

CHAPTER I

INTRODUCTION

1.1 Statement of Problems

Natural rubber is an important agricultural commodity essential for the manufacturing. Asia is the center of production and Thailand is the biggest producer today [1]. The world production of natural rubber (NR) has increased at an average rate of 3.74 percent over the five years period (1944-1998). The average production of natural rubber is 6.22 million tons per year, while the world consumption during that period is 6.17 million tons per year [2]. Being the largest producer of natural rubber, the production in Thailand is expected to reach 2.12 million tons in the year of 2001. The global natural rubber production is expected to grow at 1.1 percent during 1999-2001, reaching about 8,535 thousand metric tons in 2010 [3].

Natural rubber is the strongest of all rubbers and has excellent dynamic properties such as resistance to fatigue but it is less resistant to environmental damage (e.g. by ozone in the atmosphere and by oils) than are some synthetic rubbers. In some products the choice of rubber is determined solely by properties (e.g. aircraft tyres which require 100 per cent natural rubber) but in many products there is a competition between natural and synthetic rubbers on the basis of price and properties.

Due to the industrial growth, the technology and the quality of the products from natural rubber have been greatly developed for the past decade. Air pollution through mal-odor is a problem from all industries. The mal-odor given off during the

processing of natural rubber including coagulation, drying and mastication has also been a problem to natural rubber factories since it is offensive to both workers and people living close to the factories. This problem has been awarded but never been systematically solved in the world [4].

The main objective of this research is to characterize the major components that cause mal-odor from natural rubber and products from natural rubber. Analysis was made for commercially produced natural rubber of different grades and some of crude natural rubber such as block rubber, smoke sheet, deproteinized rubber and cup lump rubber. Gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS) were used as major characterization techniques. In addition, an attempt was made to reduce mal-odor from natural rubber by the addition of various compounds in natural rubber. The feasibility was studied for using such compound as a mal-odor reducing agent together with the effects on cured rubber properties of natural rubber mixed with these compounds.

1.2 Objectives

1. To characterize the major components that cause mal-odor from natural rubber.
2. To prevent or reduce mal-odor from natural rubber by using chemical and odor counteractant.

1.3 Scope of the Investigation

Characterization of the components that cause mal-odor from natural rubber is carried out using GC and GC/MS. Here, headspace technique was used as a sampling technique. The stepwise investigation were carried out as follows:

1. To do literature survey for related research work.
2. To prepare samples for characterization by GC and GC/MS using headspace technique.
3. To characterize the major components that cause mal-odor from natural rubber samples by GC and GC/MS.
4. To study the effect of chemical substances on mal-odor reduction.
5. To determine the mechanical properties of natural rubber mixed with appropriate substances such as stress-strain relationship, hardness and specific gravity according to the ISO and ASTM methods.
6. To summarize the results.