

as carbonate of lime may be used to improve the mechanical condition of the mixture and enable it to run easily through the drill. Occasionally excessive amounts of filler are used; mixtures containing about half their weight of ground limestone have come under notice, the percentages of the active fertilizer ingredients being, of course, proportionately reduced. On the other hand, some manufacturers use no fillers in their mixtures, the desired granularity being obtained by using suitable proportions of ground rock phosphate, or by other means.

The fineness of grinding of basic slag and ground rock phosphate is shown in the invoice certificate, the figure indicating the percentage of the fertilizer that will pass through a standard sieve having 10,000 holes to the square inch. A minimum fineness of 80 per cent. is required by the Fertilizers Act regulations.

STATEMENT OF SOLUBILITY.

Figures indicating the solubility of fertilizer ingredients appear to perplex many farmers. The solubility of nitrogenous fertilizers is not difficult to understand; such fertilizers as nitrate of soda and sulphate of ammonia contain water-soluble nitrogen, while the nitrogen of animal fertilizers is in the insoluble form. Generally, no alteration in solubility occurs when nitrogenous fertilizers are used in mixtures (the addition of lime, however, will result in the loss of nitrogen from ammonia compounds and animal fertilizers). In the case of potassic fertilizers, only water-soluble potash compounds are recognized as fertilizers, and these also do not alter in solubility when incorporated in the usual mixtures. Phosphoric acid may be recorded in the invoice certificate as soluble in water, insoluble in water, or soluble in citric acid. The usual source of water-soluble phosphoric acid is superphosphate, although some of the new concentrated fertilizers contain soluble compounds of phosphoric acid with nitrogen or potash.

It is sometimes asked why an invoice certificate of a mixed fertilizer shows little or no water-soluble phosphoric acid, although the statement of components shows that a fair amount of superphosphate is present. The reason is that the water-soluble phosphate changes (reverts) more or less to a form that is insoluble in water but is still easily soluble in weak acids and is readily accessible to the plant. The well-known basic superphosphate is an instance of the water-soluble phosphate being reverted deliberately, by the addition of lime. Since this reversion of soluble phosphoric acid goes on slowly from the time the fertilizer is mixed, the manufacturer in his invoice certificate allows for the maximum reversion that is likely to take place, and records the soluble phosphoric acid on the low side. Actually, unless lime has been used as filler, there is not usually much reversion if the fertilizer is used reasonably soon after mixing.

The solubility in citric-acid solution (citric solubility) is the cause of considerable confusion of mind, on account of the practice of some sellers of quoting figures showing the citric solubility of their fertilizers by "modified" methods. Citric solubility is determined by shaking for a definite time a mixture of definite quantities of fertilizer, citric acid, and water. By varying the respective quantities and the time of solution, varying degrees of solubility can be obtained. It is necessary, therefore, to have a standard method of procedure in order that solubility results may be compared. The Fertilizers Act regulations