

CHAPTER I

INTRODUCTION



1.1 The Purpose of the Investigation

More than one hundred years, *Hevea Brasiliensis* or para rubber has been the important biopolymer for Thailand and the world. It is one of top ten exports for Thailand (Table 1.1). The prices of raw rubber such as smoke sheet (RSS), block rubber (BR) and concentrated latex 60% (CL) are much lower than the rubber products such as tire, footwear, rubber glove, condom etc in terms of Baht/g (The Customs Department, 2000). Recently Thai government has the policy to promote the value added products from raw rubber, such as examination gloves and condom in stead of 60% concentrate latex (Sombuntanon, 2000).

The sudden increase in the production of dipped good, such as rubber gloves (household, medical, surgical and industrial), babies teats and soothers, bladders and condoms, not only in Thailand but worldwide has had its consequential effect on the latex concentrate industry (Table 1.2).

The efficient manufacture of rubber gloves involves the ability to identify faults in the product and adjust the compound and the plant parameters to reduce or eliminate the occurrence of the faults. In the case of glove, there is a wide range of faults that can occur, some affecting part of the gloves, whilst others affecting the whole of the product. A partial or complete darkening or browning of the gloves is important problem in the manufacture of rubber

gloves. The majority is due to the reaction between dithiocarbamates in the rubber reacting with copper ion and giving dark-colored stains. The copper ion contamination was normally due to latex compound, equipment used for storage latex, pipe-line and leach water, especially the leach water the copper content of the water which should not exceed 01-0.2 ppm [1]. These results in a visually offensive surface on the product which is just as commercially harmful to the manufacturer as mechanical damage or some other physical defect, and thus it is important that the problem should be eliminated and a good surface finish should be obtained.

In this research, model studies on the reduction of copper carbamate stain was accomplished by dissolving ZDBC in chloroform and copper ion in water before adding the surfactant. In addition we studied influences of surfactant concentration, pH and temperature of aqueous solution on copper ion transfer from water phase to chloroform phase that is believed the presence of surfactant could help reducing copper carbamate stain.

Table 1.1 Top ten export of Thailand.

Value: Million Bath

Item	1997	1998	1999	2000(jan-Oct)
1.Computer and access	220,302.7	320,525.6	304,982.2	270,700.1
2.Electronic circuit	75,837.7	93,833.1	111,767.4	141,864.2
3.Clothes	97,135.9	123,133.0	110,356.5	102,925.9
4.Vehicle and components	48,419.6	68,348.4	91,954.1	98,560.8
5.Plastic seed	23,980.2	40,786.3	46,025.8	61,547.8
6.Television and radio components	43,578.8	58,058.2	47,233.4	60,439.9
7.Seafood can	49,309.3	67,952.1	65,956.6	57,745.0
8.Jewelry	55,622.3	57,350.5	59,820.9	53,089.6
9.Rice	65,093.4	86,803.1	73,812.1	50,043.8
10.Natural rubber	98,093.4	55,406.3	43,941.7	48,839.6
Total (10 items)	736,729.9	972,196.8	955,850.5	945,756.7
Others	1,069,952.1	1,275,892.7	1,258,398.2	1,301,908.9
Total value	1,806,682.0	2,248,089.4	2,214,248.7	2,247,665.

Source: The Customs Department, 2000.

Table 1.2 Value of Exported Rubber Products of Thailand.

Million baht

Type	1999	2000
Reclaim rubber	21.08	14.41
Compounded rubber	455.99	608.04
Elastic	1,445.26	2,073.09
Vulcanise	42.11	105.36
Rubber hose	1,105.64	1,409.02
Automobile tire	10,658.50	12,591.35
Inner tube	1,274.99	1,257.45
Condom	889.83	1,784.32
Surgical gloves	1,521.29	1,796.44
Household gloves	9,413.18	12,621.21
Rubber band	1,167.79	1,240.22
Eraser	15.88	30.37
Other	14,671.06	4,311.52
Total value	42,682.6	39,842.8

1.2 Objectives

The objectives of this research are following:

- 1.To study the transfer of copper ion from water phase to chloroform phase in the presence of surfactants.
- 2.To determine a suitable concentration of surfactant, pH, temperature of aqueous solution to prevent copper carbamate stain.

1.3 Scope of the Investigation

In this research, the following stepwises were carried out:

1. Literature survey.
2. Study the effect of the concentration of surfactants on the transfer of copper ion from aqueous phase to chloroform phase.
3. Study the effect of pH and temperature of aqueous solution on transfer of copper ion from aqueous phase to chloroform phase.

Form types of surfactant used were:

- Nonyl phenol ethoxylate [NP(EO)₉]
- Sodium dodecyl benzene sulfonate (LAS)
- Benzethonium chloride (Hyamine 1622)
- Coco aminopropylbetaine (Tegobetaine)

4. Summarization of data and discussion.