PHYSICOCHEMICAL STUDY ON YAM STARCH

ROHANI EMBONG

BACHELOR OF SCIENCE (HONS.) FOOD QUALITY MANAGEMENT
FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA

APRIL 2005

ACKNOWLEDGEMENTS

In the name of Allah, The Most Gracious and The Most Merciful. Thanks to him for giving me the strength and patient in completing this project.

The success of this project involves contribution and support from many people. First and foremost, I would like to express my deepest gratitude and appreciation to my supervisor and project coordinator, Cik Aishah Bujang. Her constant guidance, spirited support, professionalism, interest and dedication were central to the project from the very beginning to the submission of the last element.

Special gratitude goes to Assoc. Prof. Dr. Siti Noorbaiyah Abd. Malek for being a wonderful Head of Programme. Also, I extend my heartfelt thanks to all Food Technology lecturers for their encouragement, favour and advice. Not to be forgotten, all the lab assistants, En. Omar, En. Osman, Puan Nora and Cik Hariyah who have created an environment that made possible for the completion of this project.

The heartiest thanks to my family for their emphathy, understanding, encouragement, love and support throughout my study in UiTM. To the one that always in my heart, thanks for being a good supporter, advisor and listener. Thanks a lot for your sacrifice and understanding. Last, but not least to all my fellow classmates and friends for their support, ideas and suggestions, in a way or another throughout this project.

TABLE OF CONTENTS

ABSTRACT

PHYSICOCHEMICAL STUDY OF YAM STARCH
(Dioscorea species)

The purpose of this study is to extract starch from yam (genus *Dioscorea)* and to characterize the physicochemical properties of pink and white yam tuber and its starch. The pink yam gave starch yield of 18.15% and white yam gave yield of 15.60%. Proximate composition studies showed that pink yam tuber contain 74.80% moisture content, 2.40% protein, 1.28% fiber, 0.78% ash and 0.05% fat. White yam tuber contain 69.40% moisture content, 1.45% protein, 1.26% crude fiber, 0.67% ash and 0.07% fat. Starch extracted from pink yam tuber contain 9.68% moisture content, 0.19% protein, 0.68% crude fiber, 0.27% ash and 0.03% fat. Starch extracted from white yam tuber contain 9.42% moisture content, 0.20% protein, 0.80% crude fiber, 0.33% ash and 0.02% fat. The amylose content of pink and white yam starch was 0.3730 mg/100 g and 0.1826 mg/100 g respectively. Gelatinization temperature for pink and white yam starch at concentration of 6% was 85 to 100°C and 84 to 100°C respectively. Its gel was hard and stable after cooling.

CHAPTER 1

INTRODUCTION

Starch is the reserve carbohydrate in the plant kingdom, and provides 70 – 80% of the calories consumed by humans worldwide. It is generally deposited in the form of minute granules or cells ranging from 1 to 100 μm or more in diameter. These granules are mainly deposited in the seeds, tubers or roots of plants (Macrae et al., 1993). It is a polysaccharide long chain of the simple sugar, glucose formed by the process of photosynthesis. The chemical formula of starch is $(C_6H_{12}O_5)_n$ (Egan et al., 1981). In nutritional terms, it is a common practice to describe two groups of polysaccharide in the diet which consists of starch and non-starch polysaccharide, the latter group being major components of dietary fiber (Galliard, 1987).

Few can deny that the indigenous starch crops of the tropics are true wonders of nature. With sun and rain, and little or no artificial inputs, they are able to grow in great abundance. Whether it is cassava, arrowroot, sago, taro, sweet potato or yam, for centuries tropical starches have served as staple foods for millions of people, throughout the hot and humid regions of the world. Indeed, these starch crops are so proficient at supplying essential calories to even the very poorest peoples of the world that they are considered to be the quintessential subsistence crop. The range of food products employing starch in one form or another is almost without limit. But the utility of these starches is almost entirely based upon the natural or synthesized functional characteristics (Coursey, 1967).