

**A STUDY ON MARKET SAMPLE OF GUGGULU FROM ORISSA****B.N. Mahapatra\***

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**ABSTRACT**

The plant Guggulu – *Commiphora wightii* (Arnott) Bhandari Hitherto confined to the arid rocky tracts of Rajasthan, Mysore, Deccan has also been introduced in the state of Orissa. The gum resin widely used in various Ayurvedic recopies for its anti-inflammatory, anti-arthritic, anti-rheumatic, hypo-lipideamic activity. Also it is observed that the type of guggulu available in Orissa market vary in respect of price, quality and efficacy. Thus, a comparative study of the market sample of guggulu collected from different regions of the state has been undertaken for analysis. After careful analysis of physicochemical parameter and TLC of guggulu we set a standard for using guggulu for better efficacy in best price.

Keywords: Guggulu, physicochemical analysis, TLC

**INTRODUCTION**

Guggulu, a “Divyashadhi” and precious gift of nature, obtained from the plant *Commiphora wightii* (Arnott) Bhandari (Syn. *Balsamodendron mikul*; *Commiphora mukul* Engl.) belonging to Burseraceae family in one of the very first broad spectrum drug with wide therapeutic range has been successfully used in Ayurvedic therapy since Vedic period. Guggulu plant grows abundantly in the arid, rocky areas of Rajasthan, Gujarat and Maharashtra. Its usefulness in the modern life processes diverted global attention due to its anti-inflammatory, anti-arthritic, anti-rheumatic, hypolipideamic activity for obese and cardiac patents.<sup>1</sup> Oleo-gum resin of *C. wightii* has been proved to be potent pypocholes-terolemic, hypolipideamic, anti-atherosclerotic agent both in clinical as well as experimental studies.<sup>2</sup> It is also known to increase white blood

cell count with strong disinfectant properties.<sup>3</sup> Use of guggulu available in the local market is a common practice by the pharmacies. It is observed that different types of guggulu are available in Orissa with price variation, which often creates confusion in drug selection that affect the quality of the products, so also the Ayurvedic therapy. Hence, a comparative study is the needed of the hour.

**AIM OF THE STUDY** The study was planned to evaluate the quality of guggulu procured from Orissa market for future guidance.

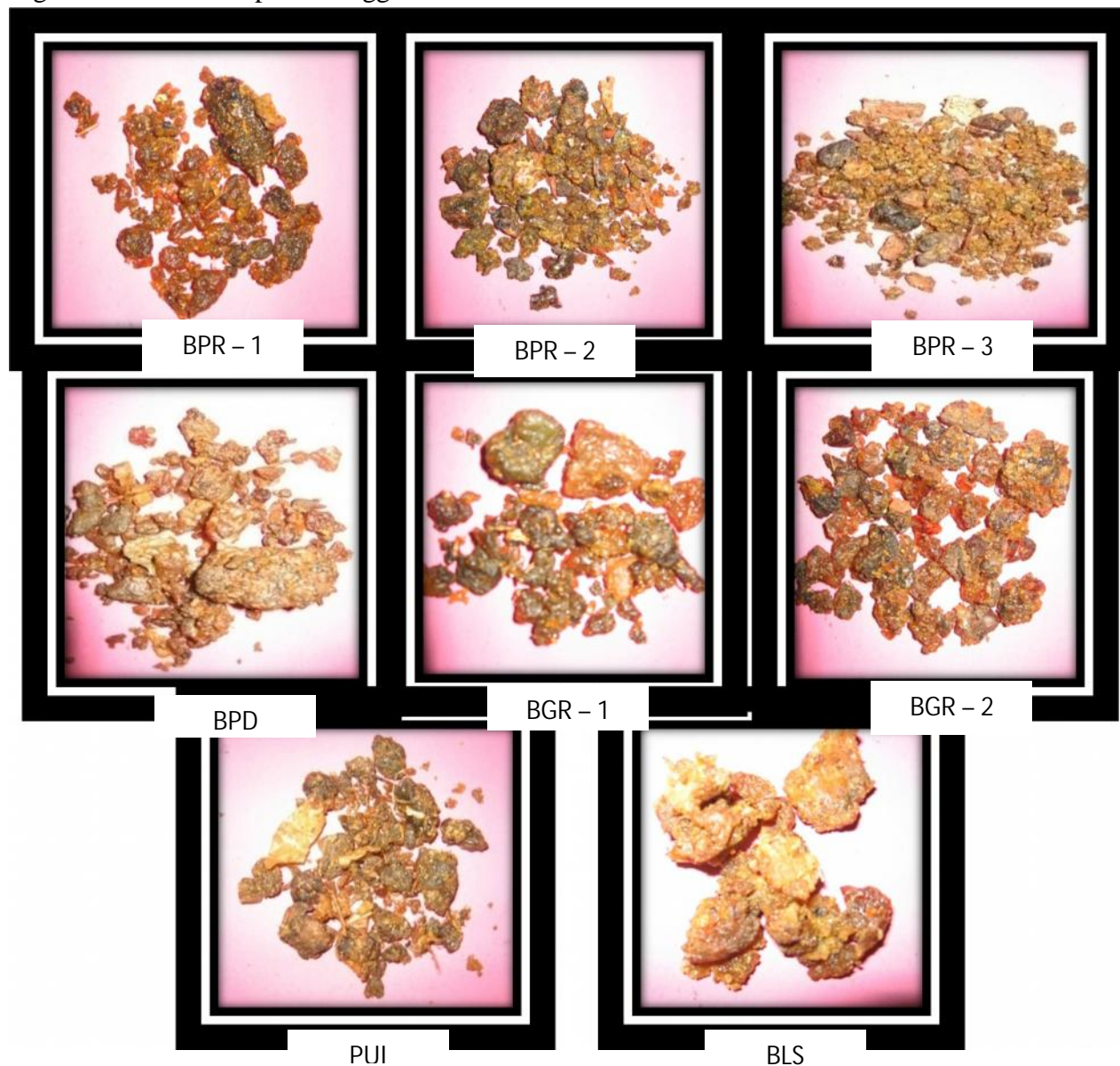
**STUDY DESIGN:** The study was a prospective, comparative and preliminary step of market sample guggulu on the basis of their macroscopic, physic-chemical parameters and TLC analysis.

**MATERIALS AND METHODS**

**Inclusion criteria:** A total number of five samples of guggulu procured from different region (Northern, Southern, Western and Central) of Orissa market were included in the study (Figure 1).

**Exclusion criteria:** Samples having more foreign matters and unpleasant odour were excluded from the study.

Figure 1: Market sample of Guggulu from Orissa



**Study procedure:** Keeping the view of differentiation, the samples from different region of Orissa were collected along with their market price and place of collection. These were coded, recorded and subjected to

macroscopic, preliminary physic-chemical and TLC analysis.

**Study drug:** Guggulu samples were found to be variable in price from place to place.

**Macroscopic characters:** Test samples were studied on the guidelines/parameters

like colour, shape, taste, odour, fracture and treating in hot water as mentioned in the standard texts and were compared.<sup>4</sup>

**Physicochemical analysis:** Preliminary physicochemical constant like percentages of foreign matters, total ash, acid-insoluble ash, alcohol soluble extractive, water soluble extractive and volatile oil contents of the test samples were compared with the standard references.<sup>4,5</sup>

**Thin layer chromatography:** A densitometric HPTLC analysis was also performed for the development of characteristic finger print profile, which may be used as marker for quality evaluation and standardization of the drug. For this, 1gm of guggulu resin extracted with petroleum ether in saxhlet apparatus on a water bath for 6 hours. The extract was concentrated and di-

luted with chloroform. 10µl was applied on different pre-coated silica gel G60 F<sub>254</sub> Merck glass plates of 20 x 10 cm with the help of a Camag-Linomat-IV applicator. The plate was developed in a solvent system of Toluene-acetone (9:11, v/v) up to a distance of 8 cm at room temperature (19°C). After development, the plate was dried in the air and scanned at 366nm. Dipped in anisaldehyde sulfuric acid reagent and heated at 105°C for about 10 minutes to obtain the Rf value.<sup>6</sup>

**RESULTS:** A total of five market samples of guggulu were taken for the study. Different samples showed difference in their rate and source of collection. The rate varies from Rs. 90.00/kg to 700.00/kg while the sources of drugs were from Raipur, Calcutta, Pakistan and Afghanistan (Table 1).

Table 1: Market price and source of Guggulu

Coded drug sample as per place of collection	Source	Rate/kg
PUI	Calcutta	Rs. 450=00
BGR-1	Raipur	Rs. 350=00
BGR-2		Rs. 90=00
BPR-1	Pakistan	Rs. 380=00
BPR-2	Calcutta	Rs. 320=00
BPR-3	Calcutta	Rs. 200=00
BLS	Afghanistan	Rs. 900=00
BPD	Calcutta	Rs. 400=00

PUI = Puri; BGR = Balangir; BPR = Berhampur; BLS = Balasoe; BPD = Baripada

Macroscopic characters of the test samples in comparison with the standard parameters were found to be more or less equal (Table 2).

Table 2: Macroscopic characters of Guggulu

Parameters	Standards	PUI	BGR-1	BPR-1	BLS	BPD
Colour	Pale yellow/brown/golden	Brownish black	Brown	Golden yellow	Pale yellow	Brown
Shape	Vermicular/stalactitic	Granular	Vermicular	Granular crystal	Stalactitic	Bitter, astringent
Odour	Aromatic	Less aro-	Less aro-	Aromatic	Aromatic	Aromatic

		matic	matic			
Fracture	Viscid	Hard	Hard	Viscid	More viscid	Viscid
Treatment in hot water	Milky emulsion	Milky emulsion	Milky emulsion	Milky emulsion	Milky emulsion	Milky emulsion

The preliminary physicochemical parameters revealed that there was variation in the findings when compared with the standards (Table 3).

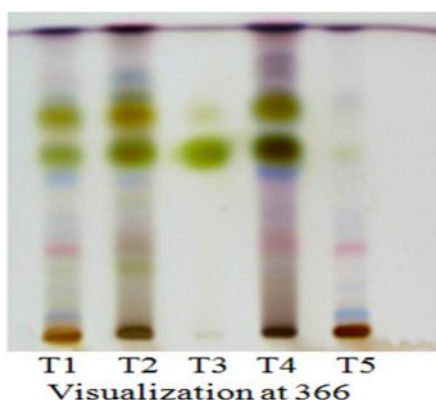
Table 3: Physicochemical analysis

Parameters	Standard		PUI	BGR-1	BPR-1	BLS	BPD
	API	DBMP					
Foreign matters (NMT)	4.0%	4.0%	6.5%	5.0%	7.0%	4.5%	6.0%
Total ash (NMT)	5.0%	5.575%	7.0%	6.5%	6.0%	5.0%	6.5%
Acid-insoluble ash (NMT)	1.0%	3.346%	2.5%	1.8%	1.8%	1.6%	1.5%
Alcohol soluble extractive (NLT)	27.0%	39.491 %	29.0%	25.0%	31.0%	33.0%	32.0%
Water soluble extractive (NLT)	53.0%	48.420 %	50.0%	45.0%	57.0%	51.0%	53.0%
Volatile oil (NLT)	1.0%	1.0%	0.8%	0.7%	1.0%	1.2%	1.5%

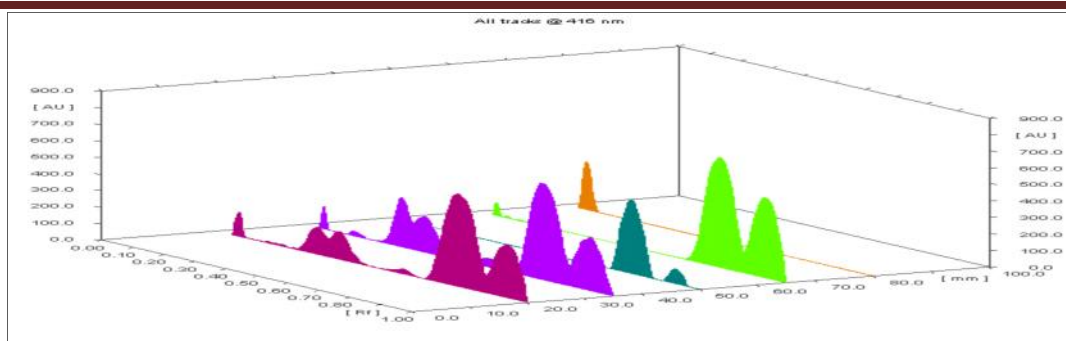
NMT = Not more than; NLT = Not less than; API = Ayurvedic Formulary of India; DBMP = Bata base on Medicinal plants used in Ayurveda

On TLC study, it is assumed that the spots obtained at Rf at 0.38 and 0.46 matched with the reported Rf value of Guggulsterone indicating all the samples contain guggulu in addition to other materials (Figure 2).

Figure 2: Thin layer chromatography (TLC) of Guggulu



T1 - PUI  
T2 - BGR 1  
T3 - BPR 1  
T4 - BLS  
T5 - BPD  
Solvent system- Toluene-acetone (9:1, v/v).  
Spray reagent- Anisaldehyde  
Sulphuric Acid



3D View

R<sub>f</sub> 0.38 and 0.46 – Guggulsterone marker

## DISCUSSION

Increase demand and decreased product/supply of guggulu have become a major problem in Ayurvedic sector. Monopoly of the traders and adulteration of guggulu with the gum-resin of Sallaki (*Boswellia serrata*) interferes with the quality and efficacy of the former. Guidelines for the assessment of genuine guggulu have been issued by the Ayurvedic Pharmacopoeia of India (API) and data base on medicinal plants used in Ayurveda (DBMP) published by Government of India and C.C.R.A.S. respectively. Macroscopic characters at the initial level followed by physicochemical and TLC analysis etc can be of immense value in the confirmation of guggulu selection before its use. Probably, the market price variation depends on transportation cost, market demand, low quality and/or adulteration. The retail market price of guggulu was Rs 860.00/kg (Sharma et al., 2001) while the samples of Orissa varies from Rs. 90.00 to 900.00/kg clearly indicated the low quality or adulterated drug. In microscopic characters the colour parameter of test samples satisfied the standard, while the shape varies. Similarly, the taste, odour and treatment in hot water of all the best samples matched with the standard except fracture parameter that showed some adulteration.

Physicochemical analysis of all the samples contained more foreign matters, while the BLS sample was the least (4.5%). The total ash of BLS was same (5%) as that of standard followed by BPR-1 (6%), BGR-1 and BPD (both 6.5%), PUI (7%). Acid-insoluble ash was found to be more in all the samples. Increased alcohol soluble extractive was found to be more in all the samples. Increased alcohol soluble extractive was noticed in BLS (33%) followed by BPD (32%), BPR-1 (31%) while water soluble extractive increased in BPR-1 (57%) and BPD (53%). The volatile oil content was more in BPD (1.5%), BLS (1.2%) in comparison to the standard. The preliminary phytochemical analysis suggested that the BLS sample was better than BGR-1 and BPD sample. The TLC studies pointed that the bands in the sample were obtained at R<sub>f</sub> of 0.38 and 0.46 which could be taken as identifying markers as Guggulsterone, since Guggulsterone was identified at 0.38 and 0.46.

## CONCLUSION

In the era of globalization, alternative system of medicine like Ayurveda, Unani, Siddha etc are emerging as options for modern system of medicine. Majority of formulations used in these systems are consisting of herbal resources. In order to

achieve landmark of Ayurveda and its drugs in global market, it is necessary to follow quality control. Ayurvedic drugs are used for treating various diseases represents a substantial proportion of global drug market. Majority of crude drugs required for indigenous drug industries are collected from wild recourses and cultivation practices are developed for only few till date. Moreover, majority of these plants are cross pollinated, their collection from nature can not assume consistent quality due to genetic and ecological variation found in natural population. In addition to this unreliable supply, doubtful botanical identity, untrained post harvest handling and greater chances of adulteration/ substitution are some of the constraints. Primarily in order to achieve therapeutic efficacy, authentic plant material collected at optimum conditions and proper handling is necessary. In general appropriate documentation, botanical and preliminary chemical standardization are important key steps. In the above study, guggulu procured from different market places of Orissa were evaluated by macroscopic, physiochemical parameters and TLC study. When the results obtained in this study compared with the reported standard value of API and DBMP, the macroscopic and physiochemical parameter values were closed to the reported values. It is assumed from the TLC study that the spot obtained at Rf at 0.38 and 0.46 matched with reported Rf value of Guggulsterone indicating the samples were guggulu. But the other spot present were other materials or adulterants with it. Since this study was preliminary, proper quality control parameters are required to be carried out in future. Therefore, this study concludes that further quality control parameters are

required to be carried out in future for its authenticity and purity.

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