

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

DAIRY RESEARCH INSTITUTE.

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Research work carried out during the year has been principally a continuation of that in progress in the previous year. Investigation of factors affecting the quality of cheese, flavour and keeping-quality of butter, and the relationship of some pasture plants to the quantity and quality of milk produced by cows fed thereon have been the chief lines of work. As in the past, these broad problems have been subdivided into projects which have been allotted to specialist workers, and the results of these separate efforts have been collated in the interpretation of the main issues.

The several projects and salient findings from each are briefly summarized in a statement below, where are given the names of the workers chiefly responsible for each project. A review of the summaries clearly shows that good progress has been made in the past year.

As pointed out in the last annual report, the fundamental cause of "fermentation" and "slit" openness in cheese has been shown to be certain gas-producing organisms that develop in the cheese while it is in the early stages of curing. These undesirable organisms generally have their origin in the milk-supply and, although their numbers and effects may be minimized by sanitary methods of milk-production and careful pasteurization of milk, there are no known methods either of absolutely preventing them from gaining access to cheese or of rapidly identifying them in milk. Fortunately their effects can be materially restrained by the use of starters which themselves contain no gas-producing organisms. Conversely, their influences are accentuated by weak starters and by other starters which sometimes contain a proportion of gas-producing organisms apparently added to starter to produce cheese flavour. Thus the Institute's success with single-strain starter cultures makes a notable advance in the control of openness in cheese texture. It has now been clearly shown that the activity of these starters can be preserved by rigid application of the technique recommended for their preparation. It has been equally well shown that good cheese can be made when the selected single strains are used as the sole source of starter, provided that care is taken to avoid either over- or under-development of acidity during the cheesemaking process. In addition to assisting in making cheese closer in texture, the use of these single-strain starters makes for uniformity in quality and time of manufacture from day to day. It should be obvious that openness of texture cannot be entirely overcome by the use of these starters. A clean milk-supply is also essential. The principal sources of infection of the milk-supply with gas-producing lactobacilli and methods of treating milk to overcome their effects are now engaging attention.

While single-strain starters make easier the production of cheese close in texture, and make cheese of reasonably good flavour, there is definite evidence that the flavour of the cheese is improved by adding to the cheese milk selected types of flavour-producing organisms. There is also some evidence that these have a restraining influence on the incidence of discoloration. These matters are being closely examined.

Chemical and cheese-manufacturing studies indicate that it should ultimately be possible to specify manufacturing procedure adaptable to different starters and milk each of known composition, thus removing much risk in the art of cheesemaking and putting it on a scientific basis.

Cheese-storage trials have indicated methods of keeping cheese for long periods as may be called for in exceptional emergencies.

Buttermaking experiments have shown that good-quality butter can be made from clover-tainted creams when it is impossible to avoid some degree of taint in farming practice. Grazing and cattle-feeding experiments have also proved that these taints can be reduced to a negligible degree by controlling the clover content of the pasture. Fundamental studies in buttermaking show that starter organisms exert a prejudicial influence on the keeping-quality of butter and that their effect is not entirely dependent on the acidity of the butter as has been commonly believed in the past. Thus the use of starters in making butter that has to be kept for a long period is called in question.

The keeping-quality of butter is also affected by the temperature employed in pasteurizing the cream from which it is made. Studies in moulds have stressed the necessity for adopting careful sanitary measures in the manufacture, packing, and storage of dairy products and for avoiding contamination of materials used in the manufacture of the products.

Dairy-husbandry trials have clearly demonstrated the important influence that the type of feed exerts on the quantity and quality of dairy products produced by milking-cows fed on these feeds. These trials also show that the solids-not-fat in milk can be materially influenced by the plane of nutrition of the milking-cows. The study of the relation of pasture species and possibly soil type to the quality of dairy products is an exceedingly important branch of dairy-research work that should be greatly expanded. The Institute is exceedingly fortunate in being situated alongside the headquarters of the Grasslands Division of the Plant Research Bureau, and it is greatly indebted to the Director and his staff for their active co-operation at all times in this work, for which they have always grown and supplied the pasture plants.