

174361

Ph. 3000

18/07/2008

RICE BRAN OIL AS STABILIZER AND PRESERVATIVE
FOR CENTRIFUGED NATURAL RUBBER LATEX.

BY
PACKKEER THAMBY ITHREES

174361

M.Sc. (Polymer Science and Technology)

2003

ABSTRACT

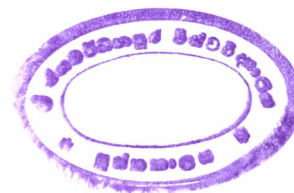
Mechanical forces are applied whenever the latex is handled, e.g. during concentration, in pumping and transportation, and in compounding and processing. The MST of freshly tapped natural rubber latex is always low (ca 100 s or less). If the latex is handled at the low level of MST, it will become coagulated. So before handling the latex, it is necessary to stabilize the latex by adding any stabilizer.

Rice bran oil contains 15 – 20 % of saturated acids, mostly palmitic and 80 – 85 % of unsaturated fatty acids mostly oleic acid which is around 40-50 % of the total fatty acids. These long chain fatty acid soaps are effective in stabilizing NR latex. Also the non-refined oil of rice bran contains wax which can be a preservative for food.

The effects of added soaps of acid mixture of rice bran oil, non-refined oil of rice bran, lauric acid, and oleic acid prepared with ammonia, potassium and sodium bases upon the mechanical stability of NR latex concentrate have been measured. All the soaps investigated are able to enhance the mechanical stability of natural rubber latex significantly. But the efficiency of both acid mixture and non-refined oil soaps is less than that of laurate and oleate soaps and in most cases acid mixture soaps approach the oleate soap's effectiveness.

Among ammonium, potassium and sodium soaps, ammonia soaps of those acid sources are found to be least effective.

The variations of the effectiveness of those soaps in enhancing the mechanical stability are explained as far as possible with the help of some previous publications.



CONTENTS		Pages
ACKNOWLEDGEMENT		I
ABSTRACT		II
LIST OF FIGURES		IV
LIST OF TABLES		V
INTRODUCTION and LITERATURE REVIEW		1
1.1. INTRODUCTION		1
1.1.1	General	1
1.1.2	Nature of natural rubber latex	4
1.1.3	Composition of natural rubber latex	4
1.1.3.1	The rubber phase	5
1.1.3.2.	The aqueous phase	6
1.1.3.3.	Lutoid phase	7
1.1.4	Ammoniation and its consequences in natural rubber latex	7
1.1.5	Preservation of natural rubber latex	8
1.1.5.1.	Why it is necessary to preserve NR latex.	8
1.1.5.2	Mechanism of spontaneous coagulation	9
1.1.5.3	Preservative System	10
1.1.6	Rice bran oil.	11
1.2. LITERATURE REVIEW		14
1.2.1	Colloidal stability	14
1.2.1.1	Chemical stability of NR latex	15
1.2.1.2	Viscosity of NR latex	16
1.2.1.3	Mechanical stability of NR latex	16
1.2.1.3.1.	Mechanism of mechanical stability	18

2.3.1	Preparation of soaps from the acid mixture.	41
2.3.1.1	Preparation of soaps	41
2.3.2.	Preparation of soaps with non-refined oil	42
2.3.3	Preparation of soaps from lauric acid and oleic acid	43
2.4	Investigation of the effects soaps to the latex through determination of MST	43
2.5	latex samples used to study the preservative effect	44
2.6	Test methods for oil analysis.	45
2.6.1	Separation of fatty acid from oil	45
2.6.2	Determination of Saponification value	46
2.6.3	Determination of base equivalent required to neutralize the acid mixture.	47
3.0	RESULTS AND DISCUSSION	
3.1.	Effect of added soap upon mechanical stability	49
3.1.1.	Comparison of the effectiveness of	64
3.1.1.1.	Acid mixture with non-refined oil soaps	64
3.1.1.2.	Acid mixture with laurate soaps.	66
3.1.1.3.	Acid mixture with oleate soaps	66
3.1.2.	Effect of counterions	66
3.2.	Preservative effect of rice bran oil.	68
3.2.1.	Variations of volatile fatty acid.	69
3.2.2.	Variation of mechanical stability.	70
3.3	Conclusion	72
3.4	suggestion for further work	73
	References	74