

S 80/81 strains, which made up 60 per cent of the total number of cultures investigated, were similar in their essential amino-acid requirements, namely: histidine, arginine, valine and cystine, while slight differences were noted in their semi-essential, accelerator and non-essential groups. In addition the antibiotic pattern of the *S* 80/81 strains were found to be similar in that they were sensitive or resistant to the same antibiotics. In general, the virulence of each strain, as indicated by lesion size after subcutaneous inoculation of standardized suspensions, appeared to be related to their ability to produce the clotting enzyme and haemolysin.

Preliminary data based on our results so far obtained indicate that the experimental induction of resistance which might be developed by cultures of *Staphylococcus aureus* to one or more antibiotics is reflected in specific and similar changes in their amino-acid requirements as well as their phage types.

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graphic extraction by the technique of Adam, Hardwick and Spencer⁷ and amounts ranging from 0.06 to 2.5 µg/ml. histamine base were obtained. There was no correlation between histamine content and kinin-forming activity of the samples.

In other experiments (Sanford and Weipers, unpublished), we have shown that many samples of peritoneal fluid were highly toxic when injected intravenously into healthy dogs. Toxic samples were found to cause slow contractions of guinea pig ileum and, with one exception, also showed kinin-forming activity.

We have no evidence to suggest that the presence of a slow contracting substance and a kinin-forming enzyme in peritoneal fluid is in itself responsible for the toxicity of such samples. These findings may, however, indicate an increased permeability in the wall of a loop resulting from the pathological changes which occur.

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VETERINARY SCIENCE

Demonstration of Kinins in Intestinal Obstruction in Dogs

In the course of an investigation into the cause of death in intestinal obstruction in dogs, we have examined material obtained from dogs with isolated loops prepared by the technique of Harper and Blain¹. Such material is known to be toxic when injected intravenously in small quantities into healthy dogs²⁻⁴. In attempting to define the nature of the toxic substance, we have examined its effect on isolated smooth muscle. Peritoneal fluid and loop contents from some dogs caused slow contractions of smooth muscle which were not abolished by atropine, mepyramine or lysergic acid diethylamide. Material was diluted 10-100 times and was applied directly to a guinea pig ileum preparation at 35° C. Contractions were slow in onset and reached a maximum in about 1 min. On changing the fluid in the tissue bath the muscle relaxed within 1-2 min. Similar, but less potent, activity was also shown by intestinal contents of normal dogs.

In a further examination of this material, samples were incubated for 5 or 10 min at 35° C with an equal volume of dog pseudoglobulin⁵ dissolved in Tyrode solution (1 mg/ml.). This resulted, in some cases, in the formation of a slow-contracting substance, presumably a polypeptide similar to bradykinin. The potency of incubated samples, which has been estimated in terms of pure bradykinin, ranged from 0.01 to 0.125 µg/ml. Incubation of samples for longer than 15 min resulted in a loss of activity, and kinin formation was completely inhibited by the addition of soya bean trypsin inhibitor. Enzymatic activity was found in some samples which contained slow-contracting substance, but was also present in others which were inactive before incubation.

It is well known that samples of peritoneal fluid and loop contents obtained from dogs having intestinal loops often contain free histamine⁶. The histamine content of each sample has been estimated following chromato-

SOIL SCIENCE

Distribution of Monocalcium and Monoammonium Phosphate Reaction Products in a Calcareous Saskatchewan Soil

THE early radioactive tracer investigations of Dion *et al.*^{1,2} revealed that under prairie conditions monoammonium phosphate (MAP) supplied phosphorus more rapidly to crops, such as wheat, oats and barley, than did monocalcium phosphate (MCP). Recent short-term absorption investigations³ with a calcareous Saskatchewan soil treated with pelleted MAP and MCP again showed the former source to be superior.

Water-soluble phosphorus fertilizers such as MAP and MCP when added to moist soil react with it to form less-soluble reaction products. Beaton and Read⁴ believed that the following characteristics of soil-fertilizer reaction products influenced uptake of phosphorus by plants: (a) chemical composition; (b) quantities formed; (c) surface area; (d) distribution in the soil. The reaction products formed from MAP and MCP in the Bradwell soil, which was used in the short-term uptake examination, have now been identified. The major initial reaction product of MAP was dicalcium phosphate dihydrate (DCPD)⁴, while mixtures of DCPD and anhydrous dicalcium phosphate (DCPA) were formed from MCP⁵. Although these two sources form essentially the same reaction products, the response obtained with them has been quite different as noted here. Consequently, a simple demonstration was set up to determine if there was any difference in the distribution of the reaction products of MAP and MCP in the Bradwell soil.

A surface sample (0-6 in.) of the Bradwell very fine sandy loam was used. This soil, which is a member of the dark brown great soil group, had the following properties: pH=7.7, 6.6 per cent calcium carbonate, 6 p.p.m. of sodium bicarbonate extractable phosphorus and 1.4 per cent total carbon. Soil moistened to 0.8 bar (13.6 per cent moisture) was added to 8 oz. screw-cap specimen jars. The jars were filled to the top with soil so as to facilitate