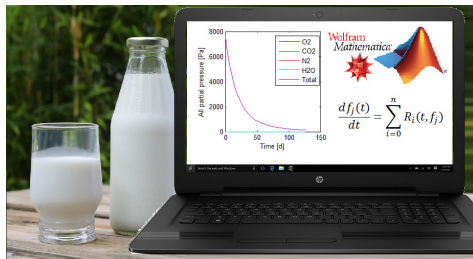




Fast Shelf Life Prediction for Milk – Fast Selection of Right Packaging

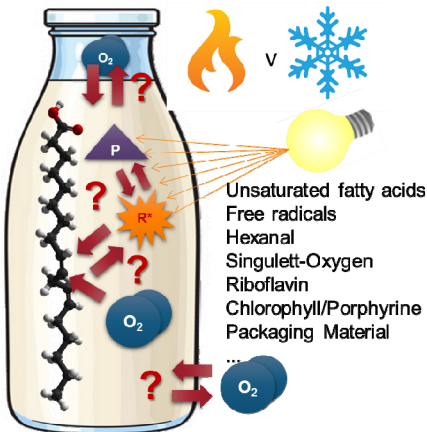
MOTIVATION

- ✓ Avoid long-lasting storage tests
- ✓ Substitute slow tests by quick ones
- ✓ Reduce number of experiments
- ✓ Make quick decisions: right packaging, expected shelf life
- ✓ Accelerate implementation of recyclable packaging materials
- ✓ Allow decisions on every step of the production chain

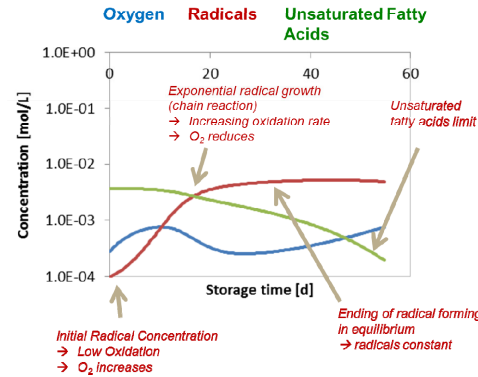


METHODS

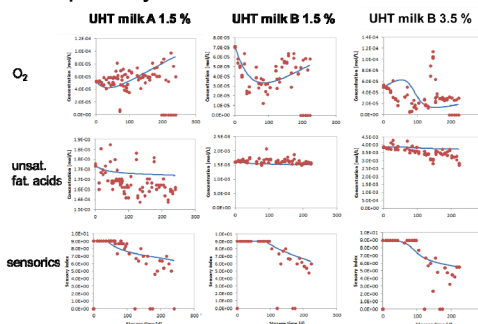
- ✓ Expandable Coupled Differential Equations with Reactions Terms, Benchmarking, “Learning Models”
- ✓ Extensive Testing for Model Development
- ✓ Big Data
- ✓ Training of Neuronal Nets
- ✓ Machine Learning



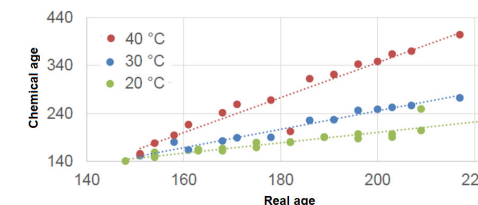
METHODS



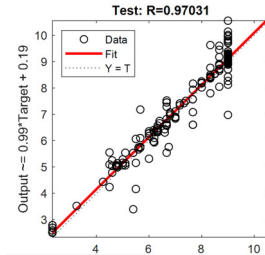
Complex dynamics of autooxidation



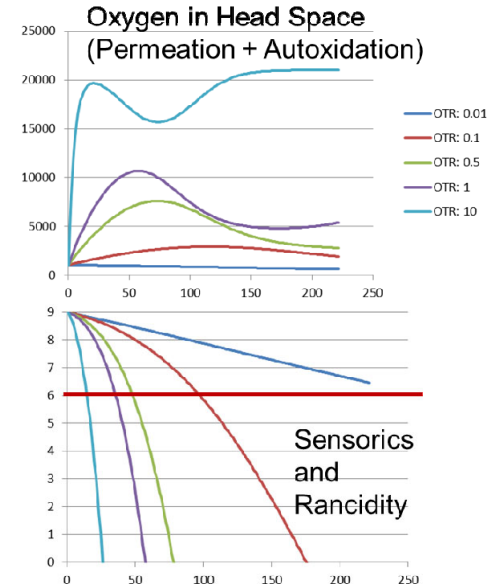
Milk in cartons packaging



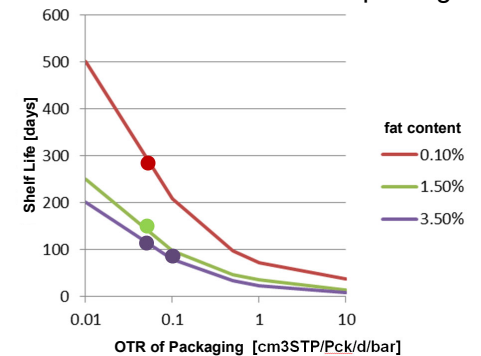
Chemical ageing of UHT-milk (1.5 % fat) stored at different temperatures, determined by chemometrical analysis of IR-spectra



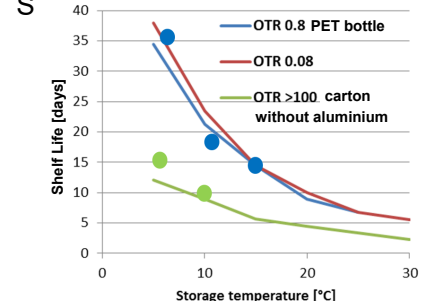
Correlation of sensory prediction (taste rancid) from a trained neural network versus validation data.
→ Quick test of quality parameters by AI-driven pattern recognition



Shelf Life of milk in different packages



Expected shelf life of UHT milk (based on development of rancidity) at different OTRs. Points: Experimental data, lines: S.



Maximum functional barrier → overpackaging / underpackaging

Expected shelf life of ESL milk (rancidity) at different OTRs and storage temperature. Points: Experimental data, lines: Simulation;