Optimization of conditions for Ricotta cheese production from Buffalo whey using Response Surface Methodology

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ABSTRACT

Whey retains 50% of milk solids and can be transformed into Ricotta cheese effortlessly by the small scale cheese producers in Pakistan. However, recovery of milk constituents is affected by processing conditions. The impact of temperature (60-90°C), pH (3-7) and $CaCl_2$ concentration (2.0-6.0 mM) on cheese yield was investigated in the study. Twenty preliminary experiments were run following Central Composite Design. Response Surface Methodology (RSM) was used to optimize the conditions, get an empirical polynomial model used to fit the experimental data. The best three experiments (90, 75 and 100°C, 7.0, 8.4 and 5.0 pH and 6, 4, 4 mM $CaCl_2$ respectively) were selected based on high cheese yield. In the next phase, these experiments were exploited for production of Ricotta cheese from mixture of Buffalo whey and skim milk (9:1 ratio). The results obtained were compared during storage of 60 days at 4±2°C after every 15 days interval. The results indicated that Ricotta cheese prepared at 90°C, pH 7 and $CaCl_2$ 6 mM exhibit the highest yield, proteins and total solids. Storage affected the pH, acidity, NPN and lactose significantly while there was no significant impact of storage on the moisture, fat, protein and ash content of cheese.