

# PHYSICO CHEMICAL ANALYSIS OF SURYAPRABHA GULIKA

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**ABSTRACT:** *Rasa sastra* uses mercury and other minerals processed into various dosage forms. This trade needs cautions and precautions due to the presence of heavy metals. Therefore the rasa drugs available in the market need to be analysed for ensuring safety and efficacy. For this, *suryaprabha Gulika* which is one of the most commonly prescribed Rasa drug in Kerala is selected. The yoga which is found in *Sahasrayoga* contains mercury, sulphur, Aconitum etc as ingredients. By analysing the physicochemical characters, we can create a standard profile which can be used as a future reference and as a guideline to manufacturers. It also aims to analyse *Suryaprabha Gulika* by creating a standard profile. Physicochemical analysis is used as study design and Protocol for Testing by Pharmacopoeial Laboratory for Indian Medicines will be used as study tool.

**Key words:** *Suryaprabha gutika*, PLIM, Physicochemical analysis.

## INTRODUCTION

Ayurvedic medicines can be categorized mainly into herbal, mineral and herbo mineral preparations. Rasasastra is a unique branch of Ayurvedic science, which mainly deals with minerals. Rasasadhya, are highly potent, quick in action, useful in many diseases and required in minute quantities.

Commonly Ayurvedic medicines are safe to use, but it may be harmful, if the proper preparatory schedule is not followed as per the directions mentioned in Ayurvedic classics. Although use of traditional remedies is advantageous, it does suffer from some limitations. The main limitation is the lack of standardization of raw materials, of processing methods and of the final products, dosage forms, and the nonexistence of criteria for quality control.<sup>1</sup>

Thus for the global acceptance of our traditional medicines, proper validation is necessary as per the newly developed standardization methods. By this we can standardize the raw drugs, methods, and also the protocol for preparing medicines, which in turn helps to increase the quality, safety and efficacy of the drugs.

*Suryaprabha gulika* is a herbo mineral formulation-mentioned in *Sahasrayoga*, (*gulika yoga prakaranam*)<sup>2</sup> is one of the commonly used herbo mineral preparation knowing its therapeutic efficacy. This formulation contains parada, gandhaka and vatsanabha, which are potentially harmful when they are not purified well. Since there is no standard manufacturing protocol is available for this formulation, proper analysis and evaluation is essential. So to provide standard value, to generate faith, to provide quality control, safety and efficacy of Ayurvedic formulations, analysis and evaluation of formulations is essential.

**AIM AND OBJECTIVE:** Physicochemical analysis of *Suryaprabha gutika*

## MATERIALS AND METHODS

This herbo mineral combination consists of two minerals *Parada (Sodhitha)*<sup>3</sup> and *Gandhaka (Sodhitha)*,<sup>4</sup> which is made into kajjali and herbal ingredients like triphala, trikatu, hingu, vatsanabha (Sodhitha)<sup>5</sup> and ajamoda. The herbal drugs used in the formulation were procured from the local market of Trivandrum and were authenticated by doing the Quality Control tests mentioned in API (Total ash, Acid insoluble ash, Water soluble extractive<sup>6</sup>, Alcohol soluble extractive). Parada procured was with 99% assumed purity and genuinity of gandhaka was confirmed through XRD. All the herbal ingredients were washed, dried and powdered separately and sieved through sieve number 85 (as per specification for churna to prepare gutika). The mineral ingredients like parada, gandhaka and the toxic ingredient vatsanabha has been subjected to specific sodhana or detoxifying procedures before using into the preparation. Kajjali<sup>7</sup> has been prepared by grinding equal quantity of Sodhitha parada and Sodhitha gandhaka for 70 hours till kajjali siddha lakshanas (slakshnatwa, Nishchandrata, rekhapurnatwa) were obtained. Three batches of *Suryaprabha gutika* was prepared following the procedure mentioned in *Sahasrayoga*. Equal parts of kajjali and powders of other herbal ingredients were mixed together and this was then triturated in lemon juice for 6 hours and rolled into pills of size 125mg each. All the three samples were subjected for the analytical parameters mentioned for gutika kalpana as per PLIM<sup>8</sup> (organoleptic, weight variation disintegration time, hardness, test for heavy metals, TLC, HPTLC). Along with this, XRD analysis was also done

## RESULTS

### Organoleptic evaluation

**Table no: 1 organoleptic characters**

Odour	Faint to nil
Colour	Black

## Table no; 2 Physico chemical evaluation

## a. Weight variation

Name	Average weight	Lower deviation limit	upper deviation limit
SPG1	124.5	7.5-nil	15-nil
SPG2	124.25	7.5-nil	15-nil
SPG3	124.5	7.5-nil	15-nil

## b. Hardness

Sample name	T1	T2	T3	Final value
SPG1	2.5	2	2.5	2.3
SPG2	3.5	3.5	3.5	3.5
SPG3	3	3	3	3

## c. Disintegration time

Sample name	T1	T2	T3	T4	T5	T6	Final value
SPG1	78	80	85	87	80	89	83.3m
SPG2	81	84	83	85	86	80	83.16m
SPG3	80	81	85	84	80	83	77.16m

## d. Test for heavy metals

Name	Lead	Cadmium	Zinc	Copper
SPG1	0.1306	0.0421	0.1673	0.1904
SPG2	0.0652	0.0433	0.2466	0.2345
SPG3	1.2510	0.0440	0.2188	0.17810



Fig no 1 TLC of prepared samples and single drugs

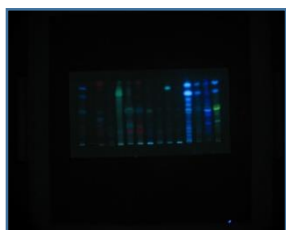


Fig no 2 Hptlc of prepared samples and single drugs

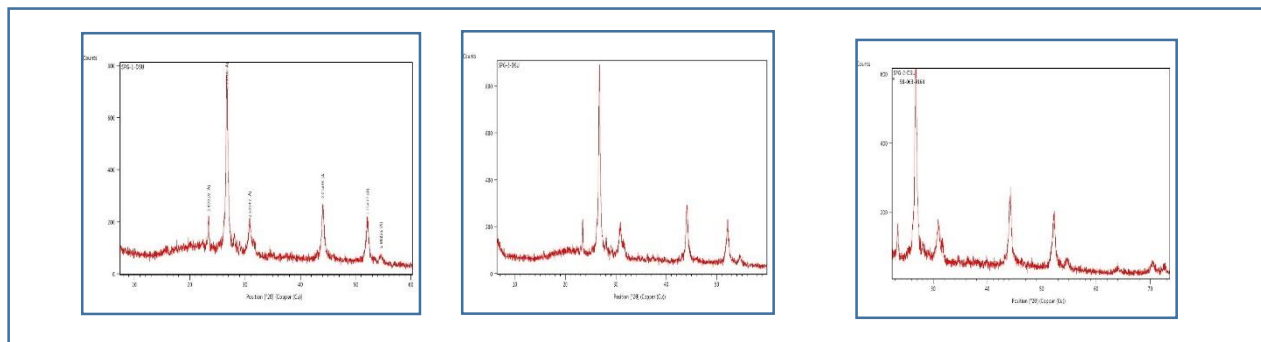


Fig no 3.xrd pattern of three prepared samples 1, 2 and 3 respectively

## DISCUSSION

Analytical study of the present work were done in DSU of Govt Ayurveda College Trivandrum and in Govt Pharmacy College, Trivandrum. Colour of the prepared SPG was of black colour, which is characteristic to that of kajjali. Odour was faint to nil of that of lemon juice.

Hardness of gulika was found to be within the limits. As the *gulika* was rolled on an average weight of 125 mg, weight variation among the *gulika* was absent. Meanwhile the samples took nearly more than 1 hour to disintegrate. It may be due to the slow rate of liquid penetration into the pills

TLC of all the raw herbal drugs were developed in the solvent system Toluene: Ethyl acetate; formic acid in the ratio 48:32:1 ml. In this particular solvent system only all the drugs showed maximum compound separation and hence finished product was also developed in the same solvent system and observed for significant spots.

The same solvent system was taken for HPTLC and the bands were formed clearly and TLC and hptlc showed peculiar bands and Rf values corresponding to that of individual ingredients

As heavy metal contents in Ayurvedic medicine is a problem of the era, this test is a must. The heavy metals that were checked for in all the samples were found to be within the limits. As it is a herbo mineral preparation containing minerals like mercury and sulphur, it is apt to do xrd to find the crystalline patterns. The presence of mercuric sulphide (HgS) is confirmed in samples, SPG1, SPG2 and SPG3 prepared in our lab with that of standard JCPDS data of (HgS), available in the literature.  $\beta$ HgS form of mercuric sulphide was identified in these samples.

The crystalline size of various samples was also studied and found that all samples have near values in the nano region ranging from 190 to 400 nm. All the three samples prepared in our lab showed lesser crystalline size compared with the market samples, highlighting the efficiency of preparation adopted in this work. The high intensity of XRD peaks of prepared samples suggests that drug sample has very good crystalline properties.

All the samples showed small peaks at 23.3414 which indicated the presence of free untreated sulphur. This ensures the absence of free mercury in the sample to an extent.

Peak values of SPG1, SPG2, and SPG3 exactly corresponds to that of  $\beta$ HgS

## ANALYTICAL PROFILE OF SURYAPRABHA GULIKA

- Description  
Colour: black  
Odour: odourless to faint lemon
- Average weight- - 125mg
- Disintegration time - (m)
- Hardness - 2.00kg/cm<sup>2</sup> (1.75-2.24)
- Identification with HPTLC  
In the solvent system Toluene: Ethyl acetate 7:3, it gave spots at Rf 0.09, 0.26, 0.30, 0.34, 0.52, 0.57, 0.68 and 0.76 Rf.
- Test for heavy metals: nil
- Test for microbial contamination: nil

## CONCLUSION

Based on the results of all the analytical tests done for the prepared gulikas be within the analytical profile has been developed. XRD analysis of the genuine sample s showed the presence of mercuric sulphide in the form of  $\beta$ HgS and confirmed the drug is crystalline in nature with values near to nano range

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