggul (Bengali) gugara (Gujarati). *Commiphora mukul* Hook is a woody shrub to a small tree, with spirally ascending branches. Leaves contain 1-3 foliate, leaflets are sessile to sub sessile and rhomboid to ovate in shape. Flowers are small, brown to pink, unisexual. Calyx shows glandular hairs, forming cylindrical cap. Petals are 4-5 times as long as sepal. Fruit are drupes, red and ovate, acuminate in shape. The tree grows in rocky and rough land types in warm and semiarid areas in India. It is found in slopes of hills and foot hills, and is found extensively in Rajasthan, Gujarat, Maharashtra, Tamil Nadu, Karnataka, Assam and Bangladesh [6, 9].

Oleo gum resin is used as hypoglycemic, antidiabetic, and anti-inflammatory. Guggulu is also used in arthritis and medoroga (obesity). Guggulu the gum-resin exudates from the tree *Commiphora mukul* is a complex mixture of steroids, diterpenoids, aliphatic esters, carbohydrates and a variety of inorganic ions besides minor amounts of sesamin and other unidentified constituents. *Commiphora mukul* has also been separated by alcohol extraction into a soluble resin (~50%) and an insoluble carbohydrate gum and detailed structural investigations on the carbohydrate gum has been reported [10, 11]. Chemical studies on guggul have revealed that it is a good source of a number of useful steroids. By combining

solvent extraction, hydrolysis and extensive column chromatography various numbers of compounds namely, a diterpene hydrocarbon, $C_{20}H_{32}$ a diterpene alcohol ($C_{20}H_{34}O$) Z-guggulsterone, E-guggulsterone, and three new steroids designated as guggulsterol-I, guggulsteroid-II and guggulsterol-III have been isolated. Z-guggulsterone and E-guggulsterone are geometrical isomers belonging to the pregnane series and have been reported for the first time from a natural source [12-13].

## MATERIALS AND METHODS

The gum resin of guggulu collected, identified and authenticated from National Institute of Ayurvedic Pharmaceutical Research (NIAPR), Patiala (Punjab).

### Guggulu sodhana with Triphla kasaya

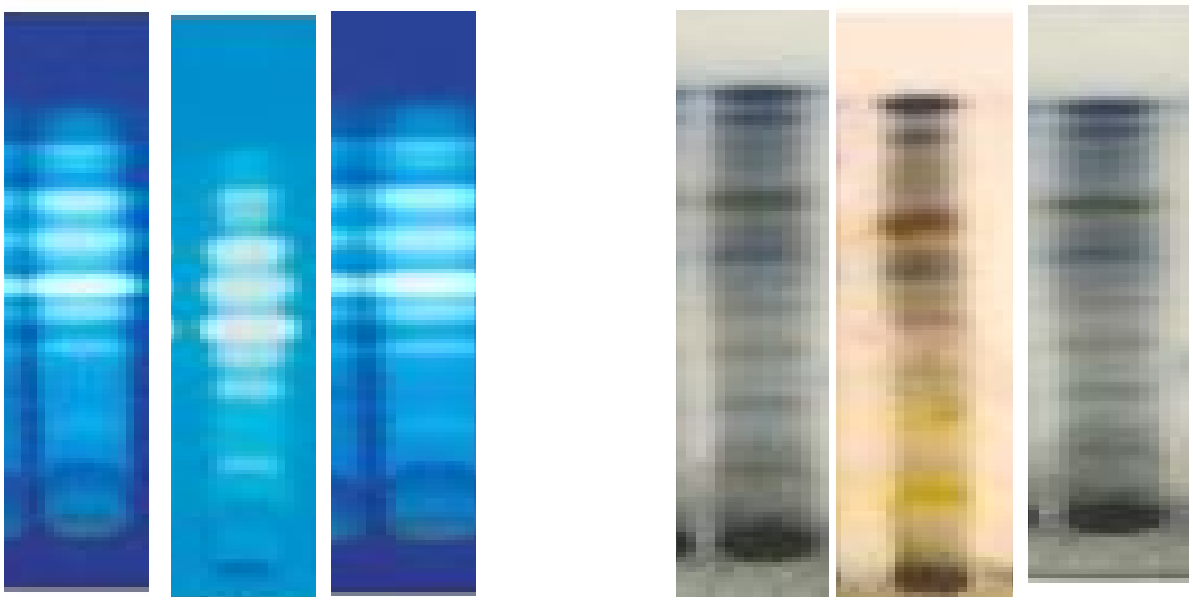
Before use sand, stone, plant debris, glass etc. were first removed from impure gum resin Guggulu. Then *Guggulu* was broken into small pieces. It was then kept in a piece of cloth and bundled it. Now dip that packed guggulu in container contained triphala kasaya. The boiling of *Guggulu* in container was carried on until all the *Guggulu* passes into the triphala kasaya through the cloth. By pressing with fingers, much of the fluid that can pass through was taken out. The residue in the cloth was discarded. The fluid was boiled again till it forms a mass. This mass was dried and pounded with a pestle in a stone mortar [14].

### Evaluation of various Parameters

Different physicochemical parameters like total ash, acid insoluble ash, ethanol soluble extractive value, water soluble extractive value, loss on drying, pH, Thin Layer Chromatography and phytochemical screening were assessed using different methods [15].

### Thin Layer Chromatography

4g of the sample was soaked in 40 ml of rectified spirit (90%) with occasional shaking for 18 hrs, boiled for 10 minutes and filtered. The filtrate was evaporated and concentrated and made up to 10 ml in standard flask. The 20 µl of the solution was applied on aluminium plate pre-coated with Silica gel 60 $F_{254}$ of 0.2 mm thickness using Linomat IV applicator. The plate was developed in Toluene: Ethyl acetate (1: 1 v/v). After air drying the plates were visualized in UV 254 and 366 nm and after spraying with vanillin reagent spots appeared in visible light [16, 17].



Batch A Batch B Batch C Batch A Batch B Batch C

**At UV 366 nm** **With spray reagent**

**Solvent system:** Toluene: Ethyl acetate (1:1)

**Fig. 1 TLC of *Tripahla Sodhita Guggulu***

## RESULT AND DISCUSSION

Preliminary phytochemical results for three batches showed the presence or absence of certain phytochemicals in the drug. The tests performed using n-Hexane, Ethyl acetate, alcoholic and water extracts. Phytochemical test revealed the presence of gum, resin, volatile oils and terpenoids in all batches.

The presence of heavy metals namely Arsenic, Mercury, Cadmium and Lead were analyzed in all samples, the concentration of all the heavy metals were below the WHO/FDA [15] permissible limits. The presence of pesticide residue organochlorine pesticide, organ phosphorous pesticides and Pyrethroids were not detected in samples.

Analysis of various parameters for three batches of *Triphala Sodhita Guggulu* is tabulated in Table 1. The pH value of 10% w/v aqueous solution was acidic for all three batches. Deterioration time of the plant material depends upon the amount of water present in plant material. If the water content is high, the plant can be easily deteriorated due to fungus. The loss on drying at 105°C for three batches of *Triphala Sodhita Guggulu* was found to be 15.12% (Batch-A), 6.83% (Batch-B) and 7.59% (Batch-C). Total ash value of plant material

indicated the amount of minerals and earthy materials attached to the plant material. Analytical results for all batches showed total ash value content was 3.71% (Batch-A), 3.79% (Batch-B) and 4.4% (Batch-C). The negligible amount of acid-insoluble siliceous matter present in three batches was 0.27% (Batch-A), 0.15% (Batch-B) and 0.36% (Batch-C). The water-soluble extractive value was found to be not less than 26%. The alcohol-soluble extractive value was found to be not less than 12%. Thin layer chromatographic technique was used to separate the chemical compounds present in the drug. Various solvent systems were checked to separate the maximum number of chemical compounds in the drug. TLC of the rectified spirits extract developed in the mobile phase of Toluene: Ethyl acetate (1:1) (Figure 1) and observed under UV 254 nm, UV 366 nm and under visible light. After spraying with vanillin reagent various spots appeared at different $R_f$ values 0.1, 0.12, 0.4, 0.5, 0.6, 0.68, 0.76, 0.88, 0.92 (Batch-A),0.1, 0.3, 0.41, 0.52, 0.6, 0.68,0.76, 0.88, 0.92 (Batch-B),0.1, 0.22, 0.41, 0.55, 0.60, 0.65, 0.78, 0.88, 0.90 (Batch-C).

**Table 1. Analysis of *Triphala sodhita guggulu* for various parameters**

| S.NO | Parameters | Standard Value | Batch-A (mean) | Batch-B (mean) | Batch-C (mean) |
|---|---|---|---|---|---|
| 1 | pH (1% aq. solution) | - | 3.80 | 3.72 | 3.75 |
| 2 | Loss On Drying at $105^0$C (%) | < 16% | 15.12±0.03 | 6.83±0.04 | 7.59±0.02 |
| 3 | Water-soluble extractive (w/w %) | > 26% | 39.33±0.09 | 26.51±0.85 | 45.17±1.3 |
| 4 | Alcohol-soluble extractive (w/w %) | >12% | 12.84±0.36 | 23.58±0.4 | 31.55±0.8 |
| 5 | Total Ash content (w/w %) | <5% | 3.71±0.06 | 3.79±0.02 | 4.4±0.16 |
| 6 | Acid insoluble ash (w/w %) | <0.5% | 0.27±0.01 | 0.15±0.07 | 0.36±0.02 |

## CONCLUSION

The study revealed the importance of different physicochemical parameters which can be used for authentication of the crude samples. Physico-chemical, phytochemical, TLC studies as well as various aspects of the samples was studied. The present work will be helpful to prevent batch- to-batch variation occurred in analysis parameters of *Triphala Sodhita Guggulu* containing polyherbal formulations like simhnand guggulu, kaishore guggulu, yograj guggulu, gokshuradi guggulu etc. The periodic assessment is vital for quality assurance and safer use of herbal drugs.

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