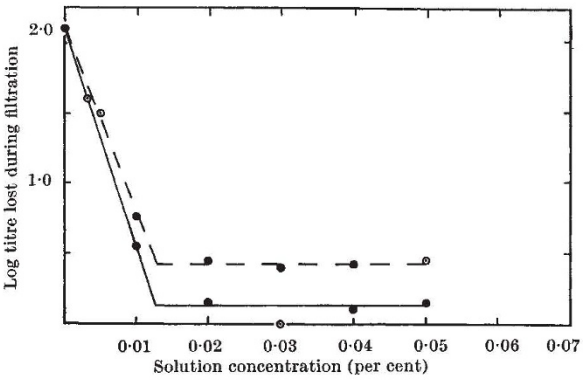

Fig. 2. Filtration of foot-and-mouth disease virus through treated asbestos filters. Mean values, ●; single values, ○; sodium alginate solution, ——; gelatin solution, – – –

infective component of the former virus being a roughly spherical particle 20–25 mμ in diameter, whereas that of the latter virus is a short rod-shaped body having an effective filtration diameter of 80–100 mμ. Nevertheless, more virus was lost in pads treated with gelatin solutions than in the corresponding pads of the sodium alginate series (Fig. 2). Irrespective of the concentrations used, it was impossible to reduce the filtration losses to less than about 0·15 log unit with sodium alginate or 0·43 log unit with gelatin.

These observations, together with the apparent inability of sodium alginate to act as an antigen, indicate that pre-treatment of asbestos filter pads with 0·04–0·05 per cent solutions of sodium alginate is a valuable means of minimizing adsorption losses during filtration of virus suspensions. The inferior results obtained with the protein, gelatin, may justify attribution of this effect to the sodium alginate *per se*, and not to the presence of infinitesimal amounts of protein impurity in the solutions used for treatment of the filters.

I am indebted to Dr. F. Brown for the protein estimations.

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SOIL SCIENCE

Factors influencing the Composition of the Cellulose-decomposing Microflora on Soil Crumb Plates

Although many soil micro-organisms can decompose cellulose[1], each group of organisms does so under its own set of conditions. For example, *Cellvibrio* and *Cytophaga* develop around soil crumbs placed on filter paper which covers a mineral silica-gel medium, as shown by Winogradsky[2]. Other workers have reported that cellulose-decomposing fungi were the first organisms to attack 'Cellophane' buried in the soil[3].

It was sought to determine what causes one or the other species of the cellulose-decomposing flora to predominate and whether this is due to differences in technique or in the cellulose substrate used. For this purpose the composition of the cellulose-decomposing soil flora on filter paper and on 'Cellophane' were compared under the same conditions. Strips of filter paper (Whatman No. 1) and strips of 'Cellophane' (*PT* 300, British Cellophane Co.) were placed on mineral agar solidified in Petri dishes. Soil crumbs taken from the same soil sample were spread on strips of filter paper and 'Cellophane', respectively, and the Petri dishes were incubated for a few days at 30°.

Bacteria only (mostly *Cellvibrio*) developed on the plates covered with filter paper, while cellulose-decomposing fungi (mostly *Stachybotrys*) predominated on 'Cellophane' plates.

The failure of *Stachybotrys* to appear around soil crumbs on the filter paper could not be explained by its inability to attack the substrate, because a pure culture of *Stachybotrys* grew well on filter paper. To elucidate this question, the possibility of the bacterial growth interfering with the fungal growth was investigated. Soil crumbs were spread on filter paper placed on mineral agar plates containing 100 μgm./ml. chloramphenicol to inhibit bacterial growth, when only cellulose-decomposing fungi, especially *Stachybotrys*, developed.

In further tests a pure culture of *Stachybotrys* spores was mixed with a pure culture of *Cellvibrio* and the mixture inoculated on strips of filter paper on mineral agar. Under these conditions *Stachybotrys* failed to develop, or grew poorly, demonstrating the strong inhibitory effect of *Cellvibrio*.

Dobbs and Hinson[4] show that soil has a strong inhibitory effect on the germination of fungal spores; thus it was of interest to see whether *Cellvibrio* inhibited the germination of *Stachybotrys* spores. Direct microscopic observations of *Stachybotrys* spores in the presence of *Cellvibrio* showed that, although the spores germinated normally, growth was arrested after the development of the germination tubes. *Cellvibrio* inhibited the growth of the fungus only on media containing cellulose as the sole carbon source, and not when glucose or cellobiose was present.

No filtrable or diffusible substances responsible for the antagonism were detected. Direct contact between both organisms seems to be necessary to get the effect.

The predominance of fungi in the flora of soil crumbs spread on 'Cellophane' could easily be explained when it was shown that a pure culture of *Cellvibrio* either failed to grow, or grew only slightly, when 'Cellophane' was used as the substrate.

'Cellophane' has been much used recently in investigations of the cellulose-decomposing soil flora[3]. It is therefore important to point out that this substrate does not equally support the development of all the cellulose-decomposing micro-organisms, but seems to be more of an enrichment medium for the selection of cellulose-decomposing fungi.

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