A NOTE ON THE LOSS OF AMMONIA FROM FERTILIZER MIXTURES

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IN *The Tropical Agriculturist,* Vol. XCII, No. 4, April, 1939, page 220, one of us (M. L. M. Salgado) reported nitrogen losses of a serious nature on storage of fertilizer mixtures containing saphos mineral phosphate, sulphate of ammonia and muriate of potash. This appeared to be contrary to a reference to the problem made previously in the Annual Report of the Tea Research Institute (Bulletin No. 12), 1934, page 17. As a result of consultation between the Coconut Research Scheme and the Tea Research Institute it was agreed that, in order to resolve the apparent difference in opinion, more detailed investigation of possible controlling factors was necessary.

A detailed joint investigation was therefore planned to examine the following points :—

(1) The behaviour of mineral phosphates derived from different sources, since the chemical composition of the original rock is known to vary with its place of origin.

(2) The effect of the state of division of the sulphate of ammonia.

(3) The effect of the addition of a " conditioner " (10 per cent. of castor cake) to the mixture.

(4) The effect of varying the proportions of the constituents, with special reference to muriate of potash.

(5) The possible influence of climatic conditions particularly temperature and humidity.

We were able to obtain locally by the help of local fertilizer distributors adequate consignments of the following mineral phosphates, Saphos A, Saphos B (A and B representing two different shipments of the same mark), Gafsa, Ephos, and Egyptian. Sulphate of ammonia is marketed in two forms known as " granular " and " rice crystal " and we have compared duplicate mixtures containing these respectively.

The mixtures upon which we have worked were in two series corresponding respectively to the types used on coconut and tea estates. The actual proportions of the various constituents were as follows :—

	Coconut.			Tea.		
	S/Amm.	Phosphate	Mur/Pot.	S/Amm.	Phosphate	Mur/Pot.
Normal	4	4	2	2	4	1
High Potash	4	4	4	2	4	2

All possible combinations of the quantities and types above-mentioned, eight in all, have been investigated in 25 lb. lots. In addition, with the courteous assistance of a commercial firm (which we cordially acknowledge), we have been able to examine the losses occurring in eight saphos mixtures (coconut series) under commercial conditions of mixing, bagging, and storage. The Tea Research Institute prepared, stored, and analysed the 40 samples of the tea series, and the Coconut Research Scheme similarly dealt with the 40 samples of the coconut series. The latter station dealt with the sampling of the commercial series, whilst as an additional check the Tea Research Institute duplicated the eight Saphos A samples of the coconut series. All samples were examined for moisture and nitrogen content initially, and after intervals of 9 and 30 days respectively. The commercial samples were in addition examined after 60 and 90 days, and the tea mixtures after 60 days. Methods of preparation, sampling and analysis were jointly standardized.

The preparation for publication of the considerable amount of data accumulated will of necessity take some time. We feel, however, that in view of the inquiries that have been received by the two stations since the original note was published (*loc. cit.*), an interim report is desirable, particularly since similar work in the same field by P. A. Keiller appears in this number of *The Tropical Agriculturist.* By the courtesy of Mr. Keiller we have been able to see a copy of his paper in advance of publication.

It may be said at once that we have found in no case losses comparable with those previously reported; and in fact such losses as we have observed are very similar in magnitude to those recorded by Mr. Keiller. As typical of the results obtained, the following example shows the average loss found on the eight saphos A laboratory samples of the coconut series :—

Nitrogen Contents of Stored Manure Mixtures.

	On mixing.	After 9 days	After 30 days	Total gain or loss.
Nitrogen content (per cent. on dry)	7·47	7·50	7·30	— 0·17
Moisture content per cent.	2·24	4·26	7·92	+ 5·68

Our observation that the commercial samples picked up much less moisture (per cent.) than the 25 lb. samples (an increase of 2·04 per cent. as against one of 5·68 per cent.) makes it highly probable that the greater loss of nitrogen from the smaller samples of 1 lb. weight used in the original investigation (*loc. cit.*) was due to the more rapid uptake of moisture from the very earliest stages.

It now seems clear that the previous findings reported in this journal were based on preliminary results obtained from samples which were too small for practical purposes. This may also apply to the Malayan work referred to previously.

The detailed results of our findings will be published in due course but we can state at this point that, in the light of this more comprehensive investigation, there is no reason to fear appreciable loss of nitrogen from manure mixtures containing mineral phosphate, sulphate of ammonia, and muriate of potash, stored under reasonable conditions.