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**Review Article** 

# PHARMACOGNOSTICAL AND PHARMACEUTICAL ANALYSIS OF *KANTKATERYADI VATI*-AN AYURVEDIC POLYHERBAL FORMULATION FOR CLINICAL TRIAL OF TYPE 2 DIABETES MELLITUS

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# ABSTRACT

Aim: To analyze the Pharmacognostical and Pharmaceutical properties of Kantkateryadi Vati

**Materials and Methods:** *Kantkateryadi Vati* was subjected to microscopic evaluation for pharmacognostical study, physico-chemical analysis like hardness, weight variation, loss on drying, ash value, acid insoluble extract, pH value, water soluble extract, alcohol soluble extract and high performance thin layer chromatography (HPTLC).

**Result:** Pharmacognostical study showed the presence of certain identifying characteristics of all the ingredients of *Kantkateryadi Vati* that is *Kantkateri, Madhuka, Amalaki, Haritaki, Bibhitaka, Chitraka*. In pharmaceutical study, preliminary physico-chemical analysis showed that hardness of 6.8 Kg/cm2, ash value

13.82%w/w, loss on drying 13.12% w/w, water soluble extract 20.85% w/w, alcohol soluble extract 31.40% w/w and pH value 6.5. HPTLC analysis showed at 254nm 11 peaks and at 366 nm 7 peaks.

**Conclusion-**Present work was carried out to standardize the polyherbal formulation of *Kantkateryadi Vati* in terms of its identity, quality and purity. Pharmacognostical and physico-chemical observations revealed the specific characters of all the active constituents in the preparation.

Keywords: Type 2 Diabeties Mellitus, pharmaceutics, pharmacognosy, Kantkateryadi Vati

#### **INTRODUCTION**

Diabetes mellitus (DM) is emerging threat to public health due to its multisystem involvement, complex metabolic abnormalities, multiple clinical manifestations and remote complications. It is commonly manifested as elevation in blood glucose levels (hyperglycemia), resulting from either a defect in insulin secretion from the pancreas, insulin resistance in cells or both.<sup>i</sup>

Type 2 diabetes (T2D), formerly known as adult-onset diabetes, is a form of diabetes that is characterized by high blood sugar, insulin resistance, and relative lack of insulin<sup>ii</sup> India leads the world with maximum number of diabetic patients being termed as the "Diabetes capital of the world."

In Ayurvedic texts the given characteristic features of *Prameha* shows marked similarity with the syndrome of diabetes mellitus. Etiological factors of *Prameha* are *Madhura*, *Amla, Lavana Rasa* dominant diet mentioned as "*Gramya Udaka Aunupa Rasa*, *Payansi*, *Dadhini*" and life style such as "*Aasya Sukham Swapna Sukham*" <sup>iii</sup> are similar to the causes quoted as over eating, eating of large amount of carbohydrates mainly sugars rich substances, dairy products, practicing sedentary life style, overweight in modern medical science literature. Ayurvedic texts have description similar to insulin dependent Diabetes in terms of *Sahaja Prameha* and '*Jata Pramehi Madhumehino va*' in which the patient is having underlying pathology in early childhood with early onset of diabetes. Further in due course of time with advancement of the lesion all types of *Prameha* may lead into *Madhumeha* which is said to be incurable. It clearly denotes the stage of insulin dependence. The narration of *Apathya Nimittaja Prameha*<sup>iv</sup> which generally seen in obese individuals have a clear cut resemblance with type-2 Diabetes.

The present study is humble effort to treat patients of Madhumeha as per classics.

In Ayurveda, *Pathya* (diet), *Vyayam* (exercise) & *Shaman Chikitsa* (medicine therapy) has been given to control the disease and avoid its fatal complication. Taking account the severity of disease subject is selected for dissertation. For the present study, *Kantkateryadi Vati*, a polyherbal formulation contains different amount of six herbal drugs [Table no.1] that is *Kantkateri(Berberis aristata)* (DC.), *Madhuka (Glycyrrhiza glabra)* (Linn.), *Amalaki(Embelica officinalis)* (Gaertn.), *Haritaki(Terminalia chebula)* (Retz.), *Bibhitaka(Terminalia bellirica)* (Roxb.), *Chitraka(Plumbago zeylanica)* (Linn.). In *Kantkateryadi Vati d*rugs like *Chitraka, Maduka, Amalaki, Haritaki and Bhibhitaka* having *Deepana, Pachana, and Rasayana* properties and having

*Katu,Tikta,Ushna Guna. Drug like Kantkateri* having antioxidant and hypoglycemic properties<sup>v</sup> as main line of management include to treat the main disease.

#### **Aims and Objectives**

1. To evaluate raw drugs of *Kantkateryadi Vati* for authenticity through various pharmacognostical procedures.

2. To develop the pharmacognostical and phyto- chemical profile Kantkateryadi Vati.

#### **Materials and Methods**

#### Collection, Identification and Authentication of raw drugs

The raw materials were collected from the pharmacy of Gujarat Ayurved University, Jamnagar. All the raw drugs were identified and authenticated in the Pharmacogonosy Laboratory, Institute of Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar.

#### **Preparation of Drug**

Ingredient mention in table (1) will be taken in equal amount. According to *Kwathanirman Vidhi* 16<sup>th</sup> part of water will be added and boiled till it reduces to 8<sup>th</sup> part. Then remaining *Kwath* will be filtered. Further by heating the filtrate to obtain solidified extract (*Ghana*). Then *Vati* will be formed and stored under the hygienic conditions. Weight of each *Vati, about* 500mg. Shape: Round shape Size: About 0.5 cm, blackish in colour with aromatic odour, Hard to touch. Storage: kept in well closed polythene bags. Ingredients of *Kantkateryadi Vati* are as shown in (Table no. 2) This *Vati* was analyzed using various standard physicochemical parameters such as, Loss on drying, PH, water soluble extract, and methanol soluble extract at the pharmaceutical chemistry lab, ITRA. Jamnagar.

#### **Pharmacognostical Study**

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

# **Organoleptic Study**

The Organoleptic characters of polyherbal drugs are very important and give the general idea regarding the genuinity of the sample. Organoleptic parameters i.e. taste, colour, odour and touch of *Kantkateryadi Vati* were scientifically studied as per the standard references.

#### **Microscopic Study**

*Kantkateryadi Vati* was powdered and dissolved with water and microscopy of the sample was done without stain and after staining with phloroglucinol + HCL. Microphotographs of *Kanteryadi Vati* were also taken under Corl-zeisstrinocular microscope <sup>vi</sup>.

#### **Physico-Chemical Analysis**

*Kantkateryadi vati* as analyzed using various standard physico-chemical parameters. The common parameters mentioned for compressed tablets in Ayurvedic Pharmacopeia of India <sup>vii</sup> and CCRAS <sup>viii</sup>, guidelines are loss on drying, total ash value, acid insoluble ash, pH value, water soluble extract, methanol soluble extra total ash, and water and alcohol soluble extractives.

# High Performance Thin Layer Chromatography (HPTLC)

Methanol extract of *Kantkateryadi Vati* were spotted on pre coated silica gel GF 60254 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  $\mu$ L 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). The slit dimensions were 6 mm x 0.45 mm and the scanning speed was 20 mm <sup>ixx</sup>

# **Results and Discussion**

## Organoleptic characters of Kantkateryaadi Vati -

Organoleptic characters contents of *Kantkateryaadi Vati* like colour, taste, touch, Odor were recorded. The color of *Kantkateryaadi vati* was Blackish. *Kantkateryaadi Vati* contain its aromatic smell and *Tikta* taste which is shown in Table -2.

# Microscopic Study of Kantkateryaadi Vati -

Identifying characters of ingredients of *Kantkateryaadi Vati* under the microscope were stone cells of *Daruharidra*, starch grains of *Chitrakmula*, stone cells of *Haritaki*, Rhombidal crystals of *Yastimadhu*, Scleroids of *Yastimadhu*, stone cells of Bhibhitaki, Trichoma of *Bhibhitaki*, Fibers of *Amalaki*, Rhombidal crystal of *Daruharidra*, Stone cells of *Chitrakmuala*, Sillica deposition of *Amalaki*, Lignified fibers *of Daruharidra*, Pitted vessels of *Chitraka*, Crystal fiber of *Yastimadhu*, Lignified stone cells of *Haritaki*, Lignified scleroid of *Yastimadhu*, Stone cells of *Bibhitaki*, Tannin containt of *Haritaki*, Scleroids of *Amalaki*, Scleroids of *Amalaki*, Lignified scleroid of *Yastimadhu*, Stone cells of *Bibhitaki*, Tannin containt of *Haritaki*, Scleroids of *Amalaki*, Scleroids Scleroids Scleroids of *Scleroid*, Scleroids Scleroids

### Physico-chemical analysis of Kantkateryaadi Vati -

Physico-chemical analysis of *Kantkateryaadi Vati* revealed the value as hardness 6.8 Kg/cm2, ash value 13.82 %w/w, loss on drying 13.12 %w/w, water soluble extract 20.85 %w/w, alcohol soluble extract 31.40 %w/w and pH value was 6.5. [Table No-3.]

### High performance thin layer chromatography of Kantkateryaadi Vati -

On performing HPTLC, visual observation under UV light showed few spots but on analyzing under densitometer much more was observed and at 254 nm, the chromatogram showed 11 peaks with Rf values 0.07,0.10,0.40,0.49,0.52,0.62,0.76,0.79,0.81,0.82,0.89,0.92 While at 366nm the chromatogram showed 7 peaks with Rf values 0.07,0.10,0.40,0.56,0.85.0.89,0.92 [Table No-4.]

### Conclusion

The Pharmacognostical and physico chemical analysis of *Kantkateryaadi Vati* confirmed the purity and genuinety of the drug. A published information is not available on pharmacognostical and physico-chemical profiles of *Kantkateryaadi Vati*. Information acquired from this study may be beneficial for further research work and can be used as a reference standard for quality control researches.

Sr.No.	Drug Name	Botanical Name	Part Used	Praportion
1.	Kantkateri	Berberis aristata (DC.)	Root	1 part
2.	Madhuka	Glycyrrhiza glabra (Linn.)	Root	1 part
3.	Amalaki	Embelica officinalis (Gaertn.)	Fruit	1 part
4.	Haritaki	Terminalia chebula (Retz.)	Fruit	1 part
5.	Bibhitaka	Terminalia bellirica (Roxb.)	Fruit	1 part
6.	Chitraka	Plumbago zeylanica (Linn.)	Root	1 part

# Table 1: Ingredients of Kantkateryaadi Vati

 Table 2: Organoleptic characters of Kantkateryaadi Vati

Drug	Colour	Odour	Taste	Consistency
Kantkateryaadi	Blackish	Aromatic	Switish	Hard
Vati			astringent	

 Table 3: Physico-chemical Parameters of Kantkateryaadi Vati

Name of the Analysis	Value of Kantkateryaadi Vati	
Loss on drying percentage	13.12%	
Ash value	13.82%	
PH value(5% aqueous)	6.5	
Water soluble extract percentage	19.72 %	
Alcohol soluble extract percentage	31.40%	

# Table 4: HPTLC results for methanolic extract of Kantkateryaadi Vati

254 nm		366 nm		
No. of spot s	. Rf Value		Rf Value	
11	0.07,0.10,0.40,0.49,0.52,0.62,0.76,0.79,0.81,0.82,0.89,	7	0.07,0.10,0.40,0.56,0.85.0.89,0.	
	0.92		92	

At 254nm at 366nm







Peak display at 366nm



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