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# Cheese Production at Low Temperatures Using Probiotic L. casei ATCC 393 and Rennin Enzyme Entrapped in Tubular Cellulose

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**Abstract :** The aim of the present work was to evaluate the production of cheese using a composite filter of tubular cellulose (TC) with [a] entrapped rennin enzyme and [b] immobilized L.casei and entrapped enzyme. Tubular cellulose from sawdust was prepared after lignin removal with 1% NaOH. The biocatalysts were thermally dried at 38oC and used for milk coagulation. The effect of temperature (5,20,37 oC) of the first dried biocatalyst on the pH kinetics of milk coagulation was examined. The optimum temperature (37oC) of the first biocatalyst was used for milk coagulation with the second biocatalyst prepared by entrapment of both rennin enzyme and probiotic lactic acid bacteria in order to introduce a sour taste in cheeses. This co-biocatalyst was used for milk coagulation. Samples were studied as regards its effect on lactic acid formation and its correlation with taste test results in cheeses. For both biocatalysts samples were analyzed for total acidity and lactic acid formation by HPLC. The quality of the produced cheeses was examined through the determination of volatile compounds by SPME GC/MS analysis. Preliminary taste tests and microbiological analysis were performed and encourage us for further research regarding scale up.

**Keywords :** tubular cellulose, Lactobacillus casei, rennin enzyme, cheese production
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