

**ESTIMATION OF TOTAL PHENOLIC CONTENT OF *Emblica officinalis* AND  
*Curcuma domestica* COLD INFUSION (Haridramalakee sheetha kashaya) AND ITS  
EFFECT ON THE FASTING BLOOD SUGAR OF PATIENTS WITH MILD  
DIABETES MELLITUS**

**GAMAGE UDAYANGA MANORI**

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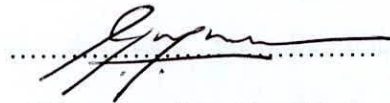
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**DECLARATION**

I do hereby declare that the work reported in this project report/thesis was exclusively carried out by me under the supervision of Prof. Ajith Abeysekera. It describes the result of my own independent research except where due reference has been made in the text. No part of this project report/thesis has been submitted earlier or concurrently for the same or any other degree.

Date.. 2010/08/02



Signature of the Candidate

Certified by:

1. Supervisor (Name):..... Date:.....  
(Signature):.....

2. Co-Supervisor (Name):..... Date:.....  
(Signature):.....

**ABSTRACT**

Ayurvedic herbal medicines have been used since ancient times to treat diabetes mellitus and many control trials have been performed to investigate their efficacy. The current review focuses on a herbal drug preparation which is used as a treatment for acute stage of diabetes mellitus. According to ayurvedic texts, Haridramalakee cold infusion has been used for diabetic mellitus since ancient time. This cold infusion contains Turmeric powder (*Curcuma domestica*) and fresh Nelli juice (*Emblica officinalis*).

This study was performed to determine the total phenolic content of Haridramalakee cold infusion every 2 hours from the initial stage up to 12 hours by UV-visible Spectrophotometer by using Folin-Denis reagent and gallic acid as the standard.

A clinical study was designed to investigate the hypoglycemic effect of Haridramalakee cold infusion in type 2 diabetes mellitus at the Ayurvedic teaching hospital, Borella. 10 patients having type 2 diabetes mellitus was given this cold infusion for 6 days without other medications, and the fasting blood glucose level was investigated on the 7<sup>th</sup> day.

According to the findings of the research, the total Poly-phenolic content of the Haridramalakee cold infusion increased with time, but rate of increase is less compared to the total poly-phenolic content of pure fresh *Emblica officinalis* juice. This gives an idea about the effect of turmeric powder on the rate of increase in total poly-phenols of Haridramalakee cold infusion. Water soluble poly-phenol content in *Curcuma domestica* powder was found to be very low. Intensity of yellow colour due to curcumin pigments increased with time in the Haridramalakee cold infusion. This shows that amount of

curcumin dissolved increases with time. Therefore it is evident that the anti-diabetic effect of the drug increases with time.

From the clinical study it was revealed that Haridramalakee cold infusion has significant hypoglycemic activity. Blood glucose level was decreased in all patients, and the blood glucose content was brought into normal range (110-120 mg/dl) in 60% of patients who had fasting blood glucose level below 200 mg/dl before treatment.



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**List of Abbreviations**

HPTLC	High-Performance Thin Layer Chromatography
UV	Ultra Violet
WHO	World Health Organization
mg/dl	Milligrams per Deciliter
mmol/l	Mill mole Per Litter
DM	Diabetic Mellitus
IDDM	Insulin Dependent Diabetic Mellitus
ppm	Parts per Million

## CHAPTER 1

### INTRODUCTION

#### 1.1 Traditional medicines

In the last few years there has been an exponential growth in the field of herbal medicine and these drugs are gaining popularity both in developing and developed countries because of their natural origin and less side effects. Many traditional medicines in use are derived from medicinal plants, minerals and organic matter. A number of medicinal plants, traditionally used for over 1000 years named *rasayana* are used in herbal preparations of Indian traditional health care systems.

In Indian systems of medicine most practitioners formulate and dispense their own recipes. The World Health Organization (WHO) has listed 21,000 plants used for medicinal purposes around the world.

Ancient Chinese and Egyptian papyrus writing describe the medicinal uses of plants. Indigenous cultures (such as African and Native Americans) used herbs in their healing rituals, even though they have other developed traditional medical systems. Researchers found that people in different parts of the world tends to use the same or similar plants for same purposes.

The role of traditional medicines as a solution for health problems is invaluable on a global level. This is more striking when we consider the fact that approximately 80% of the people living in less developed countries rely exclusively on traditional medicine for their health care needs. Traditional Indian and ayurvedic medical system as example, have been evolved during thousands of years and have left for posterity a well documented literary legacy which permits us to recognize immediately a



theoretical base whose conceptual framework even if were more or less archaic is found to be logical.

Most raw materials in traditional medicines are from vegetable origin and some have animal and mineral origin. However, the most important therapeutic resource is that of vegetable origin. They are qualitatively and quantitatively superior to the other two. In general, the plants are used as fresh, mainly as decoction.

The rich cultural reservoir of traditional Indian medicine is supported by diverse cultural sources, which have to be fully evaluated. This has to be considered as an important issue in our developmental efforts at the grass-root levels, as many of these living traditions still have the potential to contribute to the physical well being of our people

## **1.2 Diabetes mellitus/DM**

Diabetes mellitus is a disease, which occurs when the pancreas does not produce enough insulin, or when the body cannot effectively utilize the insulin it produces. This leads to an increased concentration of glucose in the blood (hyperglycemia).<sup>[1]</sup>

### **1.2.1 Ayurveda concept of DM<sup>[2]</sup>**

A study of ancient literature indicates that diabetes was fairly well known and well conceived as an entity in ancient India. The knowledge of the system of DM, as the history reveals, existed with the Indians since prehistoric age. Its earliest reference (1000 BC in the ayurvedic literature) is found in mythological form where as it is said to have originated by eating 'Havisha', a special food which is used to be offered at the times of yagna organized by Dakshaprajapati. The disease was known as 'Asrava' during Vedic era (6000 BC) and a detailed description of it is available in ayurvedic

texts such as Caraka samhita, Susruta samhita. Astanga Hrida samhita (600 AD) is the first medical treatise which encompasses a clear definition of DM by mentioning about glycosuria.

DM is a disease in which urine of the patient is sweet like honey and quantitatively increased as well as of astringent, pale and with a rough quality. The whole body of the patient (Madhumehi) becomes sweet.

Sage Caraka has given a definition of DM as the diseases in which one passes urine as astringent, sweet and rough. Susruta samhita denotes DM by the term “Kshudrameha” and states that the urine in this condition resembles honey and acquires a sweet taste.

The basic Sanskrit term “Madumeha” which is used to describe DM, is composed of the words ‘madhu’+‘meha’. “Madhu” means sweet or sweetness and “meha” means excessive urination. Hence, the disease in which excessive sweet urination take place is called as Madumeha.

In ayurvedic samhita the diseases have been classified in four ways, as follows.

1. Aetiology (causes)
2. Body constitution
3. Predominance of Doshas
4. Prognosis

According to aetiology Susruta samhita has classified two types of pramehas which are mentioned below.

By birth or by genetic defect (*Sahaja prameha*)

Acquired (*Apathyanimittaja prameha*)