

STUDIES ON COTTAGE CHEESE

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SUMMARY AND CONCLUSIONS

Cottage cheese is a very popular product in the diet of many people . It has also a pleasant taste and delicate flavour and has become very popular as a dietary or slimming cheese because of its relatively low - calorie content and high content of protein , minerals and vitamins .

Cottage cheese is a soft , unripened acid cheese type , made primarily from various combinations of pasteurized skimmilk , partly condensed skimmilk or reconstituted low-heat non-fat dry milk . In its conventional making , curd coagulation is caused by lactic acid formed by lactic starter bacteria or the optional use of edible coagulants. The selection of satisfactory starter cultures is one of the most important steps for its successful manufacture .

Cottage cheese with its delicate flavour is not a familiar type to the Egyptian consumer and it was thought worthwhile to try and introduce this product to the Egyptian market and to attempt to manufacture it either by direct acidification or the selection of the appropriate starters . Furthermore , it was decided to investigate the keeping quality of the product when manufactured under Egyptian conditions .

To achieve this goal the study included the following parts :

I : Direct acidification in making Cottage cheese

This part has covered the effect of the followings :

- 1 - The presence of rennet , temperature (2 & 20°C) and pH of milk coagulation on the properties of resultant Cottage cheese .
- 2 - Partial replacement of fresh with reconstituted skimmilk (R.S.M) on the characteristics of Cottage cheese .
- 3 - Cold aging and thermization ($5 \pm 1^{\circ}\text{C}$ for 7 days) of milk on the properties of the resultant Cottage cheese .
- 4 - Addition of starter distillate (0 , 0.5, 1 , 2 , 3 and 4 ppm. diacetyl) to Cottage cheese curd .

The results of this part reveal that :

- 1 - Satisfactory Cottage cheese was obtained when lactic acid was added to cheese milk to reduce the pH to 4.8 at 2°C in the presence of rennet .
- 2 - Temperature of acidification affected the yield of Cottage cheese in presence or absence of rennet and the higher the temperature (20°C) the less was the yield .

- 3 - Addition of rennet to cheese milk caused a decrease in the yield of Cottage cheese at all practiced pH values and temperatures.
- 4 - The yield of Cottage cheese increased with the increase in the ratio of added reconstituted milk, but the resultant cheese was of inferior quality. The product made with up to 50% R.S.M. did not differ greatly from that made from fresh skimmilk .
- 5 - The yield of Cottage cheese increased with progression of storage of milk at $5 \pm 1^{\circ}\text{C}$ for 7 days . The rate of increase was higher with raw stored milk but the quality of cheese was inferior to that made from thermized milk .
- 6 - Addition of starter distillate to the cheese curd to yield concentration of up to 1 ppm diacetyl resulted in Cottage cheese of superior quality .

PART II : Short - set method in making Cottage cheese

This part of our study was devoted to investigate the effect of :

- 1 - Type of starters on the properties of Cottage cheese. The following combinations of cultures were exercised :

1 - S. lactis sub sp diacetylactis

2 - S. lactis sub sp diacetylactis + S. cremoris(5:1 or 3:1)

3 - Leuc. cremoris + S. cremoris (1:2 or 1:3)

- 4 - Leuc. cremoris + S. lactis (1 : 3)
5 - S. thermophilus + L. bulgaricus (1 : 1)
2 - Addition of citric acid (0 , 0.05 and 0.1%)
to cheese milk inoculated with one combination of :
- 1 - S. lactis sub sp diacetylactis + S. cremoris (3 : 1)
2 - Leuc. cremoris + S. cremoris (1 ; 3)
3 - Leuc. cremoris + S. lactis (1 : 3)

The results show that :

- 1 - Of the 7 different combinations of starters practiced to make Cottage cheese , only S. lactis sub sp diacetylactis was found to be superior . However , its high proportion (10%) required to casue milk curlding in an adequate time was a major drawback . This was overcome by mixing it with S. cremoris (3:1)
2 - Addition of citric acid to cheese milk up to 0.05% led to slight increase in the diacetyl content of the resultant cheese . However , further increase in citric acid up to 0.1% led to somewhat decrease in the diacetyl content of the resultant cheese

PART III : Creaming and shelf - life of Cottage cheese

This part of the present manuscript was undertaken to apply the proper selections as a result of the factors conducted in parts I & II and their effect on the changes which occur during storage of Cottage cheese at $7 \pm 1^{\circ}\text{C}$.

The results clearly indicate that :

- 1 - Changes in T.A. of Cottage cheese samples made by S. lactis sub sp diacetylactis as well as that made with leuc. cremoris and S. lactis were limited during storage at $7 \pm 1^{\circ}\text{C}$ for 15 days . However , the fresh cream dressed cheese made with Leuc. cremoris and S. lactis resulted in highest acidity .
- 2 - The diacetyl content of all trials increased and reached its maximum in most samples on the 5th day and in the rest on the 10th day of storage and decreased afterwards . The highest diacetyl content was recorded for the cheese samples manufactured with S. lactis sub sp diacetylactis and S. cremoris (3:1) , dressed with fresh cream containing 0.15% citric acid and 4% S. lactis sub sp diacetylactis
- 3 - Creaming Cottage cheese resulted in higher total count compared with uncreamed cheese , and the highest T.C. at the end of storage was attained in the cheese samples made by D.A.
- 4 - Absence of starters in making Cottage cheese encouraged the growth of moulds and yeasts .
- 5 - The cheese made by D.A. and that made with S. lactis sub sp diacetylactis + S. cremoris as a starter and dressed with fresh cream with 0.15 % citric acid and flavour producing starter gained the highest scores in flavour .

In general it can be concluded that Cottage cheese of proper qualities could be successfully made by one of the following methods :

- 1 - Direct acidification to pH 4.8 at 2°C in presence of rennet and addition of starter distillate to yield concentration up to 1 ppm. of diacetyl.
- 2 - Short set - method using 5% inoculum consisting of a mixture of S. lactis sub sp. diacetylactis and S. cremoris 3 : 1 respectively .
- 3 - Short - set method using 5 % inoculum consisting of a mixture of Leuc. cremoris and S. lactis 1 : 3 respectively .
- 4 - Dressing Cottage cheese curd with fresh cream containing 0.15 % citric acid and flavour producing starter yield a product of superior quality .

