NOTE ON STABILIZED BLEACHING POWDER FOR TROPICAL USE.

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Hitherto users of bleaching powder in the tropics have experienced great difficulty in obtaining samples of that substance in good condition owing to its decomposition by heat and moisture.

Experiments were carried out by Rettie, Smith and Ritchie, the results of which were published in the Journal of the Society of Chemical Industry, XXVII, No. 23, 1918, pp. 311 T and 392 R. Under laboratory conditions mixtures of lime and bleaching powder were shown to possess a resistance to heat and moisture sufficient to withstand storage in a tropical climate.

This note shows the results of practical tests on a "lime-bleach" stored under ordinary conditions in various tropical countries.

(1) Laboratory Experiments.—It was found by experiment that an intimate mixture of twenty parts by weight of finely-powdered, freshly-burnt quicklime and eighty parts of the ordinary bleaching-powder as supplied to the Army, made a satisfactory mixture. The powder did not cake, lost practically no chlorine, and did not corrode the interior of a sealed tin when subjected to a moist heat of 50° C. for several weeks.

Experiments were also made to ascertain the effect of exposing the powder to air after the tin was opened, and the results were as follows: In the open tin in the laboratory at 60° F., the mixture lost 0.45 per cent of available chlorine in nine days.

A heap of powder exposed for three weeks in the laboratory lost 16.2 per cent of available chlorine on the outer layer, ½ inch deep; the interior of the heap lost 1.6 per cent.

An opened tin in the incubator at 50° C. with the air saturated with moisture lost about 1 per cent of available chlorine in a week. The available chlorine in a control sample of ordinary bleaching powder, initially about 35 per cent, fell to 4.9 per cent under the same conditions.

(2) Practical Tests.—Samples of the 20 per cent lime mixture were made up in the laboratories of Messrs. The United Alkali Company and were sent to stations abroad in four-ounce tins with press-in lids and discs soldered hermetically over them, and also in four-ounce stoneware jars with ground lids sealed with paraffin wax.

The initial content of available chlorine before despatch was 25.2 per cent. The tins were stored under ordinary conditions, and fresh tins were opened on the spot from time to time and the contents examined. At the end of a year sample tins were sent home for examination and it was found that:

(a) The powder was in a good condition, dry and not caked.
(b) There was no internal rusting or corrosion of the tins.
(c) The available chlorine content varied from 23.6 to 24.8 per cent.
The results of tests on the spot were as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Mesopotamia</th>
<th>Sierra Leone</th>
<th>Egypt</th>
<th>Egypt (stored in sun)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tins</td>
<td>Jars</td>
<td>Tins</td>
<td>Jars</td>
</tr>
<tr>
<td>July, 1921</td>
<td>25:0</td>
<td>24:6</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>October, 1921</td>
<td>24:4</td>
<td>23:0</td>
<td>24:2</td>
<td>25:0</td>
</tr>
<tr>
<td>April, 1922</td>
<td>24:0</td>
<td>24:5</td>
<td>23:8</td>
<td>24:7</td>
</tr>
</tbody>
</table>

We have to express our thanks to those Royal Army Medical Corps officers who carried out these analyses abroad.

(3) Manufacture.—When ordinary bleaching powder is made, the water present during the reaction must always be slightly in excess of the quantity necessary for the hydration of the lime. When powdered quicklime is added to ordinary bleaching powder, this excess water slakes the added lime and heat is evolved. If hydration takes place gradually and the heat produced can escape quickly, the temperature does not rise to the decomposition point of the active chlorine compound. After the excess water has been taken up, and the heat thereby produced dissipated, the mixture is stable even in the tropics.

No difficulties were encountered in the preparation of the lime-bleach mixture on a laboratory scale, but on a large scale Messrs. The United Alkali Company found that the mixture tended to “fire” and rapidly to lose available chlorine. This difficulty was minimized by storage of the lime-bleach mixture at the works under carefully controlled temperature conditions until stable. Further experiments are being made to improve the method of reaching stability.

Conclusions.—Rettie, Smith and Ritchie’s results have been confirmed by practical tests. The bleach stabilized with twenty per cent of quicklime will stand ordinary storage in tropical climates in four-ounce sealed tins, and after opening will not deteriorate to any appreciable extent in a few days.

Package in stoneware jars has no advantage over sealed tins.

As a result of these experiments, this stabilized bleach (twenty of quicklime and eighty of bleaching powder) has been adopted as a future service issue for water sterilization.