

Master's Thesis

Exploring the Shelf Life of Food and Screening Natural Preservatives through Isothermal Microcalorimetry

The stability and shelf life of food products are critical for meeting consumer expectations and ensuring food safety. Shelf life is defined as the maximum period during which a product remains stable without noticeable sensory changes or safety risks under specific storage conditions. Predicting shelf life typically involves analyzing physicochemical stability, microbiological safety, and sensory properties, but conventional methods are often labour-intensive, time-consuming, and rely on expert panels. In contrast, isothermal calorimetry (IC) presents a faster, more efficient alternative, offering continuous, real-time monitoring of microbial growth and enzymatic activity in food, which can provide valuable insights into spoilage kinetics. This thesis will evaluate the use of IC for shelf-life analysis across two different food products, applying IC to assess metabolic activity and spoilage progression. Additionally, IC will be used to screen for natural preservatives that could extend the shelf life of foods. The accuracy and effectiveness of the IC method will be validated by comparing its results to those obtained from traditional shelf-life testing methods to revolutionize food preservation practices.



Methods and devices:

- Isothermal microcalorimeter (IMC)
- Differential Scanning Calorimeter (DSC)
- Data Analysis Using MATLAB

Requirements:

The student should be highly motivated, organized, and able to work independently. Prior experience in IMC, DSC and MATLAB is not required.

Start: Immediately.

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