CHAPTER I

INTRODUCTION

1.1 Introduction

Problems associated with the handling of environment waste, particularly the large amount of discardable plastic products and the limited volume of land fill facilities, has placed added emphasis on developing products which are either biodegradable or recyclable. This is particularly true in the packaging areas where large volumes of discardable plastic packaging materials are used in various forms, including containers, sheets, films, tubing and fillers. Because of this large increase in the use of plastic materials, it has been proposed to make throwaway materials from biodegradable plastics to alleviate the waste disposal problems [1,2].

The use of starch as a biodegradable, renewable base material for packaging application is desirable as an environmentally friendly alternative to the present use of nondegradable, nonrenewable petroleum-based plastic such as polyethylene and polystyrene. Although the latter can be recycled, this is often difficult and expensive due to contamination of plastic article with food and collection costs [3].

It is known that starch containing water is heated and thereafter cooled under high temperature and pressure, it expands so as to form a lightweight material. This material formed from starch has a high biodegradability. Moreover, it has a high

degree of hardness. However since it has a low resilience, it is brittle. It is consequently difficult to use as a foam-expanded material and in particular as a shock absorber.

In order to overcome these disadvantages, various researches have been reported wherein synthetic polymers have been blended with the starch. For example, it has been proposed that a foam-expanded material can be obtained after adding polyethylene or its copolymers to starch. However, when polyethylene or its copolymers are added, the biodegradability of the starch itself declines or disappears. It was found that if a mixture of starch with natural rubber was used, the biodegradability of the starch was not lost, the resulting foam-expanded material had suitable strength and is useful as shock-absorbing materials [4].

1.2 Objective

The present work is concerned with the study to prepare cassava starch/natural rubber foams that have suitable properties to be used as a shock absorbing material.

1.3 Scope of the research

The scope of this research work to be carried out is the following:

1. Survey of literature.
2. Investigation of the suitable amount of non-ionic surfactant (Nonidet P40) to stabilize natural rubber latex.
3. Blending study by varying the amounts of natural rubber latex.

4. Preparation of polymeric foam material from the blended mixture obtained.
5. Investigation of the foam properties in terms of mechanical properties and morphological using SEM.
6. Evaluation of the thermal properties of the expanded - foam material using Dynamic Mechanical Analysis (DMA).
7. Summarizing the results.