

#### SUPPLEMENTAL VALUE OF BRAN EXTRACT IN PENICILLIN PRODUCTION

ORGANIC and inorganic supplements have recently been shown to influence the production of penicillin. Corn steep liquor<sup>1</sup> increases the yield of penicillin tenfold; 0.1 per cent. Difco yeast extract<sup>2</sup> exerts a similar effect. Aqueous extracts of freshly ground dried peas<sup>3</sup> constitute a good supplement for obtaining better mold growths and increased yields of the antibiotic. A two per cent. corn oil<sup>4</sup> is known to give an abundant and uniform mold growth and a higher quantity of penicillin. Trace elements, notably zinc<sup>5</sup>, are shown to augment the formation of penicillin.

An increased yield of penicillin and a reduction in the period of incubation, have both been secured by the employment of moist wheat bran.<sup>6</sup> More recently,<sup>7</sup> the inorganic ash constituents of the corn steep liquor have been shown to be partly responsible for influencing the production of penicillin.

As a part of the comprehensive programme of investigating the microbiologically active principles of the wheat bran, the effect of acid alcohol extracts of the material on penicillin production, has been investigated. Basal medium enriched with graded dosages of the extract calculated on the basis of total nitrogen, was employed and the experimental procedure and the method of assay followed during these studies, were similar to those described earlier.<sup>8</sup>

The basal medium was composed of: commercial glucose 40 gm.; sodium nitrate 3 gm.; potassium dihydrogen phosphate 1 gm.; mag-



TABLE I  
*P. notatum*—N.C.T.C. 1540. Test organism: *Staphy. aureus*—N.C.T.C. 2150.

Period of Incu- bation in days		Without extract	with extract corresponding to			
			0.2 mg. N <sub>2</sub>	0.4 mg. N <sub>2</sub>	0.6 mg. N <sub>2</sub>	0.8 mg. N <sub>2</sub>
4	pH after fermentation	5.2	4.8	4.7	4.6	4.8
	Antibiotic activity	Nil	Nil	Nil	Nil	Nil
5	pH after fermentation	5.2	4.8	4.7	4.6	4.4
	Antibiotic activity	243 sq. mm.	396 sq. mm.	270 sq. mm.	330 sq. mm.	396 sq. mm.
6	pH after fermentation	5.4	5.0	5.1	5.2	5.1
	Antibiotic activity.	243 sq. mm.	396 sq. mm.	300 sq. mm.	363 sq. mm.	396 sq. mm.
7	pH after fermentation	5.4	5.0	5.2	6.0	5.4
	Antibiotic activity	216 sq. mm.	270 sq. mm.	270 sq. mm.	sq. mm.	243 sq. mm.

nesium sulphate 0.5 gm.; ferrous sulphate 0.01 gm.; potassium chloride 0.5 gm.; tap-water 1000 c.c.; pH 6.8.

The antibiotic activity developed after a given number of days, has been determined by measuring the area of clearance in square millimeters. The results are given in Table I.

The addition of bran extract was found to improve the growth of the mold, which was roughly proportional to the quantity of the supplement. It will be observed from the results that bran extract favours the formation of penicillin, the maximum being attained on the fifth and the sixth days. After this period there is a gradual fall in the antibiotic content. During these studies a sixty per cent. increase of penicillin has been obtained by the addition of the bran extract.

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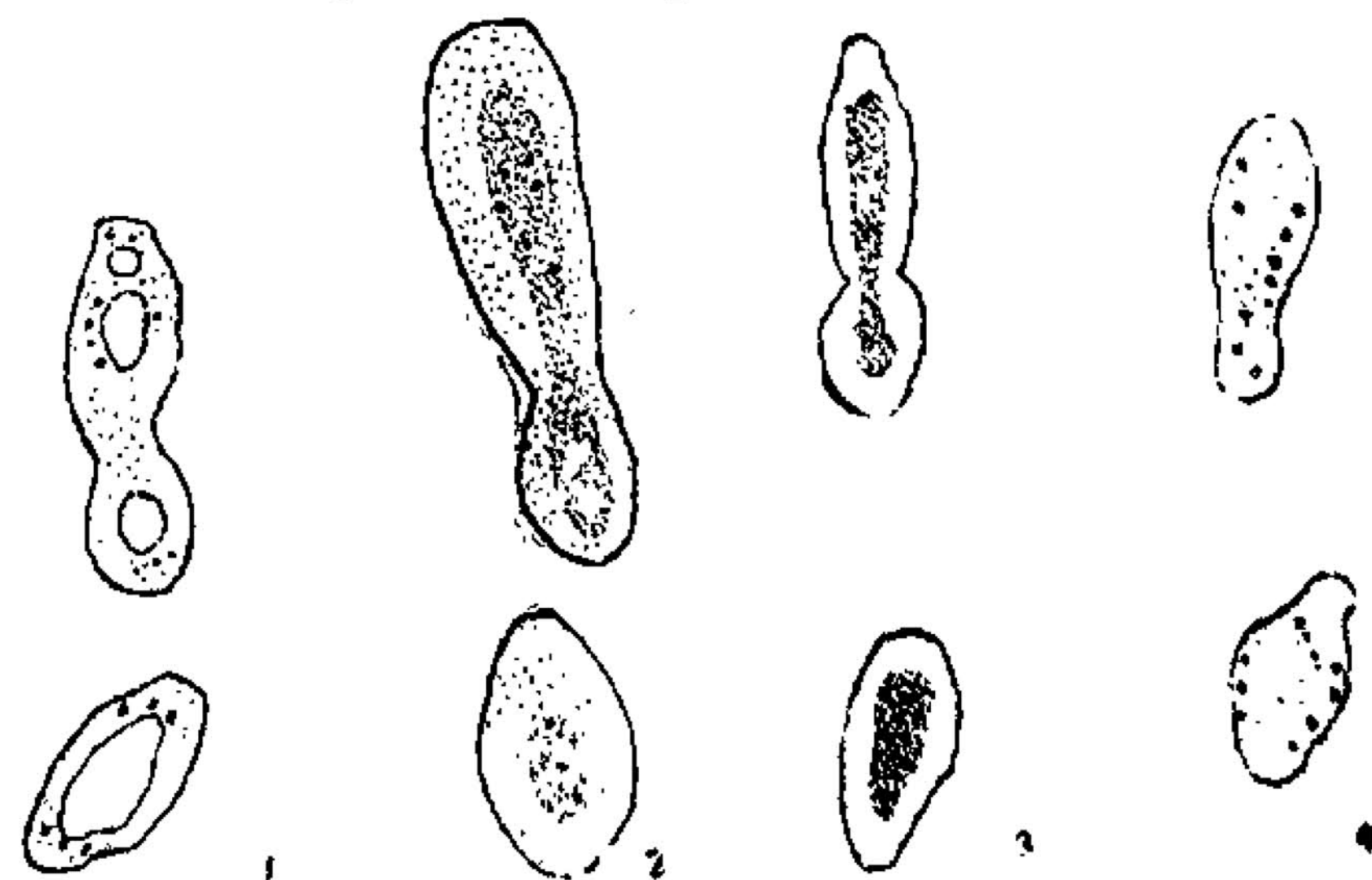
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metrically; cell counts also have been carried out. A microscopical examination of the cells has also been conducted (see Figs. 1-4). The results are given below:—

TABLE I

Medium	Turbidity, Absorption per- cent.	No. of cells Millions per c. c.
Basal medium + No Vitamins	9	1714
Basal medium + all Vitamins	30	13,248
Basal medium + all Vitamins except inositol	14	2184
Basal medium + all Vitamins except niacin	9	2400

It will be seen from the table that the organism offers possibilities of being used for the microbiological estimation of inositol and niacin. A study of the figures reveal that inositol



1 no vitamin; 2. all vitamins, 3. lacking inositol; 4. lacking niacin

deficiency appears to influence the formation of the cytoplasmic constituents while the lack of niacin is presumably connected with the development of the basophilic metachromatic granules and the nucleolar vacuole (?) of the cell.

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