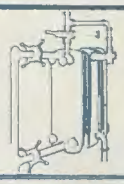
AGRICULTURAL EXTENSION SERVICE • UNIVERSITY OF MINNESOTA

MINNESOTA DAIRY PRODUCTS PROCESSOR



Editor: V. S. Packard, Jr.
Extension Specialist, Dairy Products

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Testing for antibiotics continues to be a major quality control function in the dairy industry. In the revision of the U.S. Public Health Service Milk Ordinance and Code, FDA proposes to make such testing mandatory for commingled raw milk and finished products of fluid milk operations. The agency likewise proposes the Sarcina lutea cylinder plate (CP) method as the official procedure for such testing because of its sensitivity.

We recently evaluated a new method of detecting antibiotics in milk. The results seem to indicate that the test is fully as sensitive as the CP method. It is far simpler to run and is faster, taking only a little over 2½ hours, compared with CP's 16-18 hours. The procedure was developed by Difco Laboratories.

NEW TEST FOR ANTIBIOTICS

The Difco method uses the disc assay principle. A suspension of Bacillus stearothermophilus spores, in use-size ampules, is provided by the manufacturer. Such suspensions can be held for some time prior to use. In running a test, the spores are seeded on indicator agar plates, similar to seeded plates of Bacillus subtilis used in the conventional disc assay method. In addition, brom cresol purple indicator is added to the agar and a color response is used in evaluating results. Both a zone of inhibition and a slight pink to purple color are evidence of a positive reaction. Plates are incubated at $65^{\circ}C \pm 1^{\circ}C$ for 2 hours and 40 minutes.

SENSITIVITY

We checked out the test's sensitivity against known amounts of penicillin dispersed in reconstituted nonfat dry milk (the method is equally applicable to this product as well). Some slight color change could be seen at 0.002 units of penicillin per ml, though with a scarcely recognizable zone. At 0.003 units, color change was more distinct, a zone more easily seen. At 0.004 units, both color and change and zone presence were obvious.

RANCIDITY, NO PROBLEM

In milks of Acid Degree Values (ADV) of from 2.7 to 6.1, no interference in the test was noted. This was also found true for the CP method. There should be no problem, therefore, with rancid milk in the normally lower ADV ranges found in most raw milk supplies.

COMPARISON OF METHODS ON RAW MILK

In cooperation with Dairy Quality Control Institute, Inc. 5,200 raw milk samples were analyzed for presence of penicillin by both the standard disc assay method using B. subtilis and the Difco procedure. As well, 37 samples showing positive by Difco were also checked with the S. lutea method. Table 1 shows the results for the two disc assay analyses. The B. subtilis method detected 12 positive samples, all of which were confirmed positive for penicillin. The Difco disc assay showed that of 61 positive tests, 48 confirmed positive for penicillin. This indicates perhaps four times as many positive penicillin results using the Difco compared with the current disc assay method.

When 37 samples identified as positive for penicillin by the Difco method were also tested by the CP method, there were 29 positive results. In other words, CP detected only 78.4 percent of the samples found positive by Difco disc assay. Certainly this indicates the latter to be fully as sensitive if not somewhat more so than CP. As already stated, it is much simpler to run, and requires far less time to make a test.

Table 1. Incidence of penicillin residues in 5,200 samples of commercial raw milk as detected by B. subtilis and B. stearothermophilus disc assay methods

Method	No. of positive samples detected	No. of positive samples confirmed	Percent of samples confirmed
Disc assay (B. subtilis)	12	12	0.23
Disc assay (B. stearothermophilus)	61	48	0.92

ON FINISHED PRODUCTS

Sensitivity tests on pasteurized whole milk showed the Difco method as effective on this product as on reconstituted nonfat dry milk or raw milk. In addition, 160 samples of finished products, made up of whole milk, 2 percent fat milk, skim milk, half and half, whipped cream, chocolate milk, and chocolate drink, were tested by the Difco method. While only one positive sample was noted, and this at the very lowest level of detectability, there was no reason to doubt the test's acceptability to testing of these kinds of products.

THE MEANING?

It would seem that the Difco test would find use on large supplies of commingled milk, either tank truck or storage tank milk. There is also no reason why it should not eventually replace the CP method, both for use on nonfat dry milk and for finished fluid milk products.

DAIRY AND FOOD EXPO

Dr. Edmund Zottola and I are wondering if there is sufficient interest in the Dairy and Food Expo this year to arrange a special tour. We would be happy to if enough people express interest. The Expo will be in Anaheim, California early in November 1978. Travel to California as a group would be necessary, but return travel could be arranged individually. Under tour arrangement, flight costs are less, side stops are possible (like a day in San Francisco), and dairy plant visits could be worked in.

If you or someone in your organization is interested, fill out this form and return by April 1 to me at 136h ABLMS, 1354 Eckles Ave., University of Minnesota, St. Paul, MN 55108. We'll need about 50 persons to qualify for tour rates.

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Yes, I am interested in a tour arrangement to Anaheim, California for the 1978 Dairy and Food Expo.

NAME: _____

COMPANY: _____

ADDRESS: _____

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