

SURVEY OF PENICILLIN IN MARKET AND MANUFACTURING MILK

I. INTRODUCTION

The increase in penicillin sensitivity in the community has directed attention to the possible ingestion of this antibiotic in certain foodstuffs, and in particular milk.

Richards (1958) conducted a penicillin survey of raw milk supplied to receiving depots in New South Wales. He tested 400 samples and recorded 1.5 per cent. positive results, the range being 0.5–2.55 I.U./ml.

In the survey discussed in this note, metropolitan and country pasteurized milk samples, raw tanker samples, individual raw milk samples, and cheese factory samples were screened for residual antibiotics.

II. MATERIALS AND METHODS

Petri dishes—flat-bottom plastic dishes.

Bacillus subtilis suspension—standardised inoculum of culture ATCC6633.

Filter paper discs penicillin impregnated for reference standards—specially prepared.

Filter discs, unimpregnated blanks, sterile—diameter 0.25 in. with high absorbability—for absorption of test portion of milk.

Assay seed agar—Bacto B263 with proteose-peptone replacing Casitone.

Basal agar layer—Bacto B270.

Petri dishes were poured with 10 ml basal agar. "Seed" agar prepared by inoculating 50 ml portions of the medium with 5 ml of a 24 hr broth cultures of *Bacillus subtilis* ATCC6633 was then poured into the petri dishes at the rate of 6 ml per dish. The petri dishes after being allowed to set were transferred to the refrigerator until required.

A test was performed in the following manner. Samples of milk were heated to 180° F and cooled to room temperature. A sterile disc was picked up with sterile forceps and the edge dipped into the sample, allowing the disc to wet by capillary attraction and avoiding the pick-up of excess milk. The disc was then placed on the agar surface of one of the prepared petri dishes.

A blank and a standard penicillin disc were also placed on each dish. The dishes were then incubated at $35 \pm 5^\circ$ C for four hours. At the conclusion of the incubation the dishes were examined for zones. These were measured and the values of the unknown calculated.

III. RESULTS

(a) Market and Manufacturing Milks

The number of milks examined in each category was as follows:—

Category	Number
Pasteurized	284
Tankers	191
Individual suppliers	324
Individual cows	12
Cheese factory suppliers	21
Total	832

In no case was even a trace of a zone observed.

(b) Milk from Penicillin-treated Cows

Individual quarters of cows suffering from mastitis were treated with penicillin preparations and the milk withdrawn at recorded intervals of time. The results were as follows:—

Case 1.—The affected quarter was treated with 50,000 units of procaine penicillin. A sample of milk withdrawn at the end of 24 hours tested 100 I.U./ml penicillin. A 48 hr sample showed no trace of residual penicillin.

Case 2.—The affected quarter was treated with 50,000 units of a commercial penicillin preparation. No residual penicillin was detected at the end of 24 hours.

Case 3.—The quarter was treated with 50,000 units of penicillin. A 12 hr sample of milk exhibited 100 I.U./ml of penicillin.

Case 4.—The quarter was treated with 50,000 units of penicillin. At the end of 9 hours the fore-milk was negative but the strippings showed a residual penicillin content of over 15 I.U./ml.

IV. DISCUSSION

The work carried out on market and manufacturing milk indicates that residual penicillin levels of 1 I.U./ml or more are very rare. Residual penicillin at a level less than 1 I.U./ml could be present but the method was not sensitive enough to detect it. In addition, the bulking of milk tends to reduce the level of penicillin to an unmeasurable concentration.

The cow experiments show that as a rule penicillin in measureable quantities persists in the milk from 24 to 48 hours and that the bulk of penicillin is to be found in the strippings.

REFERENCE

RICHARDS, R. J. (1958).—*Aust. J. Dairy Tech.* 13:127.

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