EMERGENCY RUBBER COAGULANTS.*

The following notes are issued in view of the prevailing shortage of formic and acetic acids among small users. It is recommended that proprietary coagulants of unknown composition should be carefully scrutinized in relation to their coagulating power. For comparison it may be mentioned that the cost of coagulation with formic and acetic acids at the present controlled prices amounts to approximately 0.4 cents per pound of rubber.

Economical Use of Coagulants.

Under normal conditions it is recommended that the dose of acid used for coagulation should be such that a clear or only slightly cloudy serum remains. This dosage should not be exceeded and it may be justifiable under present circumstances to eke out supplies by reducing the quantity slightly. It should, however, be noted that the presence of a milky serum indicates that rubber is being lost.

Many small producers roll their rubber within a few hours of addition of acid to the latex. The amount can be reduced by approximately one-third if the latex is allowed to coagulate overnight.

It has been suggested from Malaya that economy can be effected by re-using a proportion of the serum. Tests of this method are being carried out at Dartonfield, but the results so far have been rather conflicting. In an initial trial moderately good coagulation was obtained when latex (previously diluted to a dry rubber content of 2¼ lb. per gallon) was treated with half its bulk of serum from the previous day's coagulation and the dose of acid was reduced to two-thirds of the normal quantity. In a later trial under similar conditions coagulation was incomplete even when three-quarters of the normal dose of acid was used, but a further trial now in progress is giving satisfactory results with two-thirds of the normal dose. It seems possible that the value of the method is affected by weather conditions. It can, however, be recommended for trial on estates.

Alternative Coagulants.

Sulphuric Acid.

Rubber manufacturers object to the use of sulphuric acid as a coagulant because the presence of an excess of acid in the rubber, which may easily occur under estate conditions, has an adverse effect on its vulcanizing properties. Nevertheless, sulphuric acid can be regarded as a reasonably satisfactory emergency coagulant, and it is, in fact, the only alternative material which is likely to be obtainable in adequate quantities for estate use at short notice.

Concentrated sulphuric acid (oil of vitriol) is extremely dangerous to handle and should be diluted to half-strength before issue to estates and retailers. The half-strength acid should be diluted before use as a coagulant in the proportion of one part of acid to 80 parts of water. *Dilution should be effected by adding the acid slowly to the water and not by adding water to the acid.* Approximately ½ pint of diluted acid is required to coagulate a rubber sheet weighing 1½ lb. (8 fluid oz. of half-strength acid in 4 gallons of water per 100 lb. of dry rubber).

* From the *Tropical Agriculturist*, Volume XCIII., Number 6, page 348.

The following points should be carefully noted when using sulphuric acid:—

(1) The quantity used for coagulation should be as small as possible. A slightly cloudy serum should remain after coagulation.

(2) The rubber must be thoroughly washed during and after milling to remove surplus acid. The latex should be diluted to a rubber content not exceeding 1½ lb. per gallon.

(3) Machinery is liable to be damaged by the diluted acid unless thoroughly washed after use.

Half-strength sulphuric acid is at present being supplied by a leading importer at Rs. 2 per gallon (exclusive of the cost of carboys). One gallon should suffice for the coagulation of approximately 2,000 lb. of dry rubber.

Vinegar.

Vinegar is a useful emergency coagulant but it is not likely to be available in large quantities. Toddy vinegar contains approximately 5 per cent. of acetic acid and 1 gallon will coagulate approximately 100 lb. of dry rubber. It may be used undiluted for crepe manufacture but should be diluted with an equal quantity of water for sheet making. Approximately ¼ pint of diluted vinegar is required to coagulate a rubber sheet weighing 1½ lb. Rice vinegar containing about 8 per cent. of acid is also available.

Coco-nut.

The milky fluid which occurs in the coco-nut ferments on standing and produces an acid liquor which can be used as an emergency coagulant. The maximum acidity, corresponding to about ½ per cent. acetic acid, develops in 3-4 days, after which a reduction of acidity takes place. This material and other plant extracts referred to in a later paragraph should be strained through clean cloth before use to remove any solid matter. Approximately one "bottle" (⅙ gallon) of the fluid is required to coagulate a rubber sheet weighing 1½ lb.

Pyroligneous Acid.

Pyroligneous acid containing approximately 10 per cent. of acetic acid, together with other products, is obtained by the distillation of wood or similar material such as coco-nut shells. The practicability of preparing an improved material from coco-nut shells at an economic price is being investigated by the Coco-nut Research Scheme, in conjunction with the Department of Industries, but commercial supplies are not available at present.

Sugar.

When undiluted latex containing a small quantity of sugar is allowed to stand overnight the sugar ferments and moderately complete coagulation occurs. This form of coagulation does not produce first-grade rubber; crepe is off-colour owing to the absence of sodium bisulphite and the sheet is "bubbly". However, the method may be useful, especially to small holders in case of a severe shortage of coagulants.

For the preparation of a rubber sheet weighing 1½ lb., 1¼ oz. of sugar (half match box full), dissolved in ¼ pint of water, should be added to ½ gallon of undiluted latex. (One pound of sugar in 2 gallons of water per 100 lb. of dry rubber.)

Other Coagulants.

Lime juice contains 5-10 per cent. of citric acid and may prove useful as a coagulant for small holders. The juice of 3-6 limes, depending on ripeness and juiciness, is required for the coagulation of a rubber sheet weighing 1½ lb.

Various other plant juices and extracts are stated to be used by small holders when normal coagulants are unobtainable or unduly expensive. *Goraka* fruits, when extracted twice by boiling with water, were found to have an acid content of approximately 10 per cent. The extract from 1 lb. of semi-dried *goraka* fruits would thus suffice for the coagulation of 20 lb. of rubber. *Weera* and *kamaranga* fruits also yield acid extracts.

No great objection can be raised to the use of such products in an emergency, but vinegar or coco-nut water are considered preferable.

Under the present exceptional conditions it may be necessary as a temporary measure for some producers to vary their normal methods of coagulation. *It is, however, very strongly urged that normal procedure should be resumed at the earliest possible moment with a view to maintaining the Island's reputation for producing good-quality plantation rubber.*

THE TROPICAL GRASS, "MELINIS MINUTIFLORA", AS A PREVENTATIVE AGAINST MALARIA AND OTHER TROPICAL DISEASES.

It is recommended that Gordura grass, *Melinis minutiflora,* should be planted around all dwelling-houses in Venezuela, as a protection against malaria and tick-borne diseases of animals, as mosquitoes are almost completely absent from pastures planted with this grass as long as it is in the green stage, and cattle covered with ticks when entering such pastures become free after a few weeks. The grass, which is rich in protein, and, therefore, is extensively planted for fattening animals, is rather coarse for sheep, but suitable for cattle, horses and mules. Although generally used for pasture it can also be cut for fodder. It cannot be grown on swampy ground, but thrives on arid soil. It has a peculiar penetrating odour and contains an oily substance, which probably accounts for its "anti-verminous" effects. At the height of the dry season, on exceptionally arid soil, the stems may get dry and a good deal of the oily contents disappears, in which case some pests, particularly ticks, may be found in the pasture.—(*Extract from "The Review of Applied Entomology", December,* 1940.)