indicator crops will be the subject of later publications.

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Physiological Effects of the Volatile Products of Respiring Potatoes

It has long been known that the dormancy of potatoes may be prolonged by volatile substances evolved by ripe apples¹. The active substance may be ethylene, which is evolved by ripe apples² and which retards the sprouting of potatoes³. Ethylene is also found in the volatile products of bananas⁴, avocados⁵, pears⁶, and various citrus fruits⁷. In view of these observations, it now appears that the physiological effects caused by the accumulation of respiratory products are not necessarily due to the presence of carbon dioxide, though this assumption has been made^{8,9}. The prolongation of the dormancy of potatoes is one of the effects which have been attributed to the accumulation of respiratory carbon dioxide¹⁰.

During recent work it has been shown that if the volatile metabolic products of potatoes were allowed to accumulate, the sprouting of potatoes was retarded. If, however, the carbon dioxide alone was allowed to accumulate, but the other volatile products were removed by circulating the atmosphere through 96 per cent sulphuric acid containing 2 per cent w/v silver sulphate, sprouting was stimulated. This effect could possibly have been due to oxygen depletion, though this is improbable. Sprouting was markedly retarded by scrubbing out all the carbon dioxide in the storage atmosphere but allowing the other volatile metabolic products to accumulate. These results are illustrated in the accompanying table. Further work has indicated that two groups of growth-inhibiting volatile substances are evolved by stored potatoes. The members of one group are absorbed in 96 per cent sulphuric acid, which does not, however, absorb the members of the second group. The latter, which may be absorbed in 96 per cent sulphuric acid activated by silver sulphate, are

EFFECT OF STORAGE ATMOSPHERE UPON THE SPROUTING OF MAJESTIC POTATOES STORED FOR 15 WEEKS AT 10° C.

Storage atmosphere* Carbon dioxide (%)	Oxygen (%)	Volatiles other than carbon dioxide	Wt. of sprouts as % of that of sprouted tubers	Length of storage in exp. atmosphere (days)
5.6-7.3	12.9-14.5	Absent	3.4	76
0.03	20.8	Absent	1.2	95
4.8-7.1	12.9-15.0	Present	0.8	76
0.0	16.8-19.8	Present	0.0	95

* Analysis of air entering the potato containers. In every case the atmosphere was circulated through the containers (holding 31.7-31.8 kgm. potatoes) and the absorbing system at a rate of about 20 litres an hour. The oxygen was replenished as used.

probably olefines and, by analogy with fruit³, this group may consist almost entirely of ethylene.

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Bacteriophage Inactivation by Antiphage Serum Diluted in Distilled Water

THE fraction f of bacteriophages remaining active t minutes after having been mixed with antiphage serum may be expressed by the following relation¹:

$$f = \exp(-kt/D), \quad (1)$$

in which D represents the dilution of the serum. The rate constant k , therefore, is a measure of the potency of the serum. Usually, k is determined by diluting the serum and the suspension of virus particles in nutrient broth or buffered saline, in which media a good serum may, at 37° C., show a k -value of 500-1,000 per min. Hence, in order to reduce the fraction of surviving virus particles, f , to less than 1 per cent within an hour, such a serum cannot be diluted by more than 10⁴.

I have found that nutrient broth and buffered saline must contain factors which inhibit the inactivation of bacteriophages by antiphage serum, as the rate of inactivation can be greatly increased by making the reaction take place in distilled water. Moreover, the interaction of phage with antiphage appears to require the presence of a third factor, since very high dilutions of antiphage serum in distilled water will not cause observable virus inactivation, unless small amounts of normal serum, or of peptone, are added.

Thus, rabbit antiphage serum (showing a k -value of 600, in broth), diluted by a factor of 10⁶ in distilled water, can be mixed with a suspension of bacteriophages in distilled water, without the occurrence of observable inactivation. Rapid inactivation, corresponding to a k -value of 100,000 or more, will follow when normal serum at a concentration of 20-1,000 gamma per ml., or peptone at a concentration of 50-2,000 gamma per ml., is added to such a mixture. Higher concentrations of these substances have been found to inhibit the process of inactivation. Concentrations of monovalent ions exceeding about 10⁻² molar, and of calcium ions exceeding about 10⁻³ molar, were also found to be inhibitive. The general shape of the inactivation curves, when making the reaction proceed in distilled water, is the same