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PHARMACOGNOSTICAL AND PHARMACEUTICAL ANALYSIS OF *AMRITA GUGGLU:* AN *AYURVEDIC* POLYHERBAL FORMULATION

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ABSTRACT

Background: *Amrita Gugglu* is classical *Ayurvedic* polyherbal formulation mentioned in *Bhavaprakasha Madhyama Khanda* in context of *Vatarakta Chikitsa*. This paper is made to standardize the *Amrita Gugglu* formulation through Pharmacognostical and Pharmaceuticals measures and for assurance of quality of herbal compounds. **Methods**: *Amrita Gugglu* was analyzed and standardized scientifically through qualitative and quantitative analysis by physico-chemical parameters like hardness, weight variation, loss on drying, ash value, acid insoluble extract, pH value, water soluble extract, alcohol soluble extract, high performance thin layer chromatography (HPTLC) and pharmacognostical measures. **Results**: Pharmacognostical analysis showed characteristics of all the ingredient of *Amrita Gugglu* in the tablet i.e. *Guduchi, Gugglu, Haritaki, Amlaki, Vibhitaki, Danti, Maricha, Pippali, Shunthi, Vidanga, Tvacha, Trivrut.*. In Pharmaceuticals analysis, HPTLC was done in appropriate solvent system in which 11 and 09 spots were distinguished at 254 nm and 366 nm respectively. Loss on drying of *Vati* was 8.84% w/w, Ash value 10.92% w/w, Water soluble extract 49.80 % w/w, Methanol soluble extract 32% w/w, pH value (5% aqueous solution) 4.5. **Conclusions**: Pharmacognostical and physico-chemical observations achieved may provide guidelines for standardization of *Amrita Gugglu* formulation and this study may be used as reference standard in the further researches.

KEY WORDS: *Ayurveda, Amrita Gugglu*, Pharmaceuticals, Pharmacognostical.

INTRODUCTION

Amrita Gugglu[1] is a poly herbal classical *Ayurvedic* formulation used for the management of various diseases like *Vatarakta* (Gout), *Vrana* (wound), *Kasa* (cough) *Kushta* (skin diseases), *Shotha* (inflammation), *Pandu* (anaemia), *Mandagni* (indigestion), *Prameha* (diabetes), etc. *Amrita Gugglu* has been described by *Acharya Bhavamishra* in *Bhavaprakasha Madhyama Khanda Vatarakta Chikitsa*. *Amrita Gugglu* has been named on its first and one of the main ingredients *Amrita* i.e. *Tinospora cordifolia* (Willd.) Miers.

Present study aimed to develop standard parameters of *Amrita Gugglu* on the basis of pharmacognostical, physicochemical parameters and chromatographic evaluation. Thus, there is need to scientific proof for standardization of quality parameters. These pharmacognostical and physicochemical parameters can be used for quality control of the raw drugs as well as final product. Therefore, the present study was planned to evaluate the physicochemical, pharmacognostical parameters and develop the TLC fingerprint profiles of *Amrita Gugglu.*

AIMS AND OBJECTIVES

1. Authentication of raw drugs of *Amrita Gugglu* and final product through various pharmacognostical procedures.
2. Standardization of Pharmacognostical, Physicochemical parameters and HPTLC evaluation of *Amrita Gugglu*.

MATERIALS & METHODS

Collection, identification, authentication of raw drugs

All the raw drug materials were collected from the pharmacy of IPGT & RA, Gujarat Ayurved University, Jamnagar. The ingredients are mentioned in table 1.

Table-1: *Amrita Gugglu* (*Bhavaprakasha Madhyama Khanda Vatarakta Chikitsa*).

Drug	Latin name	Quantity (parts)
Guduchi	*Tinospora cordifolia* (Willd.) Miers.	64
Gugglu	*Commiphora wightii* (Arn.) Bhand.	32
Haritaki	*Terminalia chebula* Retz.	64
Amlaki	*Emblica officinale* Gaertn.	64
Vibhitaki	*Terminalia belerica* Roxb.	64
Danti	*Baliospermum montanum* Mull-Arg.	2
Maricha	*Piper nigrum* Linn.	2
Pippali	*Piper longum* Linn.	2
Shunti	*Zingiber officinalis* Roxb.	2
Vidanga	*Embelia ribes* Burm.f.	2
Guduchi	*Tinospora cordifolia* (Willd.) Miers.	2
Haritaki	*Terminalia chebula* Retz.	2
Amlaki	*Emblica officinale* Gaertn.	2
Vibhitaki	*Terminalia belerica* Roxb.	2
Tvak	*Cinnamomum cassia*	2
Trivrut	*Operculina turpethum* Linn.	1

Pharmacognostical study

All the raw drugs were identified and authenticated by the Pharmacognosy department, IPGT & RA, Gujarat Ayurved University, Jamnagar. The identification was carried out on the basis of morphological features, organoleptic features and powder microscopy of individual drugs. Pharmacognostical evaluation of prepared *Vati* was also carried out. In Pharmacognostical evaluation, *Vati* dissolved in small quantity of distilled water, filtered through filter paper, filtrate studied under the microscope attached with camera, with and without stain. The microphotographs were also taken under the microscope.[2]

Method of preparations of *Amrita Gugglu*

Guduchi and *Guggulu* are taken along with *Triphala* and four times of water are added. Boiled in a wide mouthed vessel, reduced to a quarter part (of water), filtered. After filtering, again the obtained *Kashaya* is heated till it become thick. It is added with 24 grams of each of the rest of the ingredients mentioned above, while the *Kashaya* is still hot. It turns to a semi-solid mass. It is mixed well and pills of the size of 500 mg are rolled.

Pharmaceutical evaluation

Physiocochemical parameter

Amrita Gugglu was analysed by using qualitative and quantitative parameters at Pharmaceutical Laboratory, IPGT & RA, Gujarat Ayurved University, Jamnagar. The common parameters mentioned for compressed tablets in *Ayurvedic* Pharmacopia of India[3] and CCRAS[4] guidelines are total ash,[5] pH value[6] and water[7] and alcohol soluble[8] extractives. On this basis these parameters were taken. Presence of more moisture content in a sample can create preser*vati*on problem. Hence loss on drying was also selected as one of the parameters.[9]

High Performance Thin Layer Chromatography Study (HPTLC)

Methanol extract of *Amrita Gugglu* were spotted on precoated silica gel GF 60_{254} aluminium plate as 5mm bands, 5mm apart and 1 cm from the edge of the plates, by means of a Camag Linomate V sample applicator fitted with a 100 µL Hamilton syringe. Toluene (7 ml), Ethyl acetate (2 ml), Acetic acid (1 ml) was used as mobile phase. After Development, Densitometric scanning was performed with a Camag TLC scanner III in reflectance absorbance mode at 254 nm and 366 nm under control of win CATS software (V 1.2.1 Camag).[10,11] The slit dimensions were 6 mm x 0.45 mm and the scanning speed was 20 mm s-1.

RESULTS AND DISCUSSION

Pharmacognostic study

The initial purpose of the study was to confirm the authenticity of the drugs used in the preparation of *Amrita Gugglu*. For that coarse powder of all the ingredients were subjected to organoleptic and microscopic evaluation separately.

Organoleptic evaluation

Organolptic features like colour, odour and taste of *Amrita Gugglu* were recorded and are placed at table 2.

Table-2: Organoleptic Features of *Amrita Gugglu*.

SI. No.	Characters	Observed
1.	Colour	Black
2.	Odour	Characteristics
3.	Taste	Bitter-Astringent
4.	Touch	Hard

Microscopic evaluation

Microscopic evaluation was conducted by powdering the tablet and dissolving it in the distilled water and studied under microscope for the presence of the characteristics of the ingredient drug and for the probable changes in the features if any. The microphotographs were taken by

using Carl Zeiss trinocular microscope. Characteristics of all the ingredient drugs were identified in *Vati* also.

Microscopic characters of *Amrita Gugglu* are Border pitted vessels of *Guduchi* (fig:1.2), Collenchyma cells of *Guduchi* (fig:1.3), Cork cells of *Guduchi* (fig:1.4), Starch grains of *Guduchi* (fig:1.5), Epicarp cells of *Haritaki* (fig:1.6), Lignified stone of *Haritaki* (fig:1.7), Sclereids of *Haritaki* (fig:1.8), Fibres cells of *Amlaki* (fig:1.9), Sclereids of *Amlaki* (fig:1.10), Lignified sclereids of *Vibhitaki* (fig:1.11), Stone cell of *Vibhitaki* (fig:1.12), Trichome of *Vibhitaki* (fig:1.13), Pitted vessels of *Danti* (fig:1.14), Prismatic crystal of *Danti* (fig:1.15), Black debris of *Maricha* (fig:1.16), Lignified stone cells of *Maricha* (fig:1.17), Stone cells of *Maricha* (fig:1.18), Starch grains of *Shunti* (fig:1.19), Olioresin content of *Vidanga* (fig:1.20), Stone cells of *Vidanga* (fig:1.21), Fibres of *Tvak* (fig:1.22), Lignified fibres of *Tvak* (fig:1.23), Starch grains of *Trivrut* (fig:1.24). (Figure 1).


fig:1.1 *Amrita Gugglu*

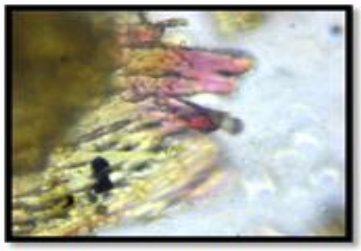
fig:1.2 Border pitted vessels of *Guduchi*

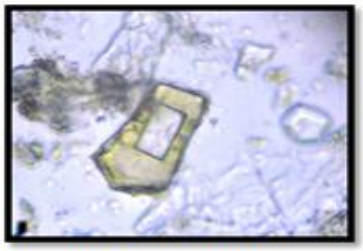
fig:1.3 Collenchyma cells of *Guduchi*

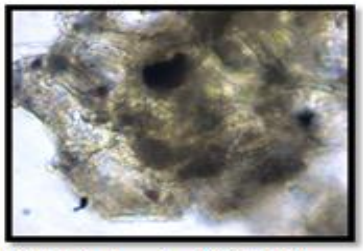
fig:1.4 Cork cells of *Guduchi*

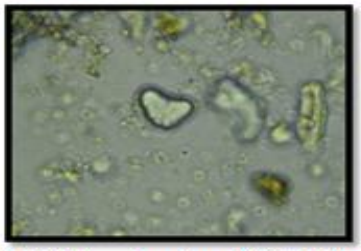
fig:1.5 Starch grains of *Guduchi*

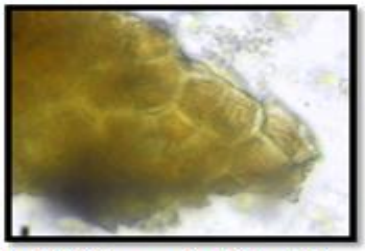
fig:1.6 Epicarp cells of *Haritaki*

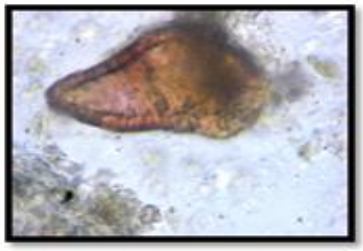
fig:1.7 Lignified stone of *Haritaki*

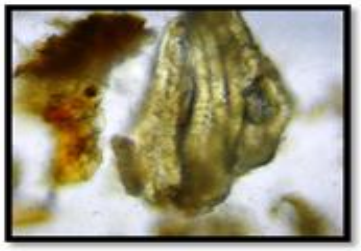
fig:1.8 Sclereids of *Haritaki*

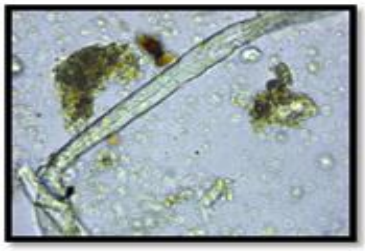
fig:1.9 Fibres cells of *Amlaki*


fig:1.10 Sclereids of *Amlaki*

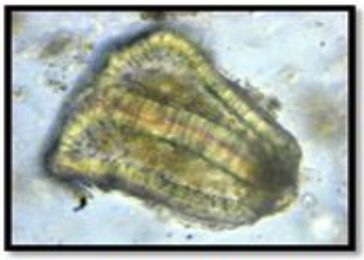
fig:1.11 Lignified sclereids of

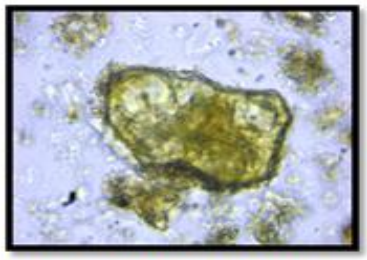
fig:1.12 Stone cell of *Vibhitaki*


fig:1.13 Trichome of *Vibhitaki*

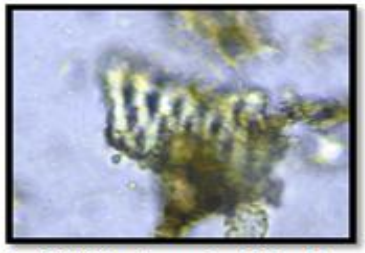
fig:1.14 Pitted vessels of *Danti*

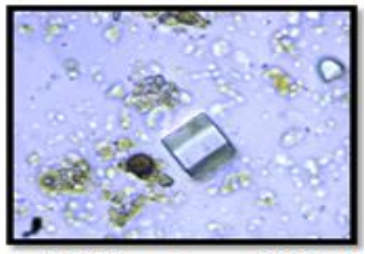
fig:1.15 Prismatic crystal of *Danti*

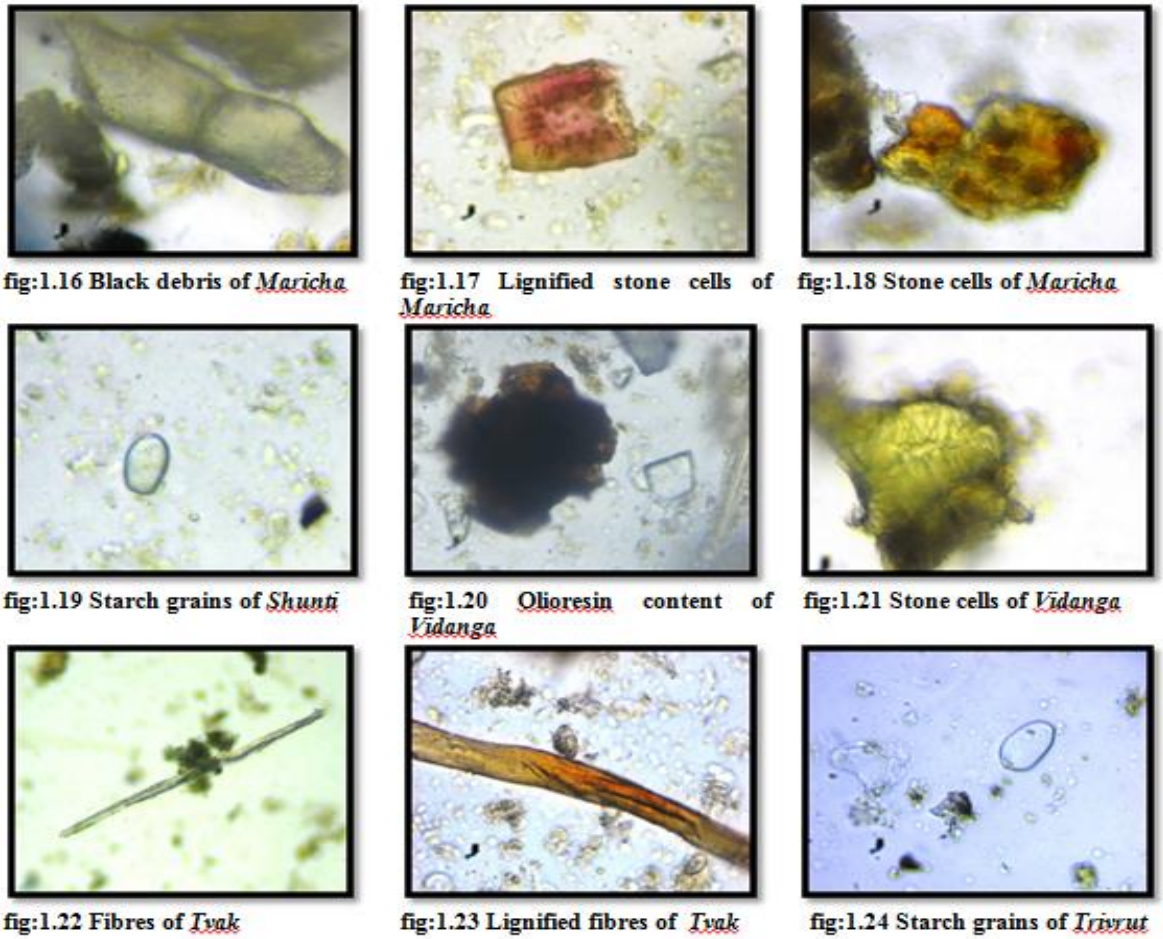

Figure -1: Microscopic photographs of *Amrita Gugglu* (Final Drug).

Pharmaceutical study

Physicochemical parameters

Physicochemical Parameters of the *Amrita Gugglu* like Uniformity, Disintegration time, Hardness, Loss on Drying were all found to be within the normal range. The water soluble extractive and methanol soluble extractive values were found to be 39.8 % w/w and 17.04 % w/w respectively. Details are placed at table 3.

Table-3: Physicochemical Parameters of *Amrita Gugglu.*

Test		Results
Uniformity of Tablet	Average	505.5 mg
	Highest	540 mg
	Lowest	475 mg
Hardness		NA
Loss on Drying		8.84% w/w
Ash value		10.92% w/w
Water soluble extract		49.80 % w/w
Methanol soluble extract		32% w/w
pH value (5% aqueous solution)		4.5

High Performance Thin Layer Chromatography Study

On performing HPTLC, the chromatogram of *Amrita Gugglu* showed 11 spots corresponding to Rf values 0.02, 0.10, 0.16, 0.24, 0.30, 0.36, 0.52, 0.57, 0.76, 0.90, 0.97 in short wave UV 254 nm and 9 spot corresponding to Rf values 0.02, 0.09, 0.16, 0.26, 0.35, 0.58, 0.76, 0.90, 0.97 obtained in long wave UV 366nm (Table 4, Figure 2 & 3).

Though it may not be able to identify particular chemical constituent from the spots obtained, the pattern may be used as a reference standard for further quality control researches.

Table-4: HPTLC of *Amrita Gugglu*

254 nm		366 nm	
Peak	**Rf**	**Peak**	**Rf**
1	0.02	1	0.02
2	0.10	2	0.09
3	0.16	3	0.16
4	0.24	4	0.26
5	0.30	5	0.35
6	0.36	6	0.58
7	0.52	7	0.76
8	0.57	8	0.90
9	0.76	9	0.97
10	0.90		
11	0.97		

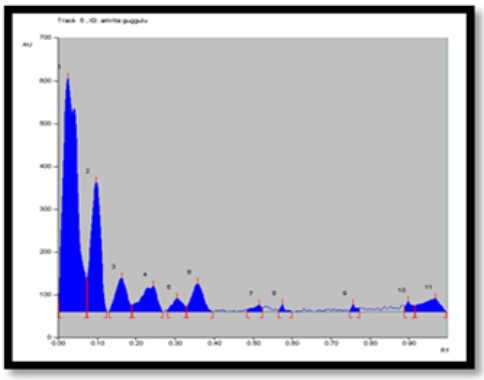

Figure 2-A (at 254 nm)

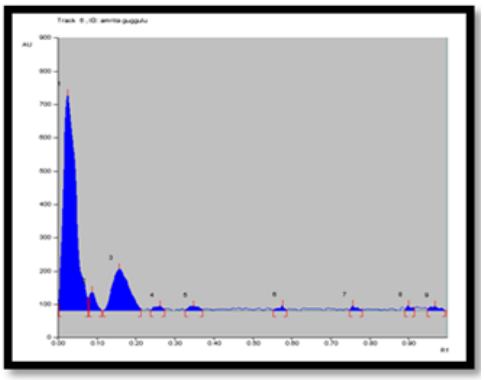

Figure 2-B (at 366 nm)

Figure-2: Densitogram curve of Methanol extract of *Amrita Gugglu* at 254 nm(2-A) and 366 nm(2-B).

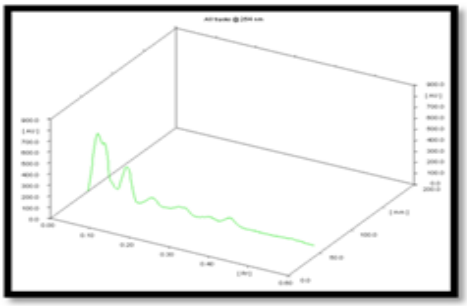

Figure 3-A (at 254 nm)

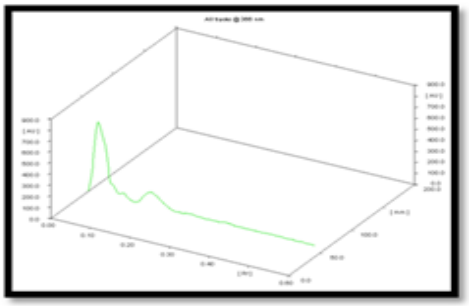

Figure 3-B (at 366 nm)

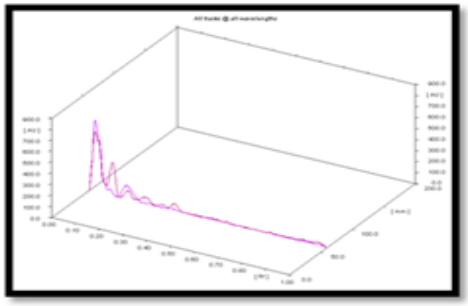

Figure 3-C (MWL)

Figure -3: 3 Dimensional graph of Methanol extract of *Amrita Gugglu.*

CONCLUSION

The ingredients of *Amrita Gugglu* were identified and authenticated pharmacognostically and were used for the preparation. In present study *Amrita Gugglu* was subjected to pharmacognostical, physicochemical, HPTLC studies. It is inferred that the formulation meets the minimum qualitative standards as reported in the API at a preliminary level. For first time, this profile of *Amrita Gugglu* was established. The inference from this study may be used as reference standard in the further quality control researches.

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