Short Communications

The Resistance of Nisin to Penicillinase

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Storgårds and Anderson have stated that penicillinase has a "restraining" action on nisin¹. Although penicillinase is highly specific (Abraham²) and the evidence presented by Storgårds and Anderson was merely suggestive, the implications of their findings if confirmed, would be so interesting that it was felt worth while to attempt confirmation. This was all the more important since some penicillin resistant staphylococci had been isolated, which were also resistant to nisin (Neave 1953³). However no action of penicillinase on nisin could be detected under a wide variety of conditions.

Nisin in all the solutions was assayed by the method of Berridge and Barrett.⁴ In this method the increase in turbidity of broth containing growing cells of *Streptococcus agalactiae* and an unknown amount of nisin is compared with similar increases in samples containing known amounts of nisin, using a photo-electric absorptiometer. The penicillinase (Wellcome) was found to be of the activity specified. For the purpose of this note 1 unit of penicillinase is that amount which will destroy 1 IU of penicillin in 16 hours at 40°. One unit of nisin will inhibit the growth of *Str. agalactiae* in 1 ml of broth for 16 hours at 37° C.

The activity of penicillinase on nisin was tested by incubating mixtures at various pH values, and at 40° for 2 hours. All samples were then brought to pH 2.0 and heated for

Table 1. Activity of nisin before and after the action of penicillinase.

40 000 units of nisin were incubated in 10 ml with 50 000 units of penicillinase and treated as described in the text.

Experiment 1		Experiment 2	
pH of incubation	Final activity units/ml	pH of incubation	Final activity units/ml
Control (no penicillinase)	4 000	Control (no penicillinase)	4 000
1.43	4 000	5.19	4 000
2.34	3 850	5.50	4 000
3.45	4 000	5.70	4 200
		6.95	4 200
		7.84	4 000
		8.42	4 000

5 min. at 100°, before assaying. The results are summarised in Table 1.

Penicillinase alone at concentration of 50 000 units per tube did not cause any inhibition of growth.

Other experiments, using different proportions of nisin and penicillinase, altering the times of incubation and changing the pH values, gave the same result.

It would appear safe to conclude that this particular kind of penicillinase has no action on nisin.

1. Storgårds, T., and Anderson, L. *Proc. 13th Int. Dairy Congr.*, The Hague, 3 (1953) 1188.
2. Abraham, E. P. in Myrbäck, K., and Sumner, J. B. *The Enzymes* 1, Part 2, p. 1170. Academic Press, New York 1950.
3. Neave, F. K. *Private communication*.
4. Berridge, N. J., and Barrett, J. J. *Gen. Microbiol.* 6 (1952) 14.

Received November 18, 1953.