CHAPTER I

INTRODUCTION

1.1 Scientific Rationale

Asia in general is the center of production, accounting for 95 per cent of world production of natural rubber. The three largest world producers are Thailand, Indonesia and Malaysia [1]. The preliminary survey of natural rubber and its application revealed from The Rubber International Magazine reported that, in 1998, Thailand produced 2,065,002 tons of natural rubber and exported 1,839,396 tons of total production [2].

Recently, synthetic rubber plays a vital role in rubber market. Natural rubber has higher green strength and modulus than synthetic polyisoprene. Natural rubber has a fixed *cis*-polyisoprene structure and cannot control its polymerization process tailored like that of synthetic rubber to provide suitable pendent groups, which improve some physical or chemical properties of rubber. Due to significant properties of synthetic rubber, demand of natural rubber consumption in the market has decreased, The other reasons for decrease of natural rubber consumption are color, smell and especially allergenic reaction caused by abnormal groups in natural rubber.

Now, it is necessary to provide natural rubber having properties different from ordinary natural rubber. This attempt is made to improve the properties of natural rubber by purification or saponification with alkali. Purified natural rubber will be a new rubber material of which properties are better than original natural rubber and *cis*-1,4 polyisoprene and also will be a material more effective for chemical modification which may widen the usage of natural rubber.

1.2 Objective of the Research

1. To find the appropriate conditions for deproteinization of natural rubber latex by varying in type and concentration of surfactant and concentration of NaOH.
2. To investigate the properties of the deproteinized natural rubber (DPNR) latex and solid DPNR.

1.3 Scope of Research Work

This research work is the study of deproteinization of natural rubber by saponification with NaOH. The procedures are as follows:

1. Literature survey and in-depth study of this research work.
2. Preparation of purified natural rubber by saponification and washing followed by coagulation.
   - 2.1 Studying the stability of latex during saponification and washing step.
   - 2.2 Studying the effect of number of centrifugation, surfactant concentration, surfactant addition method and NaOH concentration on the purified rubber properties.
   - 2.3 Studying the properties of purified natural rubber such as nitrogen content, ester content and molecular weight.
3. Preparation of purified natural rubber by saponification and coagulation followed by washing.
   - 3.1 Studying the effect of $Ca(NO_3)_2$ and H_2SO_4 on purified rubber properties.
   - 3.2 Studying the properties of purified natural rubber such as nitrogen content and ash content.
4. Summarization of the result.