

system with destructive gears; and to this extent further investigation is a stalemate.

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April 1948.

* Communicated with the kind permission of the Director of Industries and Commerce, Madras.

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MICROFLORA IN BUTTER

THE importance of micro-organisms, especially moulds of the *Penicillium* and *Oidium* groups, in fat hydrolysis and development of high acidity in butter leading to the production of a high acid ghee is well known.^{1,2} In the course of the studies on the microbiological deterioration of market butter, the authors have observed significant differences between *desi* and creamery butters in regard to the numbers as well as species of microflora present in them. The *desi* butter samples were all reported to be prepared from boiled, soured milk and one to two weeks old, while the creamery butter samples were made from pasteurised cream and 24 to 48 hours old. The average fungal and bacterial counts obtained in different samples of butter are given in Table I. Yeasts and moulds were counted on potato-dextrose agar (Difco). Total and differential counts of bacteria were made on China blue agar and coliforms counted on McConkey's agar. Nile blue sulphate agar was employed for enumerating lipolytic organisms, but the results were not satisfactory.

TABLE I
Counts of fungi and bacteria in butter
(log. averages of 10 samples each)

Type of butter	Yeast and mould count per ml.	Bacterial count per ml.			
		Total	Acid producers	Proteolytes	Coni-forms
Desi butter	4,915	198,500	31,030	20,180	425
Creamery butter—					
(a) Salted	618	1,820,000	515,200	73,500	19,000
(b) Unsalted	274	2,071,000	846,500	72,850	48,820

The types of bacteria, yeasts and moulds occurring in the above samples of butter were isolated and classified on the basis of their cultural and biochemical characteristics. Of the bacterial types found in *desi* butter samples, more than 40 per cent. were lactobacilli (mostly resembling either *L. acidophilus* or *L. casei* species), 20 per cent. mere micrococci and the rest included coliforms, aerobic spore-formers (either *B. albolactis* or *B. subtilis*) and streptococci. In creamery butter, coliform organisms (*A. aerogenes* I, Intermediate and an unidentified strain occurring predominantly) constituted more than 50 per cent. of the bacterial flora; 30 per cent. were streptococci

(ether *Str. lactic aromaticus* or *Str. paracitrovorans* strains); 10 per cent. were micrococci (mostly *M. caseolyticus* types); and the rest included species of *Microbacterium*, *Achromobacter*, *Pseudomonas* (greenish fluorescence), *Serratia* (red pigment) and aerobic spore-formers.

The difference in the type and number of organisms between the two butters is mainly due to the acid environment of *desi* butter,³ which inhibits bacterial growth but favours development of the contaminating yeasts and moulds. For the same reason the highly acid-tolerant lactobacilli, derived from the starters or utensils, form the predominating bacterial types but they are not considered to possess any influence on fat. Except for the lactose-fermenting spore-former (*B. albolactis*) the other species of bacteria are ordinary contaminants having little effect on the spoilage of *desi* butter. The present work, therefore, confirms the previous observations^{1,2} that fungi play a major role in the deterioration of *desi* butter. The description of the important types of yeasts and moulds found in butter and their characteristics will be dealt with in a separate note.

The authors are grateful to Dr. Noshir N. Dastur and Dr. K. C. Sen, Director of Dairy Research, for their kind interest in the work.

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April 5, 1948.

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INSTITUTION OF CHEMISTS, INDIA

WHILE highly appreciating the sentiments expressed by Prof. Findlay, it may be pertinent to mention, in this connection, that the Institution of Chemists (India), which was established as early as 1928, has from its very inception been actively engaged in furthering the interests and fostering the healthy development of the profession of Chemistry in this country. It has at present more than 450 members on its rolls, distributed throughout the Indian Union, and has two Branches in the industrial areas of Bihar (Patna) and the United Provinces (Kanpur). The Institution just now has before it a scheme for launching a drive for the further extension of its activities, and its Council is considering a re-orientation of its membership with this object in view.

It may further be mentioned that the Institution has also two organs, a quarterly Journal of its own and another, the Industrial and News Edition, published under the joint auspices of the Institution of Chemists (India), and the Indian Chemical Society.

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May 15, 1948.

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