Growth of Pigs given Skim Milk Soured with Nisin-producing Streptococci

Stokstad and Jukes[1] reported that diets supplemented with aureomycin hydrochloride have a growth-stimulating effect. Since then, many reports have confirmed that a number of antibiotics may act as growth stimulants in pigs and poultry. It was of interest to see if nisin[2], the antibiotic produced by *Str. lactis*, had a similar effect. The nisin used was not concentrated or purified, but was obtained by growing the cultures of *Str. lactis* in skim milk, when 100–200 units/ml. (*c.* 50 units = 1 μgm.) is always produced.

Two groups of twelve pigs each were fed individually on a cereal diet supplemented with sour skim milk, at the rate of 4–6·5 lb. a day according to live-weight, for a period of 126 days, that is, the whole fattening period of a bacon pig. The milk for one group was soured by a streptococcus not producing nisin, and the other group received milk soured by nisin producing strain 12 [3].

Table 1 gives the results as far as rate of growth and efficiency of food utilization are concerned.

Table 1. Growth and Food Utilization of Pigs Fed Skim Milk Soured by Nisin- and Non-Nisin-producing Streptococci

Treatment	Skim milk supplement containing nisin	Skim milk supplement not containing nisin
Av. initial weight (lb.)	44·0	44·6
Av. gain during experimental period of 126 days (lb.)	166·3	164·4
Food required per 1 lb. live-weight gain :		
Meal (lb.)	3·35	3·35
Skim milk (lb.)	4·49	4·51

It is obvious from the values in Table 1 that nisin fed to pigs had no growth-stimulating effect. This confirms results obtained with chicks fed on diets supplemented with concentrated nisin[4].

Bacteriological examination of the fæces of the pigs was undertaken three times. Difficulty was experienced in isolating streptococci from fæces; they appear to form a very small proportion of the bacterial population. The count varied between pigs more than it varied between the two treatments. The nisin fed to the pigs did not appear to change the bacterial count of the fæces.

After slaughter at the end of the experimental period, the gut contents of two control and two nisin-fed pigs were examined. One in each group had been fed 18 hr., the other 3 hr. before slaughter. From Table 2 one can conclude that neither the nisin-producing nor the non-nisin-producing streptococci established themselves in the intestine of the pig.

Table 2. Count of Streptococci in the Intestine of the Experimental Pigs

	Time between last feeding and slaughter (hr.)	Stomach		Small intestine		Cæcum		Colon	
		No. per ml.	Inhib. str.	No. per ml.	Inhib. str.	No. per ml.	Inhib. str.	No. per ml.	Inhib. str.
Nisin pigs	18	none	−	none	−	30	−	90	−
	3	300,000	+	500	+	10	−	50	−
Control pigs	18	120	−	200	−	20	−	40	−
	3	150,000	−	8,000	−	30	−	40	−

Although the results with nisin have proved negative, one should bear in mind that our diet contained much animal protein and that the growth-stimulating effect of antibiotics is much less pronounced on diets containing animal protein[5].

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Production of Rust-resistant *vulgare* Wheats by Backcrossing

One of the main agricultural problems in Egypt is the susceptibility of all *vulgare* wheats to black stem rust. Severe losses are sometimes experienced[1], and even in the mildest seasons not less than 10 per cent of the crop is lost[2].

Breeding for rust resistance has not so far been satisfactory, and has culminated in the production by the Ministry of Agriculture of two varieties which show some resistance under favourable conditions. In adverse conditions, however, they suffer to a certain extent, and when I subjected them to artificial infection in this year's rust nursery, their resistance was completely broken down. They are Mokhtar and Giza 139 respectively.

As part of the programme of the Plant Breeding Section of the Royal Agricultural Society of Egypt for producing rust-resistant varieties, Mokhtar and Giza 139 were crossed in March 1946, and the F_1 seed, sown in November of the same year, was backcrossed with pollen from its Giza 139 parent in March 1947. From that time until now some seed from that first backcross was maintained by controlled selfing and sown in November 1950. I give these the genetic formula B_1S_3.

In the season November 1950–June 1951, proper artificial infections were employed, in which a mixture was applied of all the physiological races of *Puccinia graminis tritici* so far discovered in Egypt through the researches of the Plant Pathology Section of the Ministry of Agriculture. I wish to record here that one segregating family from that B_1S_3 formation stood up to this severe treatment and was quite free from infection.

When seed from this family was later germinated in the greenhouse to test its reaction in the seedling

Family No.	Race Nos.							
	9	14	17	19	21	24	42	53
1004/51 from the B_1S_3	0	0	0	1	1	1	1	1