

PATENT SPECIFICATION

800,089



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COMPLETE SPECIFICATION.

Improvements in the Preservation of Rubber Latex.

We, THE BRITISH RUBBER PRODUCERS' RESEARCH ASSOCIATION, a Body Corporate, duly organised under the Laws of Great Britain, of 19 Fenchurch Street, London, E.C.3, do hereby declare this invention (communicated by The Rubber Research Institute of Malaya, Kuala Lumpur, Federation of Malaya), 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 :—

This invention relates to the preservation of natural rubber latex.

In the preparation of liquid latex for storage or export the preservative agent most commonly used is ammonia, of which from 1 to 2 per cent by weight, calculated on the water content of the latex is required to stabilise the latex for long periods against decomposition and coagulation. Such concentrations of ammonia in latex are however undesirable because (1) the latex has a pungent odour with an irritant action and is objectionable to handle, (2) much of the free ammonia must be eliminated or neutralised before the latex can be used in many manufacturing processes, and (3) the high alkalinity imparted by the latex accelerates hydrolytic changes in the non-rubber constituents of the latex, for example the proteins and lipins, and these chemical changes in turn alter the technological behaviour of the latex.

In spite of these disadvantages ammonia has become established as the most popular preservative for latex because it not only acts as a bactericide but also helps to throw out of solution naturally occurring magnesium and phosphate ions by forming insoluble chemical compounds such as magnesium ammonium phosphate. These ions have a destabilising effect. Another function of ammonia is to keep the latex alkaline and so improve its mechanical stability.

It is known that latex can be preserved with smaller amounts of ammonia if a powerful bactericide such as pentachlorophenol or its sodium salt is present in the latex, but for efficient preservation in the presence of bactericides it is still necessary to add at least 0.2% ammonia (NH_3) to latex containing 60% rubber, i.e. 0.5% calculated on the water phase. It has now been found that the amount of ammonia can be reduced still further by adding a third substance to eliminate the coagulating effect of magnesium and other polyvalent ions. Such a substance is the tetra alkali salt of ethylene diamine tetra acetic acid. In Specification No. 676,188 it has already been proposed to use the salt in latex containing 0.2 to 0.5% ammonia based on the latex. What we now propose is to preserve latex containing about 60% rubber with only about 0.1% and less than 0.2% calculated on the latex of ammonia or a molecular proportion of equivalent alkali such as tri-ethanolamine in association with up to 0.2% of a bactericide such as sodium pentachlorophenate to keep the latex free from bacteria and a sequestering agent to remove coagulating ions. The amount of bactericide depends on the potency of the compound used and in the case of some acriflavine dyes may be as little as 0.01 % by weight calculated on the latex.

In this invention therefore concentrated latex is preserved by the combined action of three substances, viz. (1) a small quantity of alkali to raise the pH of the latex above 7.0, (2) a bactericide, and (3) a substance which has a sequestering action on naturally occurring polyvalent ions.

The advantages of such a mixture consist in the elimination of obnoxious amounts of ammonia, reduction in the rate of change in naturally occurring chemical constituents when the latex is kept for long periods and an economy in the cost of preserving latex

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due to the small quantities of materials required for efficient preservation.

In one manner of practising the invention, to fresh field latex is added 0.2% by weight calculated on the latex, of ammonia. The latex is desludged by standing overnight and centrifuged the following day to give a concentrate containing ammonia about 0.1%. To this concentrate containing about 60% dry rubber is added sodium pentachlorophenate and ethylenediamine tetra acetic acid, each 0.1% calculated on the concentrated latex.

The ammonia may be replaced by molecular equivalents of other bases namely, potassium hydroxide, mono- and di-ethylamine, tri-methylamine, morpholine or triethanolamine, and other chlorphenols may be used as bactericide or acriflavine may be employed.

Sequestering agents that have been found to be effective in conjunction with ammonia 0.1% and sodium pentachlorophenate 0.1% are the following acids or their sodium salts:—

Ethylene diamine tetra-acetic acid	0.1 to 0.3%
1 : 2 Propylene diamine—tetra-acetic acid	0.1 to 0.3%
Amino trimethyl tricarb-oxylic acid	0.3 to 0.5%
Methyl amino tricarboxylic acid	0.3 to 0.5%

If the content of sodium pentachlorophenate is increased to 0.2% any one of the following sequestering agents can be used in the concentration range 0.1 to 0.3%:—

Anthranilic N : N diacetic acid
Amino diacetic acid
Methyl imino diacetic acid
Nitrolo triacetic acid
Uramil N : N diacetic acid

Sodium pyrophosphate
Sodium tripolyphosphate
Sodium hexametaphosphate.

By the present invention improved methods of preserving concentrated latex are obtained.

WHAT WE CLAIM IS:—

1. A method of preserving latex consisting in adding ammonia or equivalent molecular proportion of another alkali in an amount to leave about 0.1% and less than 0.2% by weight (calculated on the latex) when the latex is concentrated, concentrating the latex to about 60% D.R.C. and then adding up to 0.2% by weight of a bactericide such as sodium pentachlorophenate to keep the latex free from bacteria and a sequestering agent to remove the coagulating ions.

2. A method of preserving latex according to the preceding claim wherein the ammonia is added to fresh field latex which is subsequently centrifuged to give a concentrate containing about 0.1% ammonia and to this is added sodium pentachlorophenate and ethylenediamine tetra acetic acid, each 0.1% by weight calculated on the concentrated latex.

3. A method of preserving latex substantially as described.

4. Concentrated latex when preserved by the presence of less than 0.2% by weight ammonia in association with a bactericide and a sequestering agent substantially as described.

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for long periods against decomposition and coagulation. Such concentrations of ammonia in latex are however undesirable because (1) the latex has a pungent odour with an irritant action and is objectionable to handle, (2) much of the free ammonia must be eliminated or neutralised before the latex can be used in many manufacturing processes, and (3) the high alkalinity imparted by the latex accelerates hydrolytic changes in the non-rubber constituents of the latex, for example the proteins and lipins, and these chemical changes in turn alter the technological behaviour of the latex.

In spite of these disadvantages ammonia has become established as the most popular

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30 0.1 p.c. calculated on the latex of ammonia or equivalent alkali such as tri-ethanolamine

in association with similar amounts of a bactericide such as sodium pentachlorophenate to keep the latex free from bacteria and a similar amount of the sodium salt of ethylene diamine tetra acetic acid or other sequestering agent to remove coagulating ions. The amount of bactericide depends on the potency of the compound used and in the case of some acriflavine dyes may be as little as 0.01 p.c. calculated on the latex.

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