

incubated at 37° C. for different periods and the milk-clotting activities of the mixtures determined.<sup>9</sup> Typical results obtained with penicillin-papain system are presented in Table I.

TABLE I  
Inhibition of the milk-clotting activity of papain by Penicillin

Penicillin in O.U. per c.c. (cup plate method)*	Time in seconds for clotting after incubating the mixture for		
	15 minutes	30 minutes	60 minutes
Nil	31	31	31
500	70	111	140
250	54	83	125
100	40	45	50
50	39	41	45
20	32	35	37
10	32	33	34

\* The clotting times with the mixtures before incubation were found to be 31 seconds for all the mixtures studied.

Similar results were obtained for the Ficus enzyme-penicillin systems also.

Complete and instantaneous inactivation of the enzymes resulted on incubation with 0.2 mg./c.c. of allicin. When the concentration of the antibiotic was brought gradually to about 3.5 µg, results similar to those for penicillin were obtained. In the accompanying figure, results with allicin and Ficus enzyme are presented.

The above observations confirm the -SH nature of the enzymes studied. Attention has already been drawn to the inhibiting activity of allicin<sup>10</sup> on the starch-splitting activity of β-amylase, which has been shown to be another sulphhydryl enzyme.<sup>11</sup> These observations are being extended to other enzyme systems known to play an important role in cell-metabolism.

It is clear that the enzyme-inhibiting activities of antibiotics like allicin even in very high dilutions provides a quick and accurate method for their micro-assay.

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## UTILIZATION OF DESIZING WASHINGS FOR THE CULTURE OF INDUSTRIALLY IMPORTANT MICRO-ORGANISMS

FOR desizing textiles, the common practice is to impregnate the sized cloth with an active amylase solution. After standing overnight the cloth is washed in running water. The washings contain about 1 per cent. sugar besides dextrans and other soluble matter. Our studies in the preparation of bacterial amylase show that the washings could be utilised as a source of carbon for the cultivation of the industrially important micro-organisms.

Bacteria (*B. subtilis*, N.C.T.C., 2027 N), Yeast (*Torula utilis*, N.C.T.C., 3050) and actinomyces (*Actinomyces griseus*, Waksman's strain), which had been previously standardized for amylase formation,<sup>1</sup> food yeast manufacture,<sup>2</sup> and streptomycin production,<sup>3</sup> respectively were employed as test organisms for determining the efficiency of these waste liquids. The cultural conditions for the growth of these organisms were the same, except that the carbon supply in the culture medium was substituted by the equivalent amount of the desized washings on the basis of sugar present. The viscosimetric method\* was followed for determining the amylase activity. Yeast growth was observed by Turbidity measurements. The cup assay method, using a susceptible strain of *B. subtilis*, was employed for the assay of streptomycin. The comparative data obtained with the experimental and control media are given in Table I.

TABLE I

<i>B. subtilis</i>		Yeast growth		<i>Actinomyces griseus</i>	
Amylase units per 10 ml.* of medium		Galvanometric deflection		Units γ/c.c. on 10th day	
Exptl.	Contl.	Exptl.	Contl.	Exptl.	Contl.
100.0	120.0	200.0	176.0	100 γ	80 γ

\* One Amylase unit is that quantity of enzyme which, acting on a two per cent. starch solution at pH 7.0 and at 40° C., reduces the viscosity by 25 per cent. in 90 minutes.

The results show that the desized waste is a useful source of assimilable form of carbon for the micro-organisms. The difficulty of transporting large volumes of the waste could be considerably reduced either by slightly modifying the process of washing of the desized cloth or by using the washings on the spot.

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