DOI :10.31357/fapsmst.2008.00465

# Food values in different morphotypes of *Centella asiatica* L. with special preference to Iron and Calcium content

By

Kotigalage Sandamini Upendrika Perera

Thesis submitted to the University of Sri Jayawardenepura as the partial fulfilment requirement for the award of the Degree of Master of Science in Food Science and Technology on

2008

The work describe in this thesis was carried out by me under the supervision of Dr. N. Salim and Dr. U.G. Chandrika and a report on this has not been submitted in whole or in part to any university or any other institution for another Degree/Diploma.

17.03.2009 .....

Date

..... K.S.U.Perera

We certify that the above statement made by the candidate is true and that this thesis is suitable for submission to the university for the purpose of evaluation.

17/03/2009

Date

Dr. N. Salim, (Supervisor)

Head of the Department,

Department of Botany,

University of Sri Jayawardenapura,

Nugegoda.

17/03/2009

Date

Dr. U. G. Chandrika (Supervisor)

Senior Lecturer,

Department of Biochemistry,

Faculty of Medical Science,

University of Sri Jayawardenapura,

Nugegoda.

# TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF FIGURES

## ACKNOWLEDGMENT

I sincerely and cordially thank my supervisors, Dr (Mrs.) N. Salim, Head, Department of Botany, University of Sri Jayewardenepura and Dr. U.G. Chandrika, senior lecturer, at the Department of Biochemistry, University of Sri Jayawardenapura, for their encouragement and invaluable guidance given at all times without which this project would not have been possible.

My gratitude is extended to Prof. A. Bamunuarachchi, Department of Chemistry, University of Sri Jayawardenapura, for the guidance and encouragement given to make this work success.

I wish to thank Dr. K.K.D.S Ranaweera, Head, Department of Food Science and Technology, University of Sri Jayawardenapura, for giving me the opportunity to carry out this project and encouragement. And also I wish to thank all members of academic and non academic staffs of the Department of Food Science and Technology who helped me on numerous ways.

My sincere thank also goes to Mr. I.D. Wijesinghe, Technical officer, Department of Forestry, University of Sri Jayawardenapura for his assistance of operating Atomic Absorption Spectrometer.

Finally I appreciate the patience and understanding of my husband for enduring all inconveniences as a consequence of division of attention during course of study.

# ABSTRACT

Six morphotypes of *Centella asiatica*, a popular leafy vegetable in Sri Lanka were analyzed for proximate components and selected dietary minerals. Seven replicates from each morphotype were grown under homogeneous conditions in the green house for sixteen weeks. Proximate components including moisture, ash and protein and minerals calcium, magnesium, potassium, sodium, iron, zinc and copper were determined for five samples from each type and results were compared. Moisture content ranged between 85 and 86 % while ash content ranged between 15 and 17% (on dry weight basis). *Centella asiatica* contained considerable amounts of calcium, potassium, magnesium and iron. Potassium was the major element and present at an average of 3079.0 mg to 6295.0 mg per 100g. Sodium content ranged between 1114.2 and 2597.1 mg per 100g. Other minerals calcium, iron, magnesium, zinc and copper were contained in significant levels. Calcium ranged between 1150.9 and 2206.1 while iron content ranged between18.5 and 74.3 mg per 100g. Mean content of magnesium, zinc and copper ranged from 240.7 to 841.2, 11.2 to 19.3 and 2.6 to 6.4 mg per 100g respectively. $G_3$ has highest contents of sodium, calcium, zinc and copper while $G_1$ has highest content of potassium and $G_7$ has highest content of iron. Highest content of magnesium was shown by $G_8$. Significant difference in the contents of potassium, sodium, magnesium and iron could be seen among morphotypes of *Centella asiatica.*

# CHAPTER 1

# INTRODUCTION

## 1. Introduction

Gotukola is a slender-stemmed delicate perennial herbaceous creeper with kidney shaped leaves, belonging to the family Umbellifarae. Originally the plant was identified botanically as *Hydrocotyle asiatica* Linn, but subsequently it was named as *Centella asiatica.*

In the folklore of Sri Lanka, it is said that many years ago people wondered at the longevity of the elephant. They watched the animal's habits carefully, hoping to discover the secret to a long life, and found that Gotukola would keep old age at bay. A Sinhalese proverb states that two leaves of gotukola each day will keep old age from coming in. As an aid to deep meditation, gotukola can become part of a holistic attitude toward health and longevity, bringing a peace and relaxation that is a compliment to physical practices like yoga as well as the inner search for balance within the mind and body.

In the ancient art of Ayurveda, gotukola is regarded as one of the most spiritually pure herbs and particularly beneficial for the rejuvenation of the body. Gotukola's gifts include the ability to improve mental clarity while having a soothing effect on the circulatory and nervous systems and to heal wounds quickly and gently, particularly those caused by intense burns because it strengthens connective tissues to prevent scarring. A few leaves of the herb improve the blood flow throughout the body and stimulate the mind (called as 'food for the brain) both of which hasten healing in those who are confined to bed during an illness or in times of trauma, wherein clear and positive thoughts can be as beneficial as chemical pharmaceuticals. Gotukola is used as a leafy green vegetable in Sri Lankan cuisine. It is most often prepared as salad; a traditional accompaniment to rice and curry,

and goes especially well with vegetarian dishes. In addition, it is boiled and drunk as a beverage. Extract of whole plant is used for preparation of porridge (kola kenda).Gotukola is the one of the most common leafy vegetable consumed by Sri Lankans. According to the statistics given by Dynamic of Vegetable Production Distribution and consumption in Asia, per capita monthly consumption of Gotukola was averagely 73g. (Ali M., 2000)

The determination of minerals in leafy vegetables has considerable importance in recent years. Moreover, an increase awareness of the relationship between dietary minerals and the occurrence of chronic disease, such as hypertension, osteoporosis or cardiovascular disease, (Groff,1994) has contributed the increased attention paid to mineral nutrient in food. Though Gotukola is the most popular leafy vegetable in Sri Lanka, very limited publications and literatures on nutritional value are available. Hence determination of the nutritional value in gotukola is considered as important.

Twelve morphotypes of gotukola including 'heen gotukola', 'salad gotukola' and 'yodha gotukola' have been identified according to their morphological and morphometeric characters (Wijekoon,2005). People believe that some of these morphotypes are more nutritions than others. So this research was mainly carried out to determine the nutritional value, especially dietary minerals in different morphotypes of gotukola.

According to the Food and Nutrition Policy of Sri Lanka 2004-2010, Sri Lanka has three micro nutrient deficiencies that have been identified as public health problems namely Iron, Vitamin a and Iodine. They are also known as 'hidden hunger' Anemia is one of the major public health problem in Sri Lanka. It affects all segments of the population and