



PATENT SPECIFICATION

NO DRAWINGS

1036.216

Inventor: ALAN HENRY RITCHIE.

Date of filing Complete Specification: July 30, 1964.

Application Date: July 30, 1963.

No. 30208/63.

Complete Specification Published: July 13, 1966.

© Crown Copyright 1966.

Index at acceptance:—C3 E6A

Int. Cl.:—C 08 c 1/04

COMPLETE SPECIFICATION

A method for Preserving Rubber Latex

We, KEPONG PLANTATIONS LIMITED, a Company incorporated in Malaysia, of 53, Eastcheap, London, E.C.3, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a method for preserving rubber latex, and in particular to a method of affording preservative protection to natural rubber latex concentrates by the destruction of specific bacterial enzymes present in the natural rubber latex, prior to concentration.

Latex from the tree *Hevea Brasiliensis* is known to contain the enzyme tyrosinase (polyphenoloxidase) and this enzyme constitutes the medium whereby aerobic and microaerophilic bacteria are enabled to assimilate the sugars and proteins present in the latex to form products of amino and volatile fatty acids, thus having a deleterious effect upon the quality of the latex and its preservation properties.

The destruction and removal of this enzyme therefore becomes a matter of primary importance to those engaged in the concentration and preservation of natural rubber latex.

In British Patent Specification No. 788,580 there is described and claimed a method of preserving concentrated natural rubber latex, especially from bacterial and enzyme degradation, which comprises adding thereto one or more zinc dialkyl dithiocarbamates in an amount less than 0.1% by weight on the total latex and one or more anionic and/or non-ionic surface active agents, and if desired an amount of ammonia less than that required to preserve the latex.

In this method the zinc dialkyl dithiocarbamate acts as a bactericide, that is it poisons the bacteria.

We have now found that as tyrosinase (polyphenol-oxidase) is known to contain a copper ion in its prosthetic group the desired protection may be afforded by destroying the

enzyme by adding to the field latex a reagent, such as a zinc dialkyl dithiocarbamate which is capable, in the presence of ammonia which acts as the initial preservative, of reacting with and precipitating, the copper-containing prosthetic group, thus destroying the enzyme and inhibiting the use of the enzyme by bacterial action.

Accordingly the present invention provides a method for preserving natural rubber latex which method comprises removing by precipitation a copper-containing prosthetic group of an enzyme from the latex by means of a reagent capable of reacting with copper in the presence of ammonia, prior to concentration of the latex.

Any substance or material known to react with copper in the manner described may be employed in accordance with the invention, insofar as such material is compatible with the requirements of latex purity and processibility. Examples of reagents that may be employed in accordance with the invention are dithiocarbamates e.g. zinc diethyl dithiocarbamate, which form complex precipitates with copper.

In the method of the invention the precipitate is separated from the latex prior to concentration, as also is any insoluble reagent. Concentration may then be effected by the use of a centrifugal separator.

Where zinc dialkyl dithiocarbamates are used as reagents they will in general be removed from the latex either as the precipitated complex or because they are insoluble. Any minute amount of zinc dialkyl dithiocarbamate which may remain in the latex after concentration fulfils no further useful purpose, in that once the enzyme is destroyed by removal of the prosthetic group, the presence of a bactericide is no longer necessary.

It will be clear from the above that it is not necessary in the method of the invention to use an amount of reagent which has a

[Price 4s. 6d.]



80
Amount

85

90

preservative action on the latex in the sense known in the prior art as exemplified by British Patent Specification No. 788,580. For example an amount of reagent as small as 5 from 8 to 16 ppm by weight on the total weight of the latex may be sufficient to remove by precipitation the copper containing prosthetic group.

10 In carrying out the method of the invention the reagent will be added to the latex as soon as possible after it is obtained from the tree e.g. within from 5 to 48 hours of removal.

Following is a description by way of example of a method in accordance with the invention.

15 EXAMPLE

A sample of latex as tapped from the rubber trees was treated with ammonia to a concentration of 0.3%. The sample was then divided into two parts, one being used as a control 20 and the other being treated with an amount of zinc diethyldithiocarbamate sufficient to react with the copper which the latex contained.

25 Both samples were centrifugally separated into concentrate (approximately 60% dry rubber content) and impoverished rubber skim fractions.

30 The two concentrate samples were then allowed to stand without further addition of ammonia and examined after a period of time for degradation.

35 The control sample became putrid within 36 hours of concentration whereas the treated sample remained in a fresh condition for a period exceeding one month without exhibiting evidence of putrefaction.

The invention also includes a concentrated

rubber latex when preserved by the method as hereinbefore described.

In an alternative to the method of the invention to which we make no claim there 40- may be used a sequestering agent such as E.D.T.A. to sequester the copper-containing prosthetic group. Such an alternative method is disclosed in British Patent Specification No. 45 676,188.

WHAT WE CLAIM IS:—

1. A method for preserving natural rubber latex which method comprises removing by precipitation a copper-containing prosthetic 50 group of an enzyme from the latex by means of a reagent capable of reacting with copper in the presence of ammonia, prior to concentration of the latex.

2. A method as claimed in claim 1 wherein the reagent is a dithiocarbamate. 55

3. A method as claimed in claim 2 wherein the dithiocarbamate is zinc diethyldithiocarbamate.

4. A method as claimed in any one of the preceding claims wherein the latex is concentrated by means of a centrifugal separator. 60

5. A method for preserving natural rubber latex substantially as hereinbefore described in the Example. 65

6. A concentrated rubber latex when preserved by the method as claimed in any one of the preceding claims.

BOULT, WADE & TENNANT,
111 & 112, Hatton Garden,
London, E.C.1.
Chartered Patent Agents.
Agents for the Applicant(s). 78

preservative action on the latex in the sense known in the prior art as exemplified by British Patent Specification No. 788,580. For example an amount of reagent as small as
 5 from 8 to 16 ppm by weight on the total weight of the latex may be sufficient to remove by precipitation the copper containing prosthetic group.

In carrying out the method of the invention the reagent will be added to the latex as soon as possible after it is obtained from the tree e.g. within from 5 to 48 hours of removal.

Following is a description by way of example of a method in accordance with the invention.

15 EXAMPLE

A sample of latex as tapped from the rubber trees was treated with ammonia to a concentration of 0.3%. The sample was then divided into two parts, one being used as a control
 20 and the other being treated with an amount of zinc diethyldithiocarbamate sufficient to react with the copper which the latex contained.

Both samples were centrifugally separated into concentrate (approximately 60% dry rubber content) and impoverished rubber skim fractions.

The two concentrate samples were then allowed to stand without further addition of ammonia and examined after a period of time for degradation.

The control sample became putrid within 36 hours of concentration whereas the treated sample remained in a fresh condition for a
 35 period exceeding one month without exhibiting evidence of putrefaction.

The invention also includes a concentrated

rubber latex when preserved by the method as hereinbefore described.

In an alternative to the method of the invention to which we make no claim there may be used a sequestering agent such as E.D.T.A. to sequester the copper-containing prosthetic group. Such an alternative method is disclosed in British Patent Specification No. 676,188. 45

WHAT WE CLAIM IS:—

1. A method for preserving natural rubber latex which method comprises removing by precipitation a copper-containing prosthetic group of an enzyme from the latex by means of a reagent capable of reacting with copper in the presence of ammonia, prior to concentration of the latex. 50

2. A method as claimed in claim 1 wherein the reagent is a dithiocarbamate. 55

3. A method as claimed in claim 2 wherein the dithiocarbamate is zinc diethyldithiocarbamate.

4. A method as claimed in any one of the preceding claims wherein the latex is concentrated by means of a centrifugal separator. 60

5. A method for preserving natural rubber latex substantially as hereinbefore described in the Example. 65

6. A concentrated rubber latex when preserved by the method as claimed in any one of the preceding claims.

BOULT, WADE & TENNANT,
 111 & 112, Hatton Garden,
 London, E.C.1.
 Chartered Patent Agents.
 Agents for the Applicant(s). 79

