

STANDARDIZATION OF GUDUCHI SATTVA

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ABSTRACT

Ayurveda is the oldest medical system in the world which dates back nearly to 5000 yrs. *Guduchi Sattva* is an important formulation mentioned in *Ayurveda* for *Rajayakshma*¹. Its immunomodulatory activity, anti-oxidant activity, anti-allergic activity and anti-bacterial activity are very well known to the *Ayurvedacharyas*. Present study deals with the scientific validation and standardization of the pharmaceutical procedure of *Guduchi Sattva* used for treating *Kshaya* (Phthisis), *Raktapitta* (Bleeding Disorder), *Pada daha* (Burning sensation of feet). Following quality control procedures recommended for the finished product. The parameters studied for standardization are organoleptic parameters, physico-chemical parameters and TLC profiles.

Keywords: *Guduchi Sattva*, *Rajayakshama*, Standardization, Quality Control, TLC

INTRODUCTION

Use of herbal remedies is on rise globally. According to an estimate of world health Organisation (WHO) an approximately 85-90% of the world's population consumes traditional herbal medicines for its better tolerance and negligible adverse drug reactions². Looking to the persistent faith in the herbal medicine and its increase in demands, WHO has evolved guidelines for the validation of plant based drugs for developing countries like India³⁻⁴. In spite of various efforts by WHO, there not many studies supporting their scientific evaluation. Variation in the phytochemical content due to difference in place, time of collection and different environmental condition leads to inconsistent therapeutic effect. The absence of an ingredient or addition of different part or plant will certainly affect the therapeutic value of the medicine. Also the parameters to be followed at the time of preparation are not well defined and in several instances they are not clear to the manufactures. This emphasizes the need for standardization and quality control of *Ayurvedic* products.

The present study is aimed to lay down Pharmacopeial standard for *Guduchi Sattva* extremely useful in debility due to *Rajayakshama*. The sole content of this versatile formulation is fresh *Guduchi* (*Tino-*

spora cordifolia Wild.) stem. There are several parameters which have been recommended to standardize and scientifically validate *Ayurvedic* preparations as safe drugs⁵⁻⁶. The parameters studied for the present study for the standardization of test formulation include organoleptic characters, physicochemical parameters, phyto-chemical analysis and development of TLC profiles as recommended by WHO and *Ayurvedic* pharmacopoeia committee⁷.

MATERIAL AND METHOD

The constituent herbal raw drug *Guduchi* stem (*Tinospora cordifolia Wild.*) is procured from the forest area of the Chitrakoot, Dham Karvi, Satana (M.P). The Raw drug collected in fresh state and subjected for identification and authentication by experts of subject in Dept of *Dravyaguna Vignyan*, National institute of Ayurveda, Jaipur⁸. Filtered drinking water of Government Supply in Satana Dist (MP) was used for the preparation of the formulation. Stainless steel vessel was used throughout the procedure. Three samples are *Guduchi Sattva* was prepared in Gupta Farm House, Chitrakoot, Dham karvi, Dist- Satana (M.P).

PHARMACEUTICAL STUDY

Guduchi Sattva is mentioned under subhead *Sattva* in AFI⁹. The raw stem of mature *Guduchi*¹⁰ Stem was well rinsed with

water to remove dust, foreign particles adhered to drug. The cover of *Guduchi* stem was removed so as to avoid interference during preparation of *Sattva*. The removed cover of stem was weighed. Stem of *Guduchi* is then cut into small pieces and was pondered in *Khalwa* till fibres of stem get separated and the material becomes sticky. These fibres are placed in a vessel and 21 times water was added into it and rubbed well with hands thoroughly and kept overnight for soaking. Next day the mixture was again well rubbed until the stickiness disappears into the same water. Then fibers are removed and the remaining material was strained through clean cloth.

Sedimentation: The strained material was collected in a flat bottom stainless steel container and allowed for the sedimentation.

Decantation and Washing: The fine particles in the mixture were settled in the bottom

of the container, the upper liquid portion was decanted carefully. After decantation the sediments obtained was again mixed with little quantity of water and allowed again for sedimentation and liquid was removed by decantation process. By repeated washing and decantation were done, for 7 times. Then clear white starch was obtained.

Drying: Obtained starch was taken in a plate and dried in air drier at 30°C to get white coloured *Sattva*. . The changes observed in the preparation of *Guduchi Sattva* were noted with respect to following points;

- a. Color
- b. Odor
- c. Temperature
- d. Taste
- e. Appearance
- f. Texture.

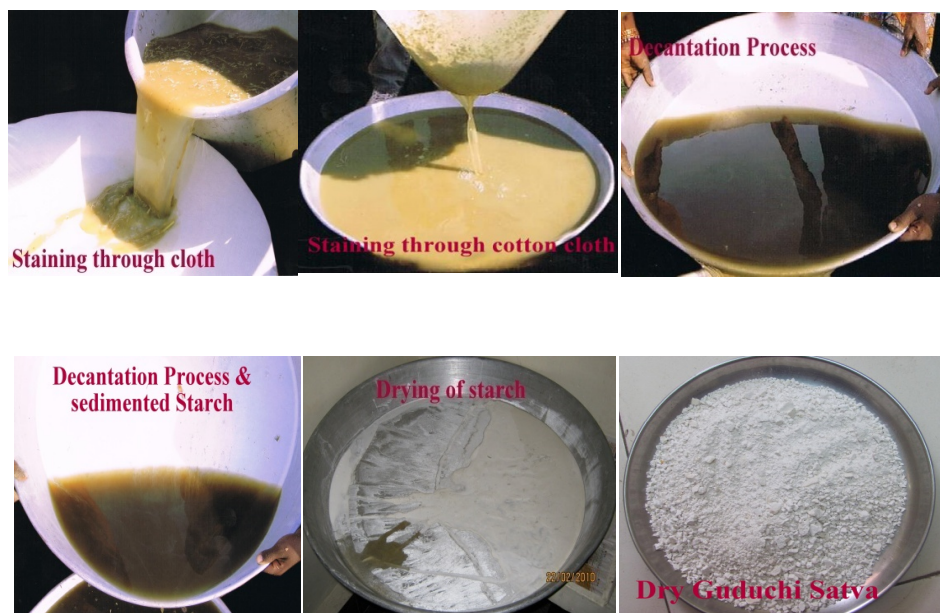
Three samples (G₁, G₂, and G₃) were prepared as per textual references to develop SOP.

Table No.1 Showing details of Pharmaceutical Procedures

Materials	Practical No.1 (G ₁ Sample)	Practical No.2 (G ₂ Sample)	Practical No.3 (G ₃ Sample)
Weight Starting material	51.510 kg	50.650 kg	48.920gm
Weight after removing upper covering of stem (Bark)	49.703 kg	48.865 kg	47.262 kg
Weight of cover (Bark) fresh	1.807 kg	1.785 kg	1.658 kg
Weight of cover (Bark) after drying	690 gm	655gm	623gm
Quantity of water used	1043.763 lit	1026.165 lit	971.500lit
Yield in %	2.4%	2.18 %	2.11%

GUDUCHI SATTVA PREPARATION





ANALYTICAL STUDY

Three prepared samples G₁ G₂ G₃ and two market samples G_M and G_H were subjected to various analytical examinations. Dried material was used for the quantitative determination according to standard procedure of Indian Pharmacopoeia and WHO/ QCMMPM¹¹. The following analytical tests were performed.

- 1) Organoleptic properties
- 2) Determination of Grain size of starch¹².
- 3) Chemical tests for Identification of *Sattva* (Starch)¹³.

- 4) Starch test (Iodine test)¹⁴
- 5) Determination of pH
- 6) Determination of Moisture Content (L.O.D.)¹⁵.
- 7) Determination of Total ash¹⁶.
- 8) Determination of Acid-Insoluble Ash¹⁷.
- 9) Determination of Water Soluble Ash¹⁸.
- 10) Determination of Alcohol Soluble Extractive¹⁹
- 11) Determination of Water Soluble Extractive²⁰
- 12) TLC²¹

Table No 2 Showing Organoleptic properties of Guduchi Sattva.

Characteristics	G ₁	G ₂	G ₃	G _m	G _H
Rupa (Colour)	Chalky white	Chalky white	Chalky white	Chalky white	Chalky white
Rasa (Taste)	Tasteless	Tasteless	Tasteless	Tasteless	Tasteless
Gandha (Odour)	Odourless	Odourless	Odourless	Odourless	Odourless
Sparsha (Texture)	Fine powder	Fine powder	Fine powder	Fine powder	Fine powder

Table No 3 Showing Strach Grain Size of Guduchi Sattva.

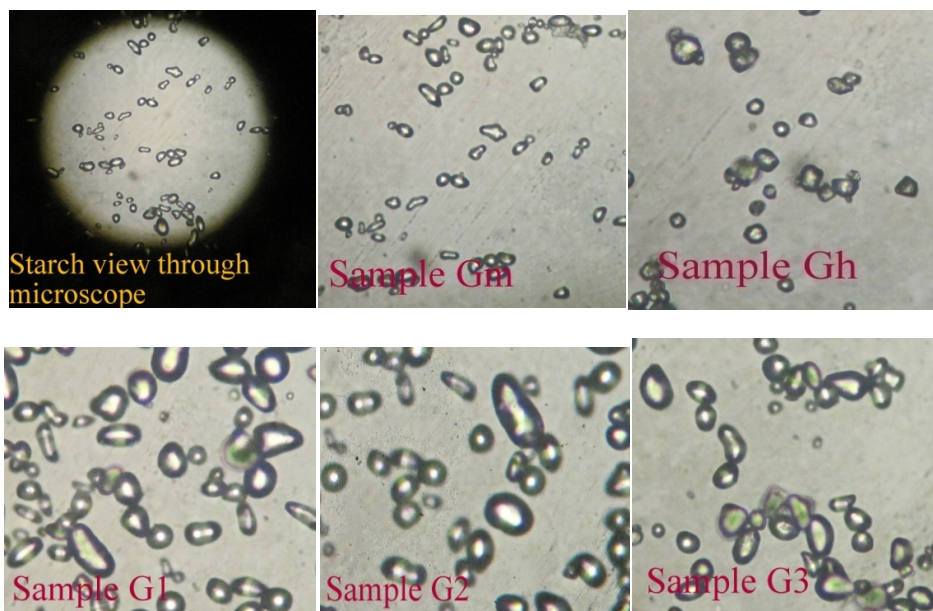
S.No	G ₁ (μ)	G ₂ (μ)	G ₃ (μ)	G _m (μ)	G _H (μ)	Wheat starch (μ)	Maize starch (μ)
1	20	16	20	12	8	4	8
2	36	28	36	28	4	8	4
3	28	20	16	12	12	8	12
4	32	24	24	28	28	12	8
5	16	32	20	8	20	8	4

Table No 4 Showing chemical identifications tests for Guduchi Sattva

No	Chemicals	G ₁	G ₂	G ₃	G _m	G _h	
1	Dis-tilled H ₂ O	Col d	Soluble, milky white	Soluble, milky white	Soluble, milky white	Soluble, milky white	Soluble, milky white
		Hot	Gelatinized	Gelatinized	Gelatinized	Gelatinized	Gelatinized
2	Dil HCL	Col d	Soluble, cremish white	Soluble, cremish white	Soluble, cremish white	Soluble, cremish white	Soluble, cremish white
		Hot	Yellow colored	Yellow colored	Yellow colored	Yellow colored	Yellow colored
3	Conc HCL	Col d	Insoluble, white ppt.	Insoluble, white ppt.	Insoluble, white ppt.	Insoluble, white ppt.	Insoluble, white ppt.
		Hot	Soluble, brown colored sol.	Soluble, brown colored sol.	Soluble, brown colored sol.	Soluble, brown colored sol.	Soluble, brown colored sol.
4	Dil H ₂ SO ₄	Col d	Soluble, milky white sol.	Soluble, milky white sol.	Soluble, milky white sol.	Soluble, milky white sol.	Soluble, milky white sol.
		Hot	Gelatinized	Gelatinized	Gelatinized	Gelatinized	Gelatinized
5	Conc H ₂ SO ₄	Col d	Insoluble, yellow ppt	Insoluble, yellow ppt	Insoluble, yellow ppt	Insoluble, yellow ppt	Insoluble, yellow ppt
		Hot	Charred sol.	Charred sol.	Charred sol.	Charred sol.	Charred sol.
6	Dil HNO ₃	Col d	Soluble, milky white sol.	Soluble, milky white sol.	Soluble, milky white sol.	Soluble, milky white sol.	Soluble, milky white sol.
		Hot	Charred sol.	Charred sol.	Charred sol.	Charred sol.	Charred sol.
7	Conc HNO ₃	Col d	Insoluble, white ppt	Insoluble, white ppt	Insoluble, white ppt	Insoluble, white ppt	Insoluble, white ppt
		Hot	Yellow sol & foam deposited on inner wall of test tube.	Yellow sol & foam deposited on inner wall of test tube.	Yellow sol & foam deposited on inner wall of test tube.	Yellow sol & foam deposited on inner wall of test tube.	Yellow sol & foam deposited on inner wall of test tube.
8	NaOH	Col d	Initially soluble, then gelatinized.	Initially soluble, then gelatinized.	Initially soluble, then gelatinized.	Initially soluble, then gelatinized.	Initially soluble, then gelatinized.

		Hot	More gelatinized	More gelatinized	More gelatinized	More gelatinized	More gelatinized	More gelatinized
9	KOH	Cold	Soluble, white ppt.	Soluble, white ppt.	Soluble, white ppt.	Soluble, white ppt.	Soluble, white ppt.	white ppt.
		Hot	Gelatinized	Gelatinized	Gelatinized	Gelatinized	Gelatinized	Gelatinized
10	KI	Cold	Soluble, milky white,	Soluble, milky white,	Soluble, milky white,	Soluble, milky white,	Soluble, milky white,	milky white,
		Hot	Semisolid gelatin formed.	Semisolid gelatin formed.	Semisolid gelatin formed.	Semisolid gelatin formed.	Semisolid gelatin formed.	gelatin formed.
11	Fecl3	Cold	Soluble, yellow solution.	Soluble, yellow solution.	Soluble, yellow solution.	Soluble, yellow solution.	Soluble, yellow solution.	yellow solution.
		Hot	Yellow, gelatinized.	Yellow, gelatinized.	Yellow, gelatinized.	Yellow, gelatinized.	Yellow, gelatinized.	gelatinized.
12	Iodine solution		Blue color	Blue color	Blue color	Blue color	Blue color	Blue color
13	Ethyl alcohol		Milky white	Milky white	Milky white	Milky white	Milky white	Milky white

MICROSCOPIC IDENTIFICATION OF GUDUCHI STARCH



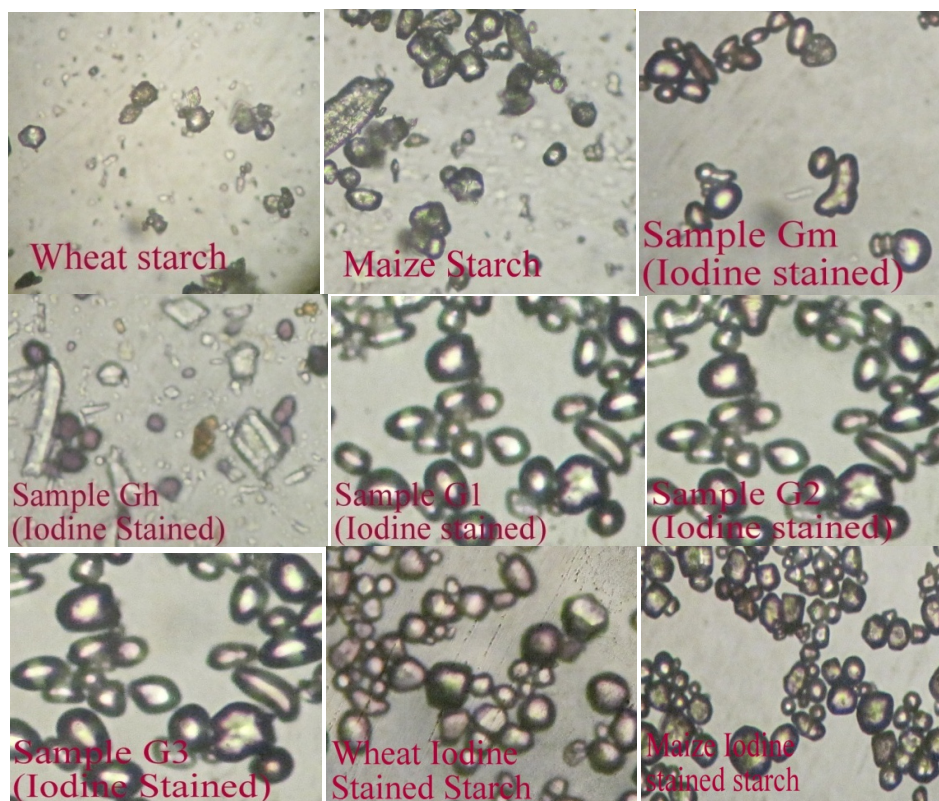


Table No 5 Showing microscopic identification of Guduchi starch.

Sam- ples	G1	G2	G3	Gm	G _H	Wheat starch	Maize starch
Struct ure	Starch grains ovoid, ir- regular or elliptical, hilum was centered with con- centric strips	Same as G1	Same as G1	Showing genuine starch grains of irregular &small size	Showing genuine starch grains of irregular &small size	Irregular octahedral, elliptical, hilum was not cen- tered	Angular in outline and com- paratively small in size.
Size (μ)	16 to 36	Same as G1	Same as G1	4 to 33	4 to 28	4 to 12	4 to 12
After Io- dine fill- ing	Well stained vio- let blue coloured	Same as G1	Same as G1	Staining showing fibres and other foreign material	Shows different type of staining dark and light	Well stained, suggestive different shapes other than T.Cordifo- lia starch	Well stained different violet blue was observed.

Table No 6 Showing pH of Guduchi Sattva.

Dilution	G ₁	G ₂	G ₃	G _m	G _H
5%	7.66	7.68	7.62	7.67	7.69
10%	7.81	7.83	7.83	7.84	7.82

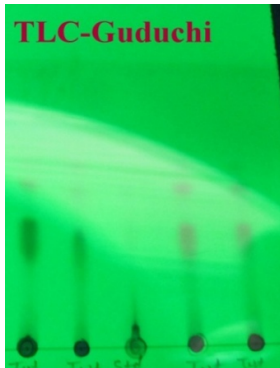
Table No 7 Showing details of physico-chemical tests.

Samples	G ₁ (%)	G ₂ (%)	G ₃ (%)	G _m (%)	G _H (%)
LOD in %	13.0055	8.1310	12.3995	10.9702	8.5909
Total % Ash	0.25	0.32	0.30	0.703	1.285
Acid insoluble Ash	0.19	0.4294	0.5909	0.7055	3.4539
Water soluble Ash	0.4501	0.4298	0.4531	0.8532	1.0613
Alcohol soluble Ext.	1.0521	1.120	1.267	1.0321	1.1468
Water soluble Ext.	0.5008	0.4389	0.5678	0.6213	1.346

Table No. 8 Showing R_f value of sample *Guduchi Sattva* samples using mobile phase Chloroform: methanol (9:1)

S. No.	Sam- ples	254nm		366nm		After Spraying with 10% ferric chloride	
		No of spots	R _f value	No of spots	R _f value	No of spots	R _f value
1	G ₁	0	--	4	0.1, 0.27, 0.8	0	--
2	G ₂	0	--	4	0.37, 0.4, 0.82	0	--
3	G ₃	0	---	4	0.12, 0.29, 0.87	0	--

TLC OF GUDUCHI SATTVA



RESULTS AND DISCUSSION

- a) All samples of *Guduchi Sattva* were same in organoleptic characters: colour (chalky white), taste (tasteless), texture (smooth), and smell (odorless).
- b) LOD (loss on drying) i.e. moisture content of samples were found in between 8-13%, suggesting the hygroscopic nature of the medicine. Total ash was below 1% except market sample G_H. As starch is organic compound, polysaccharide, its ash value should be less 1%, ash value more than 1% indicates adulteration with inorganic substances.
- c) Acid insoluble ash, water soluble as, alcohol soluble extractive and water soluble extractive were found less than 2%.

But comparatively higher values were noticed in group G_H i.e. 3.439%, 1.0613%, 1.1468%, and 1.346% respectively.

- d) Chemical identification test was done with various chemicals like dil. HCl, H₂SO₄, conc. HNO₃, NaOH, KOH, FeCl₃. But all tests were similar and did not show any significant differences suggesting starch content of the medicines.

CONCLUSION

Standardization of *Guduci Sattva* was carried out using organoleptic, physico-chemical and TLC tests. Analytical studies of *Guduchi Sattva* don't show any significant difference in the market sample and prepared *Guduchi sattva*.

But microscopic study shows the difference in starch grain size and no other difference significantly, this shows that there was a lot of adulterant in the market sample. It also shows that the *Guduchi* starch differs significantly from wheat and maize starch.

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