

Development of a low calorie herbal RTD beverage with
Murraya koenigii

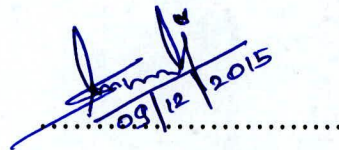
By

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Thesis submitted to the University of Sri Jayawardenapura as
the partial fulfillment for the award of the degree of Masters
of Food Science and Technology on 2015

Declaration

The work described in this thesis was carried out by me under the supervision of Prof. Arthur Bamunuarachchi and Dr. S.B. Nawarathna. Report on this thesis has not been submitted in whole or in part to any university or any other institution for another degree.

A handwritten signature in blue ink is written over a horizontal dotted line. Below the signature, the date '09/12/2015' is written in blue ink.


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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.

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Affectionately dedicated

To

My family...

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List of Abbreviations

°C	-	Degree of Centigrade
g	-	Gram
min	-	Minutes
%	-	Percentage
ml	-	milliliter
l	-	Liter
SLS	-	Sri Lanka Standards
SLSI	-	Sri Lanka Standard Institution
w/v	-	Weight/volume
w/w	-	weight/weight
SMS	-	Sodium metabisulphite
DPPH	-	2,2 – diphenyl-1-picrylhydrazyl
ppm	-	parts per million
df	-	Degree of freedom
GC – MS	-	Gas Chromatography – Mass Spectrometry

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DEVELOPMENT OF A READY TO USE LOW CALORIC BEVERAGE WITH

Murraya koenigii

By

Hewa Coottage Anushka Sandamali

ABSTRACT

Curry leaves give valuable health benefits, but most of the people do not know the real value of it. Most people remove curry leaves from their plate even when eating rice due to the unawareness of the benefits of the plant. Therefore the main objective of this research was to develop a ready –to – drink (RTD) herbal beverage product from curry leaves that would offer several health benefits. This study also focused on the keeping quality of the product at both room temperature and at refrigerated temperatures.

Research was conducted using two forms of curry leave extracts. Where one was obtained by boiling the leaves in water to obtain an aqueous extract and the second method was, crushing the curry leaves first and then boiling with water to obtain an extract. Due to unfavorable sensory characteristics, the second method was abandoned and the first method was adopted in the study. Fresh curry leaves used as ingredients were cleaned, boiled and aqueous extraction was done. Preservatives and sucralose were then added and hot filtrations were done. The final product was packed in 200 ml of hot filling PET bottles. Samples were stored at two different temperatures and chemical, physical and microbiological analysis was carried out to check the keeping quality of the final product. The shelf life was determined with samples stored at room temperature ($30^{\circ}\text{C} \pm 2$) and at the cold storage ($10^{\circ}\text{C} \pm 2$). The chemical, physical and microbiological properties were

CHAPTER 01

INTRODUCTION

Curry leaves (*Murraya koenigii*) is one of spicy herbs, which dominate among all other spices due to their valuable health effects. Curry leaves are generally used fresh in most rice and curry dishes, giving a very distinctive flavour and fragrance. Curry leaves are known to offer benefits for kidney pain, superficial skin injuries, manage diabetes, bad cholesterol, eye disorders and stomach disorders. Curry leaves contain iron, calcium, vitamin C and phosphorous. It is also high in proteins, carbohydrates and fibers.

Curry leaf (*Murraya koenigii*) is an important leafy spice herb and has its origin in Pakistan, Sri Lanka and India east to China. It has been widely cultivated in South-East Asia and some parts of the United States and Australia. In tropical Africa it is planted in many countries, including Nigeria, Kenya, Tanzania and most of the Indian Ocean Islands, where Indian immigrants are settled.

The use of curry leaves as a flavouring for curries is described in early Tamil literature dating back to the 1st to 4th centuries AD. Curry leaves are still closely associated with South India where the word 'curry' originates from the Tamil 'kari' for spiced sauces. An alternative name for curry leaf throughout India is kari-pattha.

Its leaves are widely used in cookery for flavouring foodstuffs. The leaves have a slightly pungent, bitter and feebly acidic taste and they retain their flavour and other qualities even after drying. Curry leaf is also used in many of the ayurvedic and unani prescriptions.

The bark and the roots are used as a stimulant by the physicians. They are also used externally to cure eruptions and the bites of poisonous animals. The green leaves are stated to be eaten raw for curing dysentery and the infusion of the washed leaves stops vomiting.

Curry leaves are also used in calcium deficiency. It has Vitamin A, Vitamin B, Vitamin C, Vitamin B2, Calcium and iron in plenty. Its nutritional value benefits both the young and the old alike.

Women who suffer from calcium deficiency, osteoporosis etc can find an ideal natural calcium supplement in curry leaves. Fresh juice of curry leaves, with lime juice and sugar, is an effective medicine in the treatment of morning sickness, nausea and vomiting due to indigestion (Asian J. Pharm., 2012). One or two teaspoons of juice of these leaves mixed with a teaspoon of lime juice may be taken in these conditions. The curry leaves ground to a fine paste and mixed with buttermilk, can also be taken on an empty stomach with beneficial results in case of stomach upsets and also used as laxative.

Along with mint leaves and coriander leaves, curry leaves can be used in treating excessive pitta conditions. Curry leaves can be used with effective result to treat burns, bruises and skin eruptions. Cataract development can be prevented by using fresh juice of curry leaves. Kidney pain can be cured by using juice of root of curry leaves. It can be used in preventing premature graying of hair (Singh et al., 2014).

The chemical composition of the volatile oil of the fresh leaves of *Murraya koenigii* growing wild was analyzed by gas chromatography-mass spectrometry. Thirty-four compounds consisting of 97.4% of the oil were identified. The major constituents identified were alpha-pinene (51.7%), sabinene (10.5%), beta-pinene (9.8%), beta - caryophyllene (5.5%), limonene (5.4%), bornyl acetate (1.8%), terpinen-4-ol (1.3%), gamma-terpinene (1.2%) and alpha-humulene (1.2%) (Asian J. Pharm et al., 2012).

Fresh curry leaves extracts cannot be stored for a long time at room temperature due to browning. Maximum storage time is about three weeks. But maximum storage life of refrigerated extracts extends during 04 months.

Hence the study was carried out under the following objectives.

General objective,

- To develop a ready – to – drink (RTD) low calorie herbal beverage with natural and fresh curry leaves.

Specific objectives,

- To study physical, chemical, microbiological and sensory changes occurring during the shelf life monitoring period of the product.
- To study the keeping quality of the product at both room temperature and at refrigerated temperatures.

Scientific Classification

Kingdom Plantae – Plants

Subkingdom Tracheobionta – Vascular plants

Superdivision Spermatophyta – Seed plants

Division Magnoliophyta – Flowering plants

Class Magnoliopsida – Dicotyledons

Subclass - Rosidae

Order - Sapindales

Family Rutaceae – Rue family

Genus *Murraya* J. Koenig ex L. – murraya

Species *Murrayakoenigii* (L.) Spreng. – curryleaftree



Figure 2.1 – Curry leaves plant

2.2 Traditional Uses

Fresh leaves and dried leaf powder are widely used for flavouring soups, curries, fish and meat dishes, eggs dishes, traditional curry powder blends, seasoning and ready to use other food preparations. The essential oil is also utilized by soap and cosmetic aromatherapy