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ABSTRACTS

# Microencapsulation as a protection strategy for biotic and abiotic stressors in natural starter cultures.

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● The maintenance and viability of starter cultures remain critical challenges in the production of traditional raw milk dairy products, particularly when fermentation is impaired by biotic and abiotic stressors. Encapsulation of starter cultures has been shown to offer several advantages over conventional methods, notably by enhancing bacterial tolerance to bacteriophages, contaminant bacteria, high temperatures, and low/high pH conditions. In this study, ten *Lactococcus lactis* strains isolated from traditional Trentino dairy products were selected to produce experimental microcapsules (EMI), coated with whey proteins and caseins at three different percentages each. A total of 60 EMI formulations were produced and analyzed at 1, 7, 14, and 30 days for encapsulation efficiency (EE%), and thermal stability. The average EE% was 68.26%, with casein coatings slightly outperforming whey protein coatings. Throughout storage, *Lc. lactis* strains maintained high viability (9.20 log CFU/g at day 1 and 8.3 log CFU/g at day 30 as average) and showed good thermal stability at 44°C (9.02 log CFU/g as average) and 55°C (6.01 log CFU/g as average). Based on these results, twenty promising EMI formulations using whey protein and caseinate were selected for further studies under biotic stress conditions. Milk fermentation assays of co-inoculation with an *E. coli* strain for 24 hours, demonstrated that encapsulated strains have maintained acidification capacity (average pH, 4.5) compared to unencapsulated ones (average pH, 5.5). Following these trials, six EMI formulations were selected for scale-up experiments to further investigate acidification performance in experimental cheeses.

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