

**Development of a jelly based functional food using
natural plant extract of *Centella asiatica***

By

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requirement for the award of the degree of Masters of Food Science and Technology

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DECLARATION

I do here by declare that the work reported in this dissertation was exclusively carried out by me under the supervision of Prof. Arthur Bamunuarachchi, Dr Indira Wickramasinghe. It describes the results of my own independent research except where due reference has been made in the text. No part of this dissertation has been submitted earlier or concurrently for the same or any other degree.

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ABSTRACT

Functional foods are a novel and potential source of modern Food, Medicine, and Pharmaceutical industry. As the structurally diverse biologically active compounds possessing rich source of the traditional plants gained increased attention in the last decade as functional sources.

This study reports the isolation of plant extract of Gotu Kola, from the traditional way adapted in Aurveda as well as incorporation of Plant Extract to a jelly medium that can be used as a food to benefits to consumers as stated compressively in the Literature reviews. The nutritional aspects of them, selection of jelly based medium is done with the economic scale so that process cost and organoleptically acceptance is tested. Carrageenan was the best material to use as a thickening agent for this study considering several factors like unit prices, Bulk densities, Easiness of use, settling time. It was noted that incorporated of 60% plant extract to product had the best results and it was kept under different conditions and noticed little variations of aroma only with the 03 months of shelf life study.

The antioxidant potential of the plant extract is tenfold higher than the product. The gel base used to develop the product does not show any DPPH potential. The antioxidant potential of the product is due to the herbal extract. The amount of total phenolic content is ranged from 500 -800 mg/GAE/g in all 03 stages of the product (Plant Extract, Finished Product, Gel base). Phytochemical tests represented the presence of triterpenoids, Saponin, Phenol, Glycosides, which functionally beneficial for human.

Keywords: *Centlla asiatica* (Gotukola), Jelly products, *Centilla asiatica* Extracts, Antioxidant potential of plants, Total phenolic content

ABBREVIATIONS

CA - *Centella Asiatica*

CAE - CA Extracts

CNS – Central Nerve System

CCK- Cholesystokinin

DPPH - 2, 2'-diphenyl-1-picrylhydrazyl

DNA – Deoxyribo Nucleic Acid

HQOL- Health Related Quality Of Life

PE - Plant Extracts

TLC – Thin Layer Chromatography

CHAPTER 1

INTRODUCTION

The primary role of diet is to provide sufficient nutrients to meet the nutritional requirements of an individual. There is now increasing scientific evidence to support the hypothesis that some foods and food components have beneficial physiological and psychological effects over and above the provision of the basic nutrients.

Today, nutrition science has moved on from the classical concepts of avoiding nutrient deficiencies and basic nutritional adequacy to the concept of "positive" or "optimal" nutrition. The research focus has shifted more to the identification of biologically active components in foods that have the potential to optimize physical and mental well-being and which may also reduce the risk of disease (EUFIC, 2015)

Many traditional food products including fruits, vegetables and whole grains have been found to contain components with potential health benefits. In addition to these foods, new foods are being developed to enhance or incorporate these beneficial components for their health benefits or desirable physiological effects

Jelly and gel is that generally jelly is a dessert made by boiling gelatin, sugar and some flavoring (often derived from fruit) and allowing it to set while gel is a semi-solid to almost solid colloid of a solid and a liquid, such as jelly, cheese or opal or gel. The traditional uses of seaweed as food and, to a lesser extent, as animal feed and fertilizer supplements - remain important, but in most parts of the world it is as raw materials for certain chemical products that marine algae are now chiefly valued. The especial role of seaweeds as food in

the Far East and the prospects for a wider contribution by seaweeds to human nutrition (FAO,1973)

Centella asiatica, also known as Gotu Kola in Sinhala, is an annual herb native to India, Australia and Asia. Its leaves are eaten as a vegetable and it is also an important herb in the traditional medicine systems of those places. Research has revealed support for several of *Centella asiatica's* purported health benefits. *Centella asiatica* is traditionally used as a medicinal herbs and alternative medicine in treating numerous kinds of diseases comprehensively describe in literature.

The use of *Centellain* food and beverages has increased over the years. Its potential antioxidant and neuroprotective activity has been widely claimed in many reports and basically is very much related to its properties and mechanism of action of the plant's bioactive constituents namely the asiaticoside, asiatic acid, madecassoside and madecassic acid

Centellais commonly eaten fresh as vegetable especially among the locals the salads are eatentogether with the main meal and can act as an appetizer. Beside eaten raw, it can be cooked as a part of a soup or as a main vegetables. Due to its mild bitterness it is always cook and served with the addition of coconut milk or shredded coconut and sometimes sweet potatoes and potatoes are added.

Since the *Centella* is very popular as a vegetable, it is available everywhere in the markets and supermarkets as a vegetable and therapeutic use, the whole plant including leaves; stem and root is consumed (Brinkhauset al., 2000). It is used as health tonic and processed into cordial drinks and ready to drink juice (MohdIlham, 1998). The fresh plants are also blended to make drink and juice. *Centella* herbal noodles have been developed. The best

formulation for the noodle is found to be 20% *Centella* extract, 5 g of salt with noodles base. This formulation has provided the best sensory acceptance and highest presence of flavonoids (catechin, quercetin and rutin).

Natural plant-based extracts can conserve the appearance, taste and quality of food products with minimal impact on their flavor, color and odor profiles. With natural plant extracts customers benefit from proprietary flavor extracts developed with effective antioxidant properties for delaying oxidation and increasing shelf-life. These versatile, natural solutions are label friendly alternatives to traditional tocopherols or conventional synthetic antioxidants commonly used in the food industry.

1.2. Main Objectives

Overall objective

The aim of this research was to develop a ready to eat (RTE) product using of *Centilla Asiatica* plant extract with organoleptic acceptance.

Specific objectives

- ✓ To develop an economically beneficial jelly base
- ✓ To extraction of plant decoction from *Centilla Asiatica*
- ✓ To develop the jelly product using deferent strength (m/v %) of the herbal extracts
- ✓ To conduct Phytochemical analysis of extracts/finished jelly products
- ✓ To determine the Antioxidant activity and the Total Phenolic Content.
- ✓ To determine the proximate analysis (Selective) of the product
- ✓ To study for the Shelf life & Cost analysis of the finished product