

A NOTE ON A SIMPLE METHOD OF CONTROL OF LATEX COAGULATION

By

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The amount of acid required for coagulation of latex is not a constant figure but depends on various factors such as the amount and type of anticoagulant used in the field, the nature of the clone, the weather, the quality of the water used, the distance to the factory, the dilution, the time of coagulation, etc., and may therefore vary from day to day. These factors make it difficult for the rubber maker to determine daily the optimum amount of acid required for coagulation. Experience may enable him to estimate the required amount, but sometimes this results in too much acid giving a hard coagulum, which may cause difficulties in the milling of sheets, or in too little acid, resulting in a milky serum entailing a loss in rubber and a liability to bacterial action.

Both extremes, too much or too little acid, may influence the quality of the final product and reduce the outturn of first grade rubber. A well performed coagulation should give a clear or slightly opaque, yellowish coloured serum.

The coagulation of latex by the addition of acids is a result of the precipitation of the protective layer of proteins around the rubber globules in the latex by a lowering of the pH. Proteins in alkaline solution (high pH value) have a negative electric charge and in acid solution (low pH) a positive electric charge. Between these exists a certain pH, the so-called iso-electric point, where the electric charge is zero and the precipitation of the rubber particles, having the electric charge of the protective layer, occurs. This minimum solubility of the latex proteins is in the region of pH 4.5 to 4.8.

Depending on the required hardness of the coagulum, *viz.*, for sheet or crepe manufacture, and the milling, *viz.*, the same day or the following day, the suitable pH for coagulation is therefore approximately between 4.4 to 4.8. In order to ensure a proper coagulation it is therefore desirable to control the pH of the latex after the addition of the coagulant. A simple and quick determination of the pH can be done by means of Bromo Cresol Green indicator, which changes colour according to the pH from blue through bluish-green and yellowish-green to yellow.

A coagulation at a pH of 4.8 proceeds quite slowly, resulting in a soft coagulum suitable for sheet manufacture. The serum may be slightly milky and the colour of the B.C.G. indicator paper will be bluish-green. If the pH is lowered to 4.6 the serum will be clear and the coagulum would be suitable for sheet or crepe manufacture. The colour of the B.C.G. indicator paper will be green. A lowering of the pH to 4.4, giving a yellowish-green colour of the indicator paper produces a clear serum and a harder coagulum suitable for crepe manufacture. A blue colour of the indicator paper indicates insufficient acid and a yellow colour indicates an excess of acid.

Bromo Cresol Green test papers are best used by skimming the surface of the paper strip over the latex. One side will be coated with the latex and the colour indicating the pH will be clearly visible on the other side. Dipping into the latex will obscure the colour. If the latex is spotted on the indicator paper, the spot produced may vary in colour from the centre outwards, and some difficulties may be experienced in deciding the correct shade showing the actual pH.

Bromo Cresol Green indicator papers can be obtained in limited amounts from the Rubber Research Institute.

This article will shortly be issued as an Advisory Circular illustrated with a colour chart of pH values for use in the rubber factory,