

**NUTRITIONAL AND SENSORY PROPERTIES OF BOTTLED
LOTUS RHIZOME**

By

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Delaration

The work described in this thesis was carried out by me under the supervision of Prof. Shiromi Samarasinghe and Mr. M.A.J Wansapala and a report on this has not been submitted in whole or in part to any other institution for another Degree\Diploma.

.....*Harsh*.....

C.M. Ranawaka

We certify that 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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ABBREVIATIONS

(1) NA	- Nutrient agar
(2) PDA	- Potato Dextrose agar

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Nutritional and sensory properties of bottled lotus rhizome

By

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ABSTRACT

Lotus rhizome is rich in fibre content and therefore it is a popular commodity among local communities. In addition to fibre, it contains high amounts of calcium and can be a good calcium sources for children and pregnant women to meet their daily calcium requirements. It is also reported that it contains zero fat which makes it good for individuals having heart and high blood pressure complications. Although lotus rhizome can be prepared into different delicious dishes, it is regularly not available to urban communities. Lotus plants are commonly available among the natural water reservoir, and major supplies came from north east of our country. A shortage in supply of lotus rhizomes can be observed during the monsoon rain period from December to February. During rainy season this commodity is very difficult to find in the market.

A study was carried out to increase the shelf-life of bottled lotus rhizome. A treatment system which included sorting, cleaning, peeling, cutting and steam blanching for 3 minutes and packaged in 3% salt solution, exhausting and pasteurization was found to be the best among the treatments and conditions tested in this study.

The manufacturing of bottled lotus rhizome has been successful. The keeping quality of the product was satisfactory. Lotus rhizome can be stored more than two months without fungal and bacterial contamination. Chemical analysis confirmed that the bottled lotus rhizome has a similar nutritional value compared with its fresh counterparts. The sensory evaluation showed that the bottled lotus rhizome has a good sensory acceptance.

Chapter 01

Nutritional and Sensory properties of bottled lotus Rhizome

Introduction

Fruit and vegetables are important sources of essential minerals and vitamins in the human diet. These commodities contain significant amounts of calcium, iron and some other minerals required for health. Sodium, potassium, iron, calcium, phosphorus and many trace elements play an essential role in our body functions. Vitamins too are essential for the control of chemical reactions in the body. Vegetables are also important sources of vitamin C and other essentials. Fibre or "roughage" is found in large amounts in these fresh produce. Though indigestible, it plays an important part in the function of digestion, and a diet containing high fibre content is shown by medical studies to reduce susceptibility to disease. Lotus rhizomes contain relatively high fibre content. Therefore it was consumed to improve the digestion process and recommended for our commonly diagnosed diseases. (Ex: Diabetic mellitus) In addition to fibre, It has high calcium which is highly recommended to children and pregnant women to their daily calcium requirements. Lotus rhizome is a rare food containing zero fat and therefore is good for heart and high blood pressure patients. Therefore taking lotus rhizomes as a vegetable for a diet is most advised by Auyurvedic and Weston medical practitioners. Lotus rhizome can be found in rural areas in lakes, ponds and reservoirs but it is difficult to harvest it entire year. Therefore, it is necessary to find out a low cost method to preserve lotus rhizomes without affecting its nutritional value and sensory qualities.

The objectives of the project

Therefore, the objectives of the present study were the following;

- (1) Increase the shelf life of lotus rhizomes by minimal processing and using a brine solution and package in a glass bottle.
- (2) Comparatively analyze the nutrients of fresh and bottled lotus rhizome.
- (3) Analyze sensory properties of bottled lotus rhizome.

Chapter 02

Literature Review

2.1 General Description

2.1.1 Lotus

Botanical Name *Nelumbo nucifera* Gaertn

Kingdom = Plantae

Division = Angiospera

Class = Dicotyledonea

Family = Nymphaeaceae

Lotus (*Nelumbo nucifera* Gaertn.; Syn. *Nelumbium speciosum* Willd.), also called Sacred Lotus and/or Indian Lotus originated in Asia, Persia, India and has spread to China and North Eastern areas of Australia. Lotus is a perennial, aquatic crop that is grown and consumed throughout Asia. Leaves, flowers, seeds and rhizomes are all edible the largest market, however, exists for rhizomes,

World lotus production areas

Lotus is cultivated in many countries in the world, especially in India, China, Japan, Korea, South East Asia, Russia and some countries in Africa. Lotus grown in Europe and America is mainly used for ornamental purposes but rarely for food.

Medicinal and nutritional values

One of the wonderful components of fruits and vegetables is their indigestible fibre. As fibre passes through the digestive system, it sops up water like a sponge and expands. This can calm the irritable bowel and, by triggering regular bowel movements, can relieve or prevent constipation (Lembo, et al 2003). The bulking and softening action of insoluble fiber also decrease pressure inside the intestinal tract and so may help prevent diverticulosis (the

development of tiny, easily irritated pouches inside the colon) and diverticulitis (Aldoori et al, 1998). Nutritional values of edible Lotus rhizomes are shown in Table1. (www.iamshaman.com/lotus/whitelotus.htm)

They are high in calcium, fibre and vitamine C(Lembo, et al 2003)

Its consumption is supposed to benefit liver function and is said to strengthen the heart, spleen and stomach. Uncooked lotus root juice clears “heat” and stops all internal bleeding; cooked lotus root can “promote blood,” treat women for anemia from heavy menstruation and at the same time clear and improve energy. (www.foodsnherbs.com)

Table 1. Nutrient value of 100 g edible rhizome

Water	81.2
Energy,Kcal	66.0
Energy,Kj	276.0
Protein,(g)	2.1
Fat.g	0.00
Sugar,g	15.1
Dietary fibre,g	0.6
Calcium,mg	18.0
Phosphorus,mg	60.0
Iron,mg	0.6
Sodium,mg	28.0
Vitamin B1,mg	0.09
Vitamin B2,mg	0.02
Vitamin C,mg	55.0
Niacin,mg	0.2