SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE USE OF FIBROUS SODIUM PECTATE AS A SUBSTITUTE FOR AGAR IN BACTERIOLOGICAL GELS

THE war has stopped importation of agar and, because facilities for its manufacture in America are not sufficient to meet the demand, the development of a suitable substitute for use in bacteriology is of extreme importance.

In this laboratory certain mixed metallic salts of fibrous pectic acid have proved satisfactory. The preparation and properties of fibrous sodium pectate have been reported by Baier and Wilson.[1] It should not be confused with the ordinary granular form which is not suitable for the purpose described. Fibrous sodium pectate may be purchased on the market[2] but is more satisfactory if purified by suspending it in 60 per cent. alcohol, adjusting the pH of the suspension to 7.5 with sodium hydroxide, filtering the pectate and drying it *in vacuo* at 60° C.

In preparing a nutrient gel, fibrous pectate to make a 2.5 per cent. solution is added to a nutrient broth which should contain 2 mg of calcium ion per gram of pectate in addition to the amount already present in the broth. A test should be made on the nutrient broth with a calcium salt to be sure that no ions are present which precipitate calcium, since that ion is necessary for the formation of the gel. Complete dispersion of the pectate is obtained by heating the mixture above 80° C. The medium is sterilized in the usual manner.

When preparing counting plates care must be taken to insure complete mixing of the bacterial suspension and pectate medium, which is somewhat more viscous than a similar agar medium. Plates should be allowed to stand at least 30 minutes prior to inversion and incubation. Pour-temperature after one autoclaving is between 45 and 50° C. The medium can be remelted in an autoclave, but each remelting raises the gelling temperature five to ten degrees.

Nutrient gels prepared with sodium calcium pectate show a smaller change of pH on sterilization than do similar agar gels. The water retention ability is slightly better than that of agar. Most organisms tested grow on pectate media without causing liquefaction and the fact that some do cause liquefaction may offer a means of differentiating them. Many tests[3] have been made on the action of microorganisms on pectate media, typical results being illustrated in Table 1.

TABLE 1

ACTION OF MICROORGANISMS ON PECTATE MEDIA

Microorganism	Growth	Liquefaction
Bacillus danicus	good	none
Escherichia coli	"	"
Pseudomonas fluorescens	"	"
Proteus vulgaris	"	"
Staphylococcus albus	"	"
Aerobacter aerogenes	"	"
Salmonella enteriditis	"	"
Bacillus subtilis	"	positive
Sporosarcina ureae	"	"
Vibrio cholerae	fair	none
Leuconostoc dextranicus	poor	"

The results in Table 1 are a representative sample of the 58 organisms tested. The growth of molds has not been tested on pectate media in this laboratory; however, the Fermentation Division, Northern Regional Research Laboratory, Peoria, Illinois, has reported that a number of molds grew well on them. Only three of those examined, *Rhizopus oryzae,* an *Aspergillus niger* and a *Penicillium italicum,* liquefied the pectate.

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[1] W. E. Baier and C. W. Wilson, *Ind. Eng. Chem.*, 33: 287, 1941.

[2] California Fruit Growers Exchange, Ontario, California.

[3] We express our appreciation to Ruth M. Chesbro, R. O'Neal and C. S. York, Department of Bacteriology, University of California, for their bacteriological testing.

BOOKS RECEIVED

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