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PHARMACOGNOSTICAL AND PHARMACEUTICAL ANALYSIS OF KHADIRADI GHANAVATI- AN AYURVEDIC FORMULATION FOR DIABETES MELLITUS (TYPE 2)

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ABSTRACT

Introduction: Khadiradi Ghanavati, is formulation of Khadira, Kadara and Puga. This preparation is given in Madhumeha by Chakradatta. Though the combination had been suggested in the form of decoction in the classical text, it is converted into the tablet (Ghanavati*)* form for resolving palatability issues and proper dose fixation in terms of its effectivity. The pharmacognostical and physico-chemical data is not published on Khadiradi Ghanavati till date. Hence the present study was planned**. Aim:** To evaluate the pharmacognostical and physico-chemical characters of Khadiradi Ghanavati. **Materials & Methods:** The finished product is collected from pharmacy of the institute and authenticated from the laboratory of the same institute. Standard procedures were followed to undertake pharmacognostical and physico-chemical analysis. The Khadiradi Ghanavati subjected to microscopic evaluation, physico-chemical analysis like hardness, loss on drying, ash value, pH value, weight variation in tablet, water soluble extract, alcohol soluble extract, High Performance thin layer chromatography (HPTLC) etc. **Results:** Pharmacognostical study showed the presence of certain identifying characters of all of the three ingredients in the preparation like epicarp cells of Puga, fibres of Kadar, prismatic crystals of Khadir, scleroids of Kadar and Khadir, silica deposition of Khadir, stone cells of Khadir and Puga and tannin content of Puga etc. Preliminary physico-chemical analysis showed that hardness 3.83 Kg/cm2, ash value 6.10%, loss on drying 16.27%, water soluble extract 30.63%,

methanol soluble extract 26.96% and HPTLC showed sixteen spots at 254nm and ten spots at 366nm. **Discussion:** The Pharmacognostical study comprised of organoleptic study and microscopic study of finished product alongwith physico-chemical analysis finds out authenticity of ingredient of the Khadiradi Ghanavati**.** Presence of all raw content in the finished product shows genuineness of the product. **Conclusion:** Presented work was carried out to standardize the finished product Khadiradi Ghanavati in terms of its identity, quality and purity. Pharmacognostical and Physico-chemical observations as there is no reported study till date. It showed the specific characters of all active constituents in the formulation and will be helpful as reference guidance for future scientific evaluation of the drug.

KEYWORDS: Khadiradi Ghanavati, Madhumeha, pharmacognosy, physico-chemical analysis, HPTLC.

INTRODUCTION

A drug is defined as any predicament used for the purpose of diagnosis, prevention, relief or cure of the disease. This definition appears more applicable with the terms of Ayurveda, which aims at the preservation of good health apart from mitigation of diseases. The ultimate goal of Ayurveda is Prakriti-sthapana, it can be achieved with the help of proper drug. The drug used in the current study is Khadiradi Ghanvati. In Ayurveda Acharya Charaka considered Madhumeha (Diabetes) under Astamahagada i.e. one of major disease in eight main diseases.[1] In Chakradutt, Acharya Chakrapani told oral administration of Kwatha (decoction) of Kadar, Khadira and Puga should be used for the treatment of Madhumeha.[2] But, here for better palatability and standardization of dose, it is converted into Ghanavati (tablet) form. The ingredients of Khadiradi Ghanavati are Kadar (Acacia Suma Kurg), Khadira (Acacia catechu Linn. f. Willd.) and Puga (Areca Catechu Linn.). Khadira (Acacia catechu Linn.f.Willd.) contain many potent flavonoids such as catechin present in this plant plays a vital role as anti-oxidant. Catechins and rutin are most important constituents which are free radical scavengers. The chief major active chemical components are also flavonoids which inhibit Cyclooxygenase and 5-Lipoxygenase and hence decrease inflammation. Kadar (Acacia Suma Kurg) is having Katu Vipaka and Prameha-har properties.[3] Puga (Areca Catechu Linn.) is also having the same Katu Vipaka and Kapha-Pitta Doshharatva as per Bhavprakasha Nighantu[4] pharmacognostical and phyto-chemical profile of Khadiradi Ghanavati is not evaluated till date.so this work will be helpful in future.

AIMS AND OBJECTIVES

1. To evaluate collected raw drugs and Khadiradi Ghanavati for authenticity through various pharmacognostical procedures.
2. To develop the pharmacognostical and phyto-chemical profile of Khadiradi Ghanavati.

MATERIALS AND METHODS

Collection, Identification and Authentication of raw drugs

Ingredients of Khadiradi Ghanavati, Kadar (Acacia Suma Kurg), Khadira (Acacia catechu (Linn.f.Willd.) and Puga (Areca Catechu Linn.) needed was collected from the pharmacy of Gujarat Ayurved University, Jamnagar. Raw drugs were identified and authenticated in the Pharmacogonosy Department of the Institute.

Preparation of Drug

All the ingredient of Khadiradi Ghanavati drug were taken in equal quantity in the Yavakut form and decoction was made as per the classical guidelines. Decoction was heated, until it is converted into Ghana form and further Ghanavati is made out of it finally.

Pharmacognostical study

The Pharmacognostical study comprises of organoleptic study and microscopic study of finished product.

Organoleptic Study

Organoleptic parameters i.e. Taste, Colour, odour and touch of Khadiradi Ghanavati were scientifically studied following standard references.[5]

Microscopic Study

Khadiradi Ghanavati was powdered and dissolved with water and microscopy of the sample was done without stain and after staining with Phloroglucinol plus HCl. Microphotographs of Khadiradi Ghanavati was also taken under Carl-Zeiss trinocular microscope.[6]

Physico-chemical analysis

Khadiradi Ghanavati used for this work was subjected to various physico-chemical and HPTLC analysis in the Pharmaceutical Chemistry Laboratory of I.P.G.T & R.A., Jamnagar. All the experiments were done by following the standard procedures mentioned in Ayurvedic Pharmacopoeia of India[7] and CCRAS[8] guidelines are total ash, pH value and water and alcohol soluble extractives.

HPTLC

Methanol extract of Khadiradi Ghanvati was used for HPTLC study. Extract was spotted on precoated silica gel GL60254 aluminium plate as 10mm bands by means of a camag linomate V sample applicator fitted with a 100 µL Hamilton syringe. The development time was 30 minutes.

RESULTS AND DISCUSSION

Ingredients of Khadiradi Ghanavati, are Kadar (Acacia Suma Kurg), Khadira (Acacia catechu (Linn f.Willd.) and Puga (Areca Catechu Linn.) shown in table number 1.

Table no. 1: Ingredients of khadiradi ghanvati.

Drug Name	Botanical Name	Part	Part Used
Khadir	Acacia Catechu Wild	1 part	Stembark, Heartwood
Kadar	Acacia Suma Kurg.	1 part	Stembark, Heartwood
Puga	Areca Catechu Linn.	1 part	Fruit

Organoleptic characters of Khadiradi Ghanavati

Organoleptic characters contents of Khadiradi Ghanavati like colour, taste, touch, Odor were recorded and shown in Table 2.

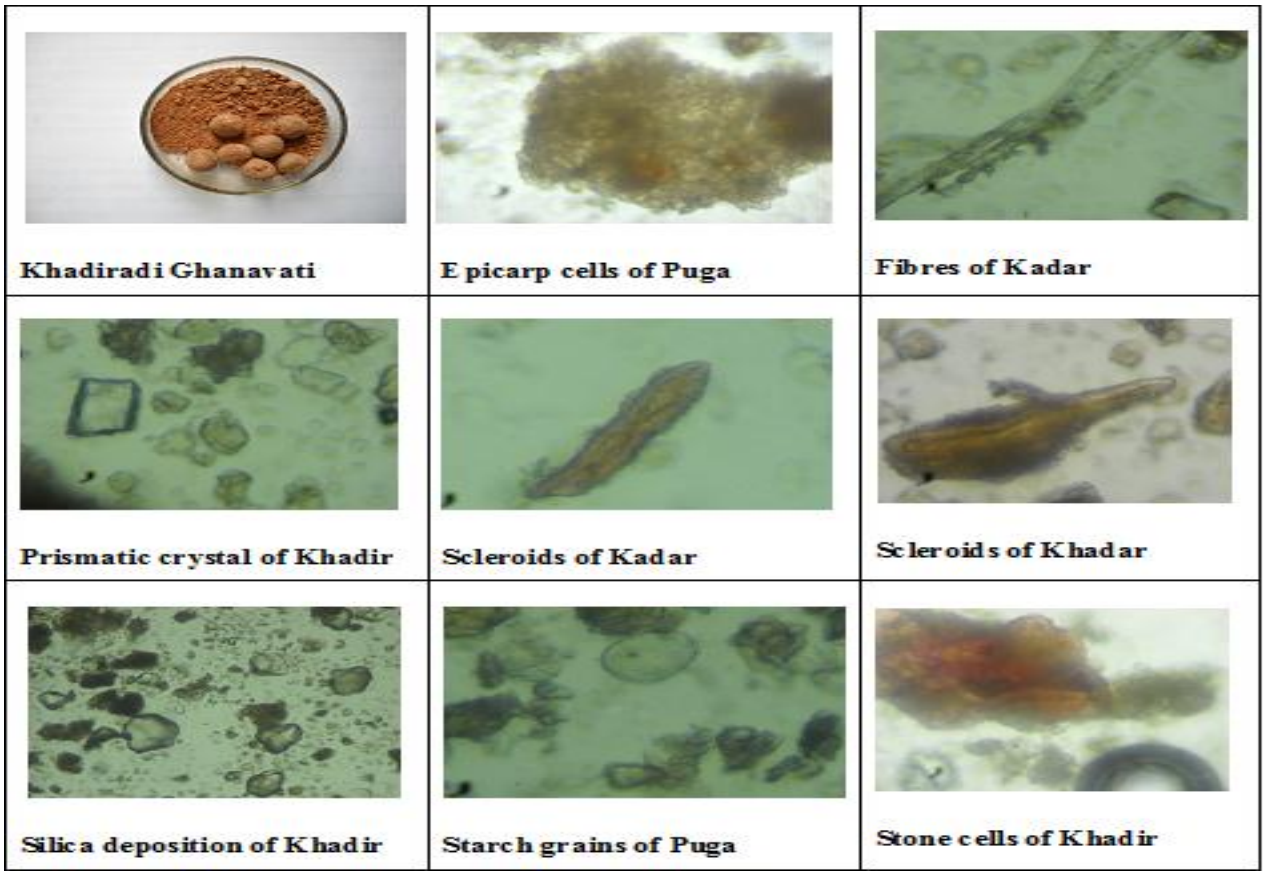
Table no. 2: Organoleptic characters of khadiradi ghanavati.

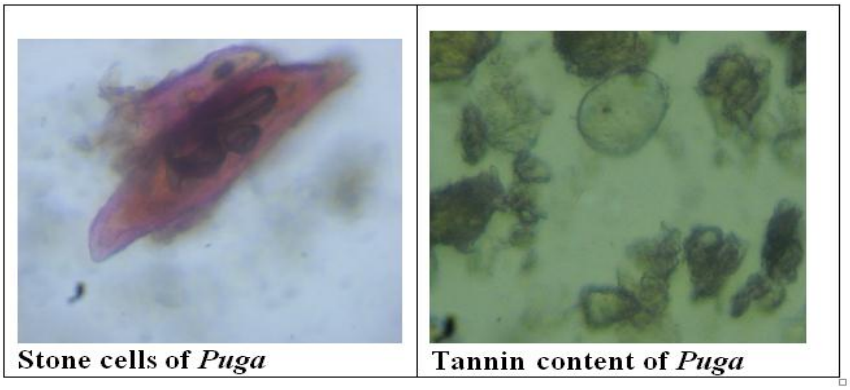
1	Colour	Light pinkish brown
2	Odour	Slightly aromatic
3	Taste	Astringent
4	Touch	Hard and smooth

Microscopic Study

Identifying characters of ingredients of Khadiradi Ghanavati under the microscope were epicarp cells of Puga, fibres of Kadar, prismatic crystals of Khadir, scleroids of Kadar and Khadir, silica deposition of Khadir, stone cells of Khadir and Puga and tannin content of puga etc. All these are showed in Plate 1.

Plate no. 1





Physico-chemical analysis

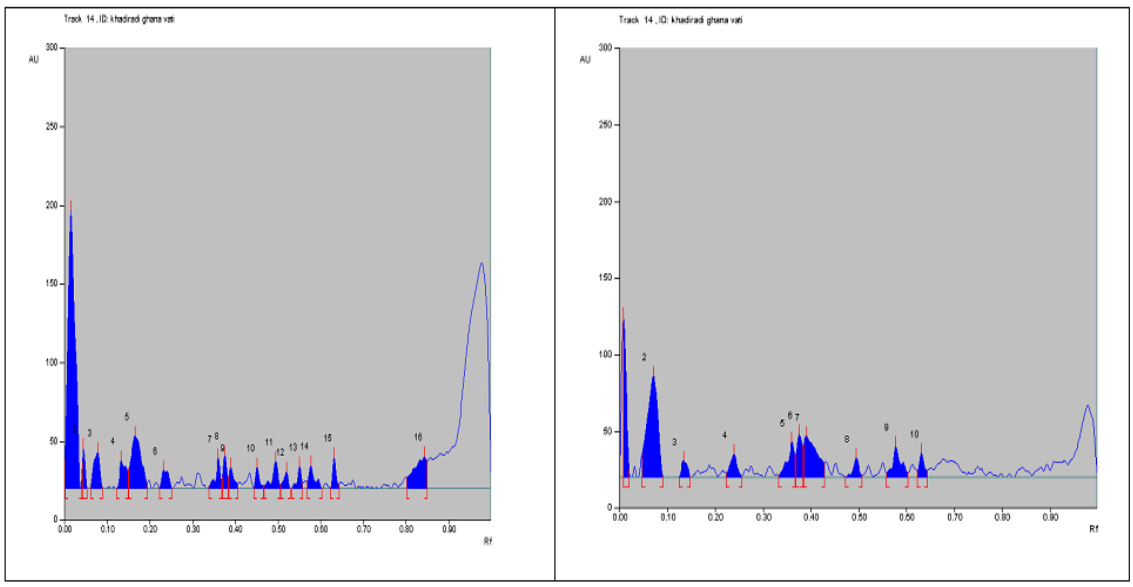
Physico-chemical analysis of Khadiradi Ghanavati revealed the value as hardness 3.83 Kg/cm2, ash value 6.10%, loss on drying 16.27%, water soluble extract 30.63%, alcohol soluble extract 26.96%, pH 6 are shown in Table -3.

Table no. 3: Physicochemical parameters of khadiradi ghana vati.

S. no.	Test	Result
1	Tablet uniformity	527 mg
2	Disintegration time	≤90 minutes
3	Tablet hardness	3.83 kg/cm2
4	Loss on drying	16.27 %w/w
5	Water soluble extract	30.63 %w/w
6	Methanol soluble extract	26.96 %w/w
7	Ash value	6.10 %w/w
8	pH	6

High performance thin layer chromatography of khadiradi ghana vati

High performance thin layer chromatography (HPTLC) is an invaluable quality assessment tool for the evaluation of botanical materials. The chromatographic study (HPTLC) was carried out under 254 and 366 nm UV to establish fingerprinting profile. It showed 16 spots at 254 nm and 10 spots at 366nm with Rf values were recorded which may be responsible for expression of its pharmacological and clinical actions. (Plate no.2)



Picture a & b at 254nm and 366nm respectively.

DISCUSSION

Pharmacognostical study helps for authentication of constituents present in formulation by its organoleptic characters like taste, odor, color and touch along with microscopical characters. The present pharmacognostical study revealed the presence of all constituents like, epicarp cells of Puga, fibres of Kadar, prismatic crystals of Khadir, scleroids of Kadar and Khadir, silica deposition of Khadir, stone cells of Khadir and Puga and tannin content of Puga etc.

These are the common characters of the ingredients that were already known. Hence, the presence of all contents of raw drugs in the final product shows the authenticity of the final product. All the pharmaceutical parameters like hardness of tablet, average weight of tablet, water soluble extract pH of drug etc. analyzed revealed values that are permissible for the Ghanavati. The Physico-chemical Parameters show that percentage of water soluble extract is more than alcohol soluble extract. Thus, it can be concluded that the drug may yield desired pharmacological action. HPTLC is the most common form of Chromatographic method used by Ayurvedic researchers to identify the number of ingredients present in a formulation. It also helps to determine the purity of the sample.

CONCLUSION

The Microscopic pictures of the constituents present in formulation and all the previously described organoleptic characters, these all are the peculiar characters of all ingredients presents in Khadiradi Ghanavati (mentioned in above table-1) and all previously described physico-chemical parameters showed within permissible limits. For the standardization of the drug, the results of the study will be helpful as there is no reported study on the Khadiradi Ghanavati and present work might help as reference guidance for future scientific evaluations and standardization of the drug.

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