

**MANUFACTURE AND UTILIZATION OF  
BANANA FLOUR**

**BY**

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## DECLARATION

“The work described in this thesis was carried out by me under the supervision of Dr.K.K.D.S.Ranaweera Head, Dept. of Food Science & Technology, Faculty of applied sciences, University of Sri Jayawardenapura, and Mr. M.A. Jagath Wansapala, The Lecturer, Dept. of Food Science & Technology, Faculty of applied sciences, University of Sri Jayawardenapura 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”.


.....  
*Thanga*

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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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**I dedicate this thesis**

**To my parents**

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## **ABSTRACT**

The purpose of the study was to manufacture banana flour while keeping the nutritional value and determine the effects on appearance, tenderness, moisture, and eating quality of banana flour incorporated foods such as banana bread, banana custard and banana cake. The amount of starch, protein, total fat, and the total fibre in the banana flour were determined, and the contents of sugar and reducing sugar were also assayed.

Banana flour was prepared from five banana varieties, namely Embon, Alukehel, Kolikuttu, Seenikehel and Anamalu. Embon (AAA) was evaluated for its physical and chemical characteristics. The yields of flour averaged 20.7% and pH range was 5.1 to 5.0. The average chemical composition (% dry matter) of the flour was as follows: moisture  $10.8 \pm 1.4$ , crude protein  $1.1 \pm 0.07$ , total fat  $1.0 \pm 0.2$ , fiber  $2.0 \pm 0.1$  and ash  $2.6 \pm 1.4$ . Carbohydrate composition indicated the flour to contain  $3.2 \pm 0.2\%$  reducing sugars, total sugar  $3.3 \pm 0.07\%$  and  $60.2 \pm$  starch. Estimated values for available carbohydrate is 82.8% and caloric value of flour is 344.5 Kcal/100g. The overall results are suggestive of the potential of green bananas as a source of flour.

The banana flour was substituted for 20% of the wheat flour in a master mix. The bread was tested for taste, colour, odour and texture or mouth feel of the treatment products were compared to products made using the original wheat flour. Fifteen untrained panelists evaluated the banana bread. Results for the banana bread indicate that there was no

significant difference in taste, Colour, odour, and texture except overall acceptability for the mixed samples, when compared to the control sample. The study indicates that banana flour can be incorporated successfully into a master mix of bread with further improvements.

The banana flour was substituted for 20% of the wheat flour in a master mix for cake and banana custard, prepared replacing egg by banana flour. There is no significant difference in the taste, odour, texture and overall acceptability of the banana custard and banana cake when compared to their reference products. Banana custard can be introduced as vegetarian custard. Products made with banana flour are acceptable.

## CHAPTER 1

### INTRODUCTION

#### 1.1 General Introduction

##### 1.1.1 Banana

A banana plant is an herb in the genus *Musa*, which because of its size and structure, is often mistaken for a tree. Banana belongs to the family *Musaceae*. Banana consists of dessert varieties, which could be eaten without cooking and cooking varieties generally referred as plantains. The edible cultivars derived from two wild species *Musa acuminata* (AA) and *Musa balbisiana* (BB). A-genome provides character of the dessert fruit and B-genome provides starchy characters of the cooking variety. The plantain or cooking banana is classified as *Musa x paradisiaca*. The Manila hemp or abaca is classified as *Musa textilis*.

Globally, bananas rank fourth after rice, wheat and maize in human consumption. They are grown in 130 countries worldwide, more than for any other fruit crop. Bananas are native to tropical Southeastern Asia. They are at the same time a major staple commodity, together with rice, wheat and maize, and a fundamental export commodity.

Bananas are grown extensively in tropical and subtropical regions and are an important food crop. Although the composition of banana fruit has been defined, comparatively little work has been carried out on the flour (Luis, 1998). Banana is a climacteric fruit and in Sri Lanka is consumed when the fruit is ripe. For this reason many fruits are lost during commercialization due to deficient post harvest handle.

Some local varieties of banana are of small sized fruit. Due to low commercial acceptance for export, it can be considered as a possible resource for industrial