Abstract

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Cheese ripening: A review on modern technologies towards flavor enhancement, process acceleration and improved quality assessment

Abstract Background Cheese is one of the fermented milk-based foods characterized by its many different flavor, texture and aroma. Ripening is the most crucial technological step in cheese manufacturing, constituting a cascade of biochemical events, mediated by a diverse array of microbial flora that confer the perceived sensory attributes. These sensory attributes are evaluated by various descriptive, instrumental and computational methods. Scope and approach The recent biotechnological advancements for accelerating the ripening process and the production of its associated flavor compounds are reviewed herein. The different assessment methodologies, both sensorial descriptive and modern analytical profiling platforms are outlined with their respective applications for either monitoring the ripening process predicting the different cheese quality attributes. Finally, computational tools employed for rapid detection of cheese artifacts are reviewed. Key findings and conclusions The assessment of cheese ripening is such a challenging but imperative process, which warrants the use of methods to effectively study the multitude biochemical changes that occur during this process. Some practices are posed in this review for more future applications to include exploration of a wider range of encapsulated enzyme cocktails and mixed attenuated adjunct cultures, design of intelligent packaging and utilization of IR technology, E-nose, optical techniques to control quality and estimate shelf life of cheeses. The main technological challenge in this reviewed processes for flavor enhancement and ripening acceleration is how applicable to be implemented in the cheese industry.