

## AN ECONOMIC ANALYSIS OF CHEDDAR CHEESE MANUFACTURE

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### INTRODUCTION

Dairy plants in public and cooperative sectors are making cheddar cheese on commercial lines. It is imperative that the economics of cheddar cheese production should be favourable to the plants. For this purpose, component-wise and process-wise costing of its production to get detailed cost estimates is a pre-requisite. Keeping this in view, cost analysis of cheddar cheese manufacture in the Experimental Dairy, of the Institute was carried out.

### MATERIALS AND METHODS

In the Dairy, for manufacturing cheddar cheese, milk is pasteurised and standardised to 0.7 casein-fat ratio. Cheese starter is added at 0.5 to 1% of milk. Rennet (3 gm/100 lit of milk) is added after 10 min. Curd is cut and cooked slowly to the maximum temperature of 38° - 39°C 1°C every 4 min. Whey is drained, curd is cheddared and milled when acidity of whey is 0.5%. The curd is salted at the rate of 2% and hooped. Green cheese is dressed by arranging cheese cloth before and after pressing to give smooth surface to the finished cheese. Green cheese blocks are ripened and finally cured under refrigeration at 10°C for 6 months. During the study period (1975-76) 53 batches of cheddar cheese (700 litres in each batch, on an average) were made. It was estimated that the yield obtained was 10.19% of the milk used whereas cheese yields

ranged from 9.1 to 10.5 % in 24 cheddar cheese plants in Iowa (Langrange and Reinbold, 1958).

The plant handles about 50% of its installed capacity of 10,000 litres milk. This plant has basically two departments, main and subsidiary. Subsidiary (services) departments like boiler, refrigeration, maintenance, stores maintenance, quality control, water, etc., provided their services to the main departments in their respective products manufacture. The main departments were divided into 4 sections, market milk, cheese and butter, condensing, drying and ghee, and ice-cream & flavoured milk. In such a multi-product dairy plant, production is characterised by mixed and joint operations which make it difficult to draw a distinction and allocate and apportion the consumption of various services and utilities for the purpose of operation-wise cost estimation of various products. The various kinds of expenditure were allocated to the main and subsidiary departments, unless attributable as direct cost to the product produced. Accordingly, the costs of subsidiary departments were charged proportionately to the main departments as the latter claimed services from the former. Finally overall costs of the main departments were distributed over the produced (Singh and Kalra, 1979).

The data for the present study were collected for the financial year 1975-76 from the records maintained in the Dairy.

## RESULTS AND DISCUSSION

Cost of production was calculated in two ways component and process wise.

*Component cost :*

In cheddar cheese manufacture, raw materials accounted for Rs. 12.08 (74.47%) and different operations for Rs. 4.14 (25.53%) per kg, the total cost of production being Rs. 16.22 (Table-1) Labour was the costliest component (20.5%) of the processing cost. Bergman and Joost (1956) found it to be 44.4% and King (1956) it to be 30%. Electricity was the next costliest item (20%) of the processing cost. The main portion of this cost was owing to cheese ripening. Steam cost about Rs. 0.58 per kg of cheese contributing about 14% of the processing cost. Bergman and Joost (1956) estimated electricity and steam costs at 14% for swedish hard cheese.

TABLE 1

## Component-wise cost of production of Cheddar Cheese\*

Cost Component	cost (Rs/kg.)	Percentage of total cost
A. Raw Material	12.08	74.47
B. Processing		
1. Consumable articles	0.63	3.85
2. Services**	2.19	13.48
3. Labour	0.85	5.27
4. Depreciation	0.37	2.30
5. Losses	0.10	0.63
Sub-Total	4.14	25.53
C. Total cost of production (A.+B)	16.22	100.00

\* Total quantity of final product — 3779.64 kg. manufactured during 1975-76.

\*\* It includes costs of electricity, water, steam, maintenance of machinery and equipment, maintenance of stores, supervision and other miscellaneous items.

*Process cost :*

The cheddar cheese is manufactured through different processes right from preparation of starter culture to ripening of cheese blocks, and expenditure on each process is given in (Table 2).

TABLE 2

## Process-wise cost of production of Cheddar Cheese

Items of expenditure	Cost per unit (per kg)	percentage cost
1. Starter culture preparation*	0.29	7.00
2. Pasteurisation	0.43	10.39
3. Preparation and receiving milk in vat	0.43	10.39
4. From starter and rennet addition till cutting	0.14	3.38
5. Cutting & cooking	0.14	3.38
6. Drainage of whey and cheddaring	0.26	6.28
7. Milling, Salting, Hooping and pressing	0.40	9.66
8. Paraffining	0.68	16.43
9. Ripening	1.37	33.09
Total	4.14	100.00

\* Includes cost of mother culture.

Among all the processes, ripening was most expensive operation costing Rs. 1.37 per kg. of the product, representing 33.09% of the processing cost. For swedish hard cheese its share was estimated to be 19.1% (Kosikowski, 1954). Pasteurisation of milk for cheese and paraffining of green cheese are other two process of importance, costing individually about Rs. 0.43 and 0.68 respectively per Kg. of cheese.

For 3 Victorian cheese factories, Ip and Willins (1975) estimated starter culture costs in cheddar cheese manufacture varied from Rs. 0.05 to Rs. 0.07 per kg whereas in the present study it was observed to be Rs. 0.29 per kg of the finished product.

#### SUMMARY

Economics of production of cheddar cheese was worked out for the Experimental Dairy of the Institute. Component-wise costing showed that raw materials accounted for about 75% and different cost components 25% of the total cost of production (Rs. 16.22 per kg). Among the different processes in the cheese manufacture the ripening accounted for the maximum share (33%) followed by paraffining (16%). It may, therefore, be concluded that the efforts should be made to minimise the

cost of cheese manufacture by judicious use of milk solids and reduction of cost in the operations like ripening and paraffining.

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