

## PHARMACOGNOSTICAL AND PHYSICOCHEMICAL ANALYSIS OF *DURVADI GHRITA* – AN AYURVEDIC POLYHERBAL FORMULATION

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### ABSTRACT

*Durvadi ghrita* is a polyherbal formulation indicated in bleeding disorders. Based on its pharmacological properties, it can be used trans- nasally to arrest bleeding seen in Diabetic retinopathy. Present study deals with the pharmacognostical identification of ingredients of *Durvadi ghrita* and its physico-chemical analysis. Pharmacognostical study containing both macroscopic and powder microscopy of raw drug revealed the quality and genuineness of all the constituents of *Durvadi ghrita*. Organoleptic features of coarse powder made out of the crude drugs were within the standards prescribed. Specific Gravity of *Durvadi ghrita* was found to be 0.9416; Acid value 1.6850,

Refractive Index 1.4730 at room temperature, Iodine value 47.226 and Saponification Value was 232.16.

**KEYWORDS:** Diabetic retinopathy; *Durvadi Ghrita*; Organoleptical; Pharmacognostical; Physicochemical.

### INTRODUCTION

Diabetic retinopathy (DR), the leading cause of visual disability in diabetics, is an important complication of diabetes mellitus (DM). The pathogenesis includes loss of integrity of capillary walls, micro aneurysms, exudations, pericyte loss, endothelial damage and finally

up to hemorrhages which are directly evident from fundoscopic examination of the eye. The retinal changes thus observed are termed as Diabetic Retinopathy, which becomes cause for impaired vision (*Timira*) initially and turn to blindness ultimately. Along with *Tridoshasamana*, the treatment includes *Pittasamana* and *Raktaprasadana* specifically to check hemorrhage under *Urdhvanga Raktapitta* spectrum. *Durvadi ghrita* is one such formulation explained in *Sahasrayoga*.<sup>[1]</sup> In view of severe undesirable side effects of synthetic agents, there is growing focus to follow systematic research methodology and to provide scientific basis for the traditional herbal medicines that are claimed to possess effect in eye disorders. The first step for scientifically based research is to provide quality standardization of drug. With this background the present study was undertaken to ascertain the authenticity of all the ingredients of *Durvadi ghrita* and presence of components as recommended through pharmacognostical study and physicochemical analysis of *Durvadi ghrita*.<sup>[2]</sup>

**Collection of Raw Drug** Raw drugs were collected from the Pharmacy, I.P.G.T. & R.A., G.A.U., Jamnagar. All these were identified and authenticated in Pharmacognosy Laboratory, IPGT and RA, Gujarat Ayurved University, Jamnagar. *Aja ghrita* (Goat's ghee) and *Aja Ksheera* (Goat's milk) were procured from local milk vendor, Jamnagar. *Tandulodaka* was prepared in Pharmacy of Gujarat Ayurved University, Jamnagar. *Durvadi ghrita* was prepared in Pharmacy of Gujarat Ayurved University, Jamnagar.

#### **Method of preparation of *Durvadi ghrita***

After collecting all the ingredients of *Durvadi ghrita* (Table 1), in a large vessel *Aja ghrita* was poured, when it got liquefied under moderate flame, Kalka of *Durva*, *Utpala kinjalaka*, *Manjistha*, *Elvaluka*, *Shita*, *Usheera*, *Musta*, *Chandana* and *Padmakam* was added, followed by addition of goat's milk, sugar and *tandulodaka*. To get final product, the contents were subjected to moderate heat till up to *Sneha Siddhi* (properly prepared medicated Ghee) features were observed.<sup>[3]</sup>

#### **Pharmacognostical evaluation of ingredients of *Durvadi ghrita***

**Organoleptic study** Individual powders were subjected for various sensory characters like colour, taste, odour etc., and were carefully noted down.<sup>[4]</sup>

**Powder microscopy** In certain limits it is possible to analyze the finished products for the pharmacognosy i.e. Compound formulations like *Choorna* (powder), *Vati* (tablet), *Kalka*

(paste) etc. It was difficult to analyze the *Ghrita* to find out the cellular level of raw drugs. In this study as *Durvadi ghrita* was made from Kalka (paste) of *Durva*, *Utpala kinjalaka*, *Manjistha*, *Shita*, *Usheera*, *Musta*, *Chandana* and *Padmakam*, thus raw drugs powders individually were studied separately with and without staining. The microphotographs were taken under Corl zeiss Trinocular microscope attached with camera.<sup>[5][6]</sup>

**Physico-chemical study** *Durvadi ghrita* was analyzed using various standard physico-chemical parameters such as Acid value, saponification value, Refractive Index value, iodine value, and specific gravity at Pharmaceutical chemistry laboratory, IPGT and RA, Jamnagar.

#### **Organoleptic Characters of finished product i.e. *Durvadi ghrita***

*Durvadi ghrita* was characterized as fine homogenous thick liquid which was sticky and slow falling as drop, orange yellow in colour, sweet smelling aromatic in odour, sweet, astringent in taste and immiscible in water. Pharmacognosy of *Durvadi ghrita* was not possible under microscope; hence individual raw drugs of *Durvadi ghrita* in powder form were analyzed separately.

### **RESULTS AND DISCUSSION**

**Pharmacognostical analysis** Organoleptic characters were noted down and are depicted in Table 2. Powder microscopy of herbal ingredients of *Durvadi ghrita* was studied and microphotographs were placed at respective figures.

**Microscopical Characters** Individual powder microscopy characters were as follows: *Durva* (*Cynodon dactylon* Linn): Epidermal cells with stomata, Oil globule, Prismatic crystals, Silica deposits. (Figure 1) *Utpala* (*Nymphaea caerulea* Sav): Lignified branched trichome, Pollen grains, Simple fibres, Simple starch grains with hilum. (Figure 2) *Manjistha* (*Rubia cordifolia* Linn): Acicular crystals, Border pitted vessels, Cells with brown content, Cork in surface view. (Figure 3) *Chandana* (*Santalum album* Linn): border pitted vessels, Lignified fibres, oil globules, Rhomboidal crystals (Figure 4). *Usheera* (*Vetiveria zizanioides* Linn) Group of fibres, Oval to spherical thick walled pith cells, Pitted fibres, Pitted vessels (Figure 5). *Musta* (*Cyperus rotundus* Linn) Oil globules, Prismatic crystals, Scalariform vessels, Silica deposits. (Figure 6) *Rakta Chandana* (*Pterocarpus santalinus* Linn) Crystal fibres, Lignified fibres with oil, Pitted vessels and lignified fibres, Pitted vessels. (Figure 7) *Padmakam* (*Prunus puddum* Roxb) Crystal fibres, Lignified cork, Simple fibres, Stone cells (Figure 8).

**Physico-chemical analysis** *Durvadi ghrita* was analyzed using various standard physico-chemical parameters such as acid value, saponification value, refractive index, iodine value, specific gravity. (Table 3).

**Table 1: Ingredients of *Durvadi ghrita***

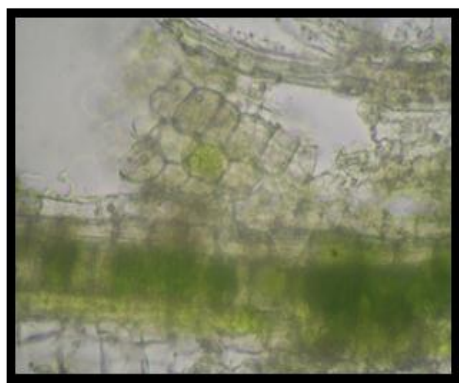
Sr.no.	Drug	Botanical Name	Part used	Proportion
1	<i>Durva</i>	<i>Cynodon dactylon</i> Linn	Whole plant	1 part
2	<i>Utpala kinjalaka</i>	<i>Nymphaea caerulea</i> Sav.	Stemens	1 part
3	<i>Manjistha</i>	<i>Rubia cordifolia</i> Linn	Whole plant	1 part
4	<i>Elvaluka</i>	<i>Aloe vera</i> Linn	Resin	1 part
5	<i>Sita</i>			1 part
6	<i>Shita</i>	<i>Santalum album</i> Linn	Stem	1 part
7	<i>Usheera</i>	<i>Vetiveria zizanioides</i> Linn	Root	1 part
8	<i>Musta</i>	<i>Cyperus rotundus</i> Linn	Root	1 part
9	<i>Chandana</i>	<i>Pterocarpus santalinus</i> Linn	Heart Wood	1 part
10	<i>Padmakam</i>	<i>Prunus puddum</i> Roxb	Heart Wood	1 part
11	<i>Aja ghrita</i>			4 part
12	<i>Tandulodaka</i>			4 part
13	<i>Aja ksheera</i>			4 part

**Table 2: Organoleptic characters of ingredients of *Durvadi ghrita***

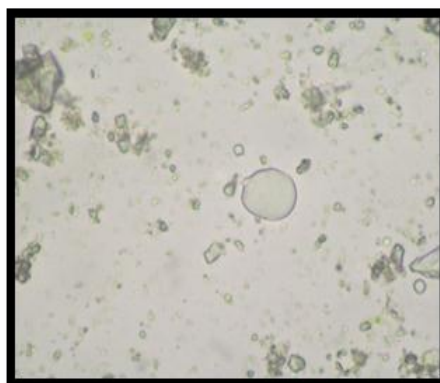
Drug name	Colour	Odour	Taste	Touch
<i>Durva</i>	Creamish white	Aromatic	Astringent	Fine
<i>Utpala kinjalaka</i>	Brownish red	Aromatic	Astringent	Fine coarse
<i>Manjistha</i>	Brick red	Aromatic	Strong astringent	Fine
<i>Shita</i>	Creamish yellow	Aromatic	Astringent oily	Fine coarse
<i>Usheera</i>	Creamish white	Aromatic	Astringent	Fine
<i>Musta</i>	Brownish black	Aromatic	Astringent	Fine
<i>Rakta Chandana</i>	Brownish red	Aromatic	Astringent oily	Fine coarse
<i>Padmakam</i>	Creamish brown	Aromatic	Astringent oily	Coarse

**Table 3: Physico-chemical analysis of *Durvadi ghrita***

Parameter studied	Result
Acid value	1.6850
Refractive Index	1.4730
Iodine value	47.226
Saponification Value	232.16
Specific Gravity	0.9416



Epidermal cells with stomata



Oil globule



Prismatic crystals



Silica deposits

Figure 1: Powder microscopy of *Durva*



Lignified branched trichome



Pollen grains



Simple fibre



Simple starch grains with hilum

Figure 2: Powder microscopy of *Utpala*





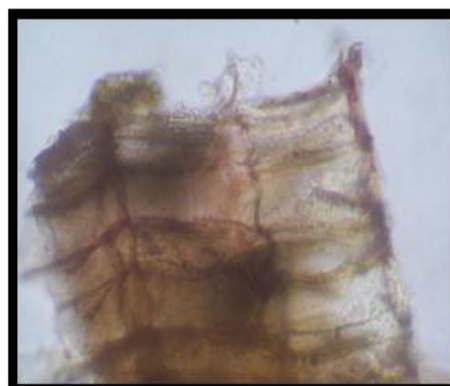
Acicular crystal



Border pitted vessels

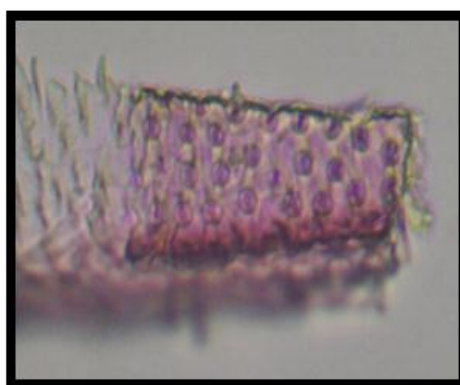


Cells with brown content



Cork in surface view

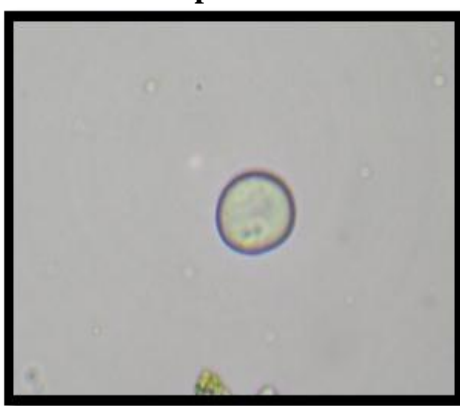
Figure 3: Powder microscopy of *Manjishta*



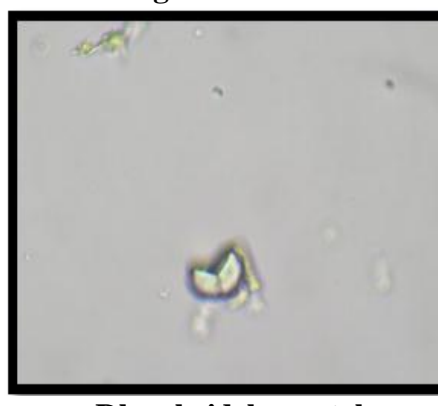
Border pitted vessels



Lignified fibres



Oil globule

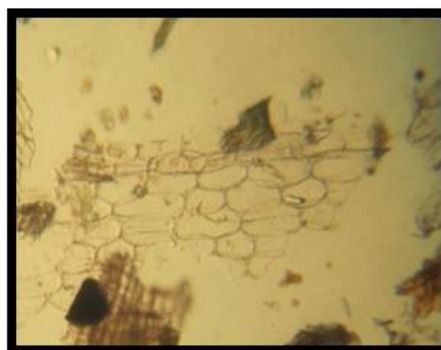


Rhomboidal crystal

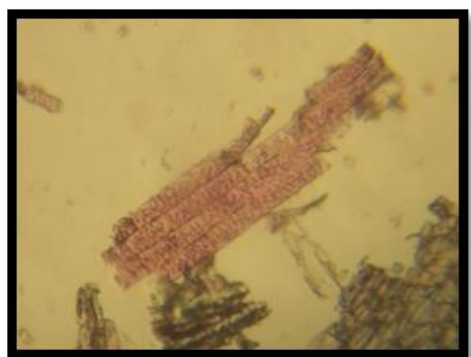
Figure 4: Powder microscopy of *Chandana*



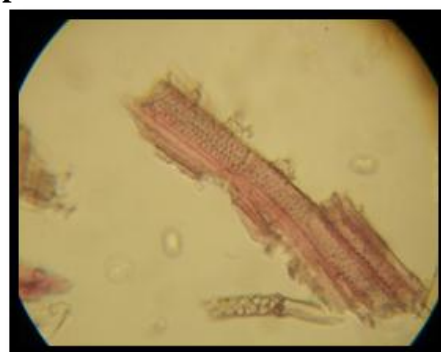
Group of fibres



Oval and spherical thick walled pith cells

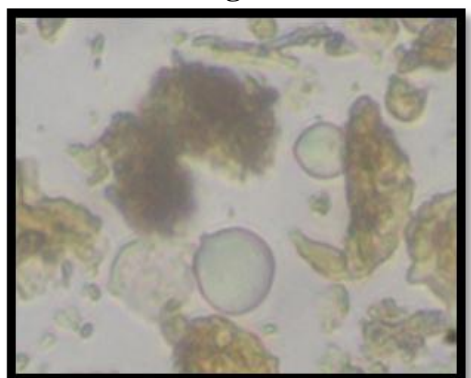


Pitted fibres

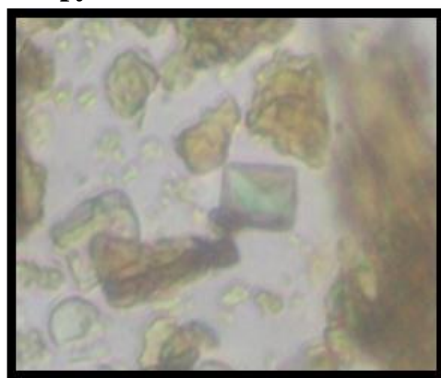


Pitted vessels

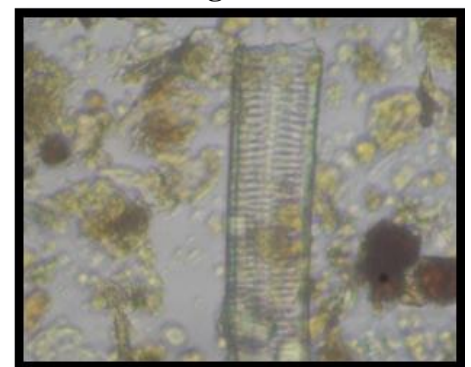
Figure 5: Powder microscopy of *Usheera*



Oil globules



Prismatic crystal

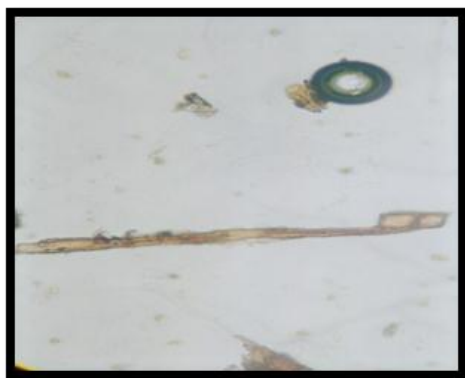


Scalariform vessels

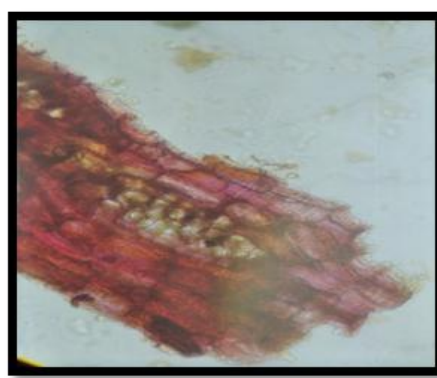


Silica deposits

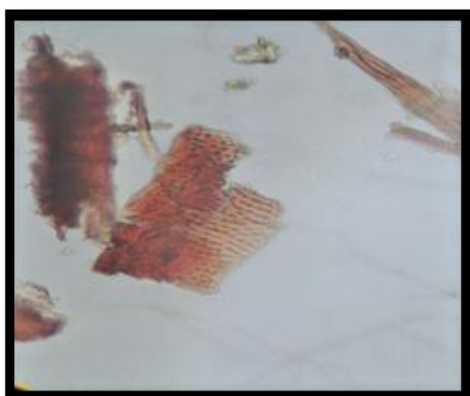
Figure 6: Powder microscopy of *Musta*



Crystal fibre



Lignified fibre with oil



Pitted vessel with lignified fibres

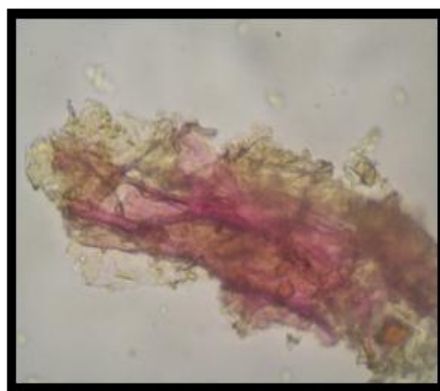


Pitted vessel

Figure 7: Powder microscopy of *Raktachandana*



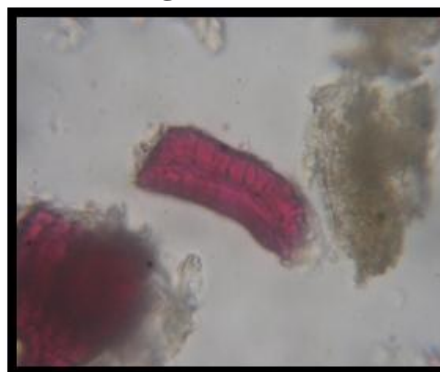
Crystal fibre



Lignified cork



Simple fibres



Stone cells

Figure 8: Powder microscopy of *Padmaka*



## DISCUSSION

Pharmacognostical study reveals authentication of individual raw drugs of *Durvadi ghrita* and is cross verified.<sup>[7][8][9][10][11][12][13][14]</sup> The pitted vessels, oil globules, rhomboidal crystal, Acicular crystals, starch grains, prismatic crystals, fibres etc. were observed in ingredients. Quality control parameters like specific gravity, saponification value are standard for any fat or oil. Similarly, when oil-fats become rancid, triglycerides are converted into fatty acids and glycerol,<sup>[15]</sup> causing an increase in acid value, iodine value and refractive index suggestive of oxidation.<sup>[16]</sup> The oxidation levels of vegetable oils are important quality criteria in food chemistry because oxidation increases their toxicity by the formation of products such as hydroperoxides, aldehydes, ketones, etc.<sup>[17]</sup> All the physico-chemical parameters, acid value, saponification value, refractive index, iodine value, specific gravity analyzed were almost near to the reference range as specified for goat's ghee (no previous research work is available as standard reference for *Durvadi ghrita*).<sup>[18]</sup> All the results show that the prepared *Ghrita* formulation is not rancid (after 7 months of preparation) and the quality of the *Ghrita* is standard.

## CONCLUSION

Pharmacognostical study findings confirm the ingredients present in the *Durvadi ghrita*. It is inferred that the formulation meets maximum qualitative standards based on physicochemical parameters. The results of this study may be used as the reference standard in further research undertakings of its kind.

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