

REPORTS OF THE RESEARCH COMMITTEES OF THE COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH.

DAIRY RESEARCH.

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The following is an outline of the progress results of investigations carried out by the Dairy Research Institute on problems affecting the manufacture of butter and cheese.

Butter problems have had special reference to flavour, whilst cheese problems relate to quality in general. Three years ago it was planned to investigate the causes of openness of texture in cheese, but it was soon found that this problem could not be adequately studied without considering other factors affecting cheese quality.

CHEESE STUDIES.

Openness of Texture.

Many factors operating individually and collectively influence this defect. It is further complicated by the fact that there are three distinct types of openness, two of which generally are associated with other defects in quality, whilst the third, to a limited extent, is often present in cheese which otherwise is of finest quality.

In the present state of knowledge, it is not possible entirely to prevent openness, but it has been shown that the trouble may be attributable to or aggravated by any or all of the following conditions:—

- (a) Low-grade milk:
- (b) Inactive starters:
- (c) Faults in manufacture:
- (d) The aim for excessively high yields:
- (e) Unduly hastening the manufacturing process:
- (f) Excessively high curing-room temperatures:
- (g) Sale of cheese before it is properly matured.

(a) Low-grade milk influences the defect in two ways: it may unduly hasten the making process or make it too slow. In neither case can the cheesemaker by any variation in the process of manufacture adequately prevent the condition from arising. Moreover, when milk varies in grade from day to day and from vat to vat, the factory-manager cannot standardize his manufacture to suit his factory supply. That type of milk known as non-acid milk frequently gives rise to cheese which is open in texture. The reason for the spasmodic occurrence of non-acid condition is not clearly understood.

(b) Inactive starters cause considerable trouble. The factory-manager's difficulty is to know in advance when a starter is good, because a starter may appear to be normal when added to the vat and yet prove quite inactive in the making process. Furthermore, it has been shown at the Institute that one of the several cans of starter, all made up in exactly the same way, may prove inactive, while the others are normal. The reason for this is not definitely known; but the problem has been narrowed down to a few possibilities, which are being closely investigated. A most important advance in the control of starters has been made by the development of a test for accurately determining the vitality of a starter without actually making cheese with it. This same test may be used for detecting non-acid milk; details of it have been published in the *New Zealand Journal of Science and Technology*, April, 1932.

(c) Errors in manufacture of cheese may contribute to the openness defect, but, since this involves technical considerations, it may be omitted from the present report.

(d) Any endeavour to reach an excessively high yield of cheese per pound of butterfat plays a prominent part in the defect. Any attempt to increase yield by incorporation of excessive moisture in cheese will result in increased openness of texture, besides deteriorating quality in other respects. The most important aspect of the evil effects of aiming at excessive yields is that these become most evident after the cheese leave the factory, and even after the cheese is graded, with the result that the factory never has the opportunity of adequately realizing the disastrous effects of this policy.

(e) Unduly hastening the manufacturing process: A close examination of hundreds of records of cheeses made at the Institute and correlated with quality reports of the mature product shows that cheese which work normally in the vat in from seven to eight hours from the time of adding the starter till the curd is hooped give the best results. To this time must be added that required for receiving and pasteurizing the milk, cleaning up the factory, and dressing the cheese at the end of the day's work. Therefore it is essential that the prompt delivery of milk at the factory in the morning should be enforced, and that hours of labour should be so arranged as to give a reasonable time of manufacture for even the last vat filled with milk in the morning. It may be observed that hurried manufacture may not make noticeable its adverse influence till some time after the cheese has been graded.