

Development of a fast method for monitoring quality of Baltic herring

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FOOD CHEMISTRY

Introduction and aim of the study

Baltic herring is economically the most important fish species in Finland, living especially in the northern parts of the Baltic Sea. As a food fish, herring is very nutritious, but variations in the quality of herring may limit their use as food. Little is known about the suitability of different quality measurement methods for Baltic herring at different stages of the food chain. Finding a suitable method of quality monitoring is important in order to improve the quality of Baltic herring and thus food consumption.

The aim of this study was to investigate how different quality monitoring methods describe changes in the quality of Baltic herring during cold storage.

Materials and methods

Baltic herrings were stored in a cold room covered with ice for 0-9 days. During these nine days, samples were taken from different time points.

The quality monitoring methods used in the study were measurement of volatile compounds by headspace solid-phase microextraction (HS-SPME) coupled to gas chromatography–mass spectrometry, determination of total volatile nitrogen (TVB-N), monitoring of changes in electrical conductivity by **Torrmeter** and measurement of primary oxidation products with peroxide value (PV). Samples were also examined with sensory analysis using the quality index (QIM) and RATA (rate-all-that-apply) methods.

1 days



2 days



4 days



6 days



7 days



8 days



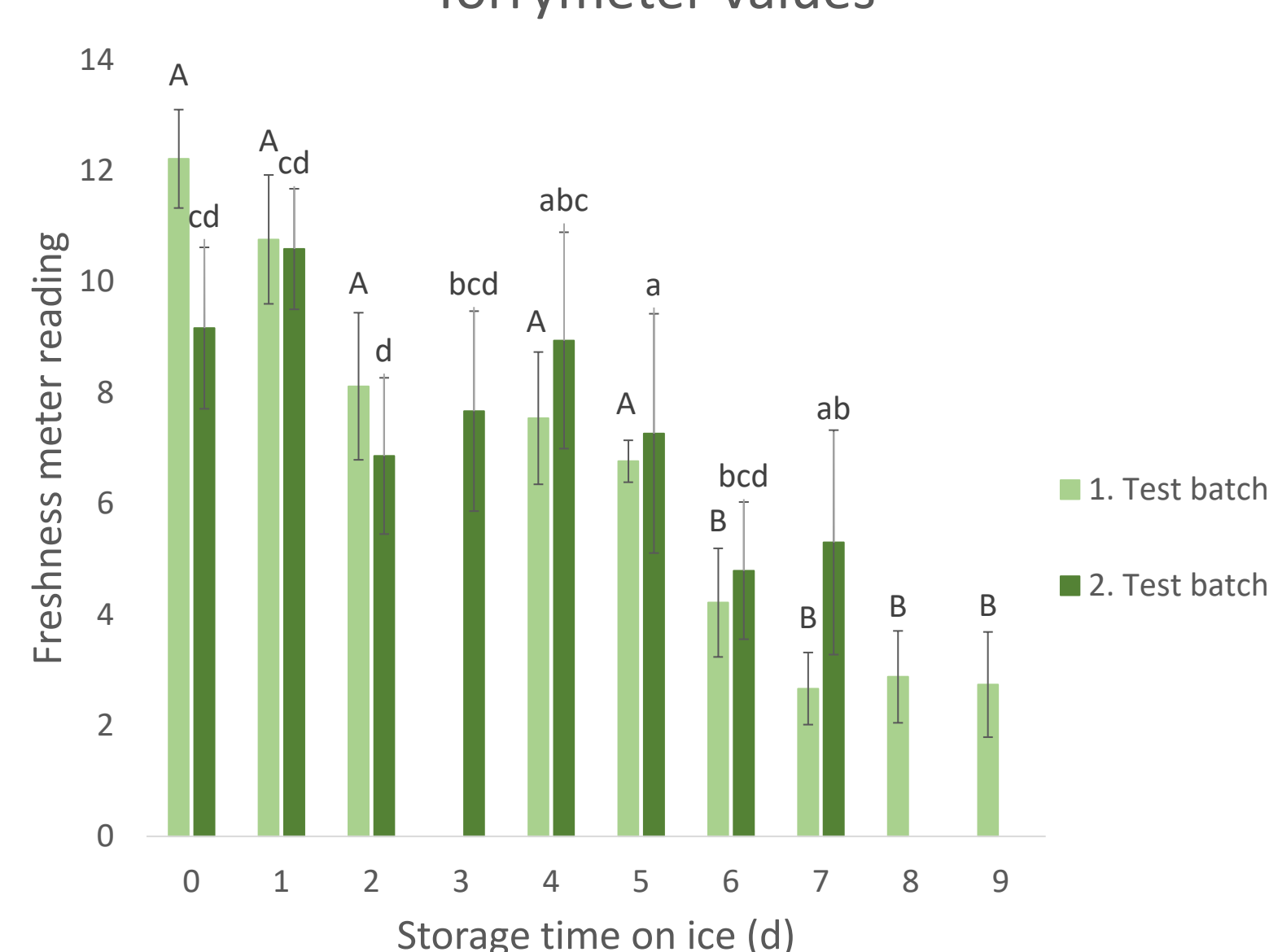
9 days



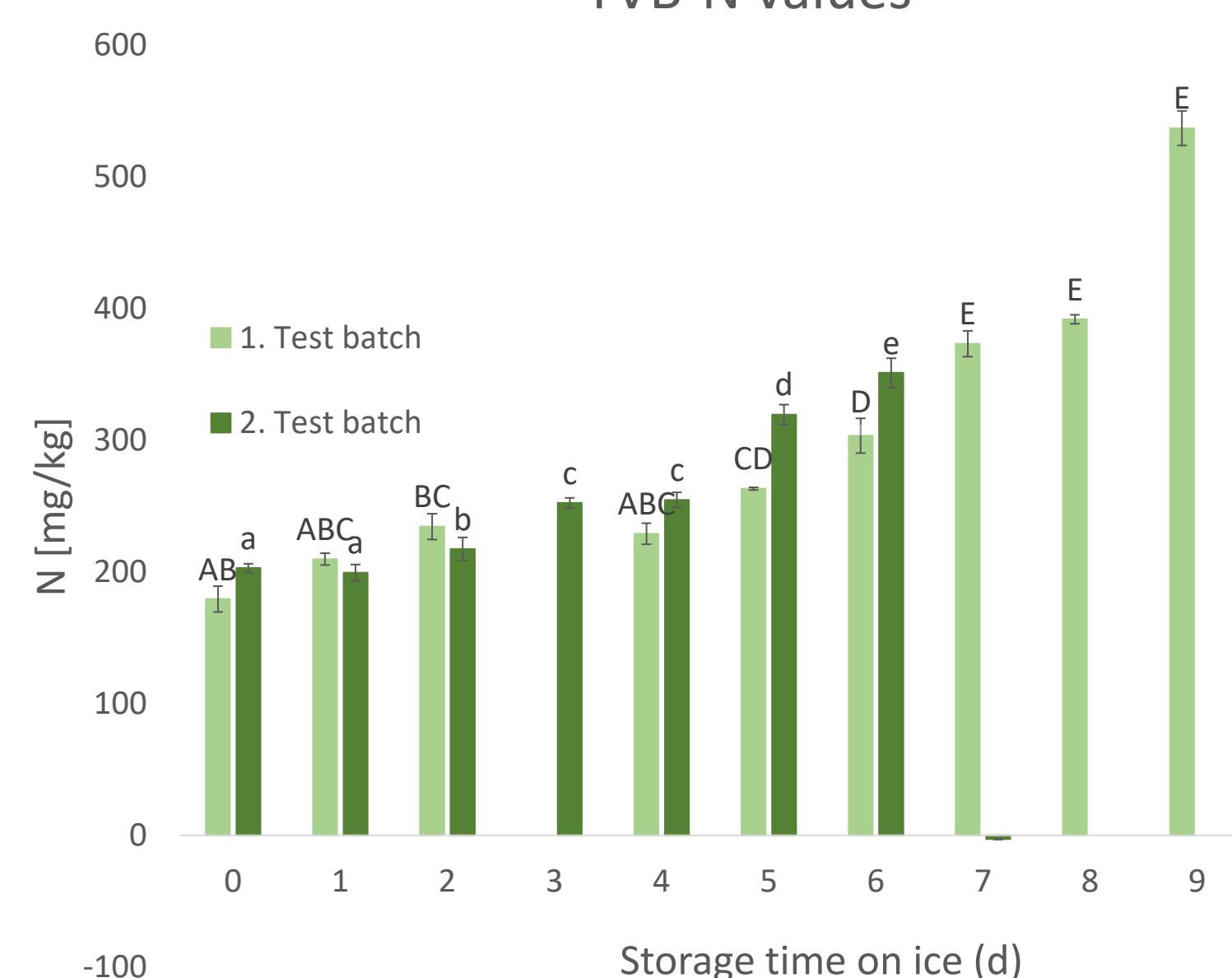
Results

- In all methods except pH and peroxide value results changed linearly as the spoilage progressed.
- Storage time had no significant effect on pH values, making pH measurement an unreliable method.
- According to the RATA method, the odor attributes of fresh samples were fresh, marine, and herbaceous, with intensities gradually beginning to decrease as the spoilage progressed and replaced by odors suggestive of spoilage, such as rancidity, acidity and sulfuric.
- Based on multivariate methods (PCA and PLS) the Torrmeter readings and TVB-N results were inversely correlated. The Torrmeter readings also appeared to correlate with various chemical and sensory variables as expected.
- Torrmeter seemed to be the best alternative to the rapid method for monitoring the quality of Baltic herring. Torrmeter showed the most promise as a simple and inexpensive method to monitor the quality of Baltic herring

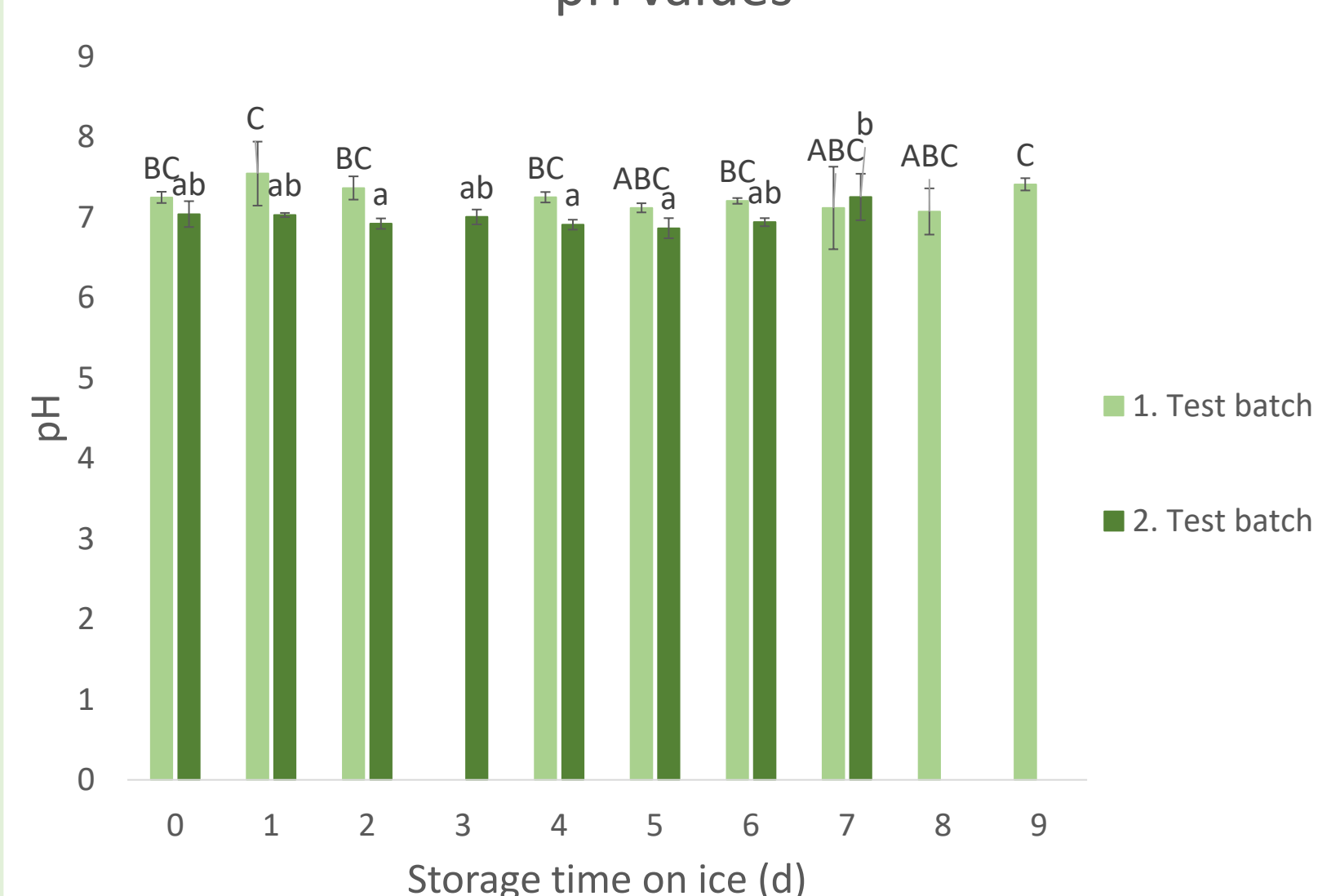
Torrmeter values



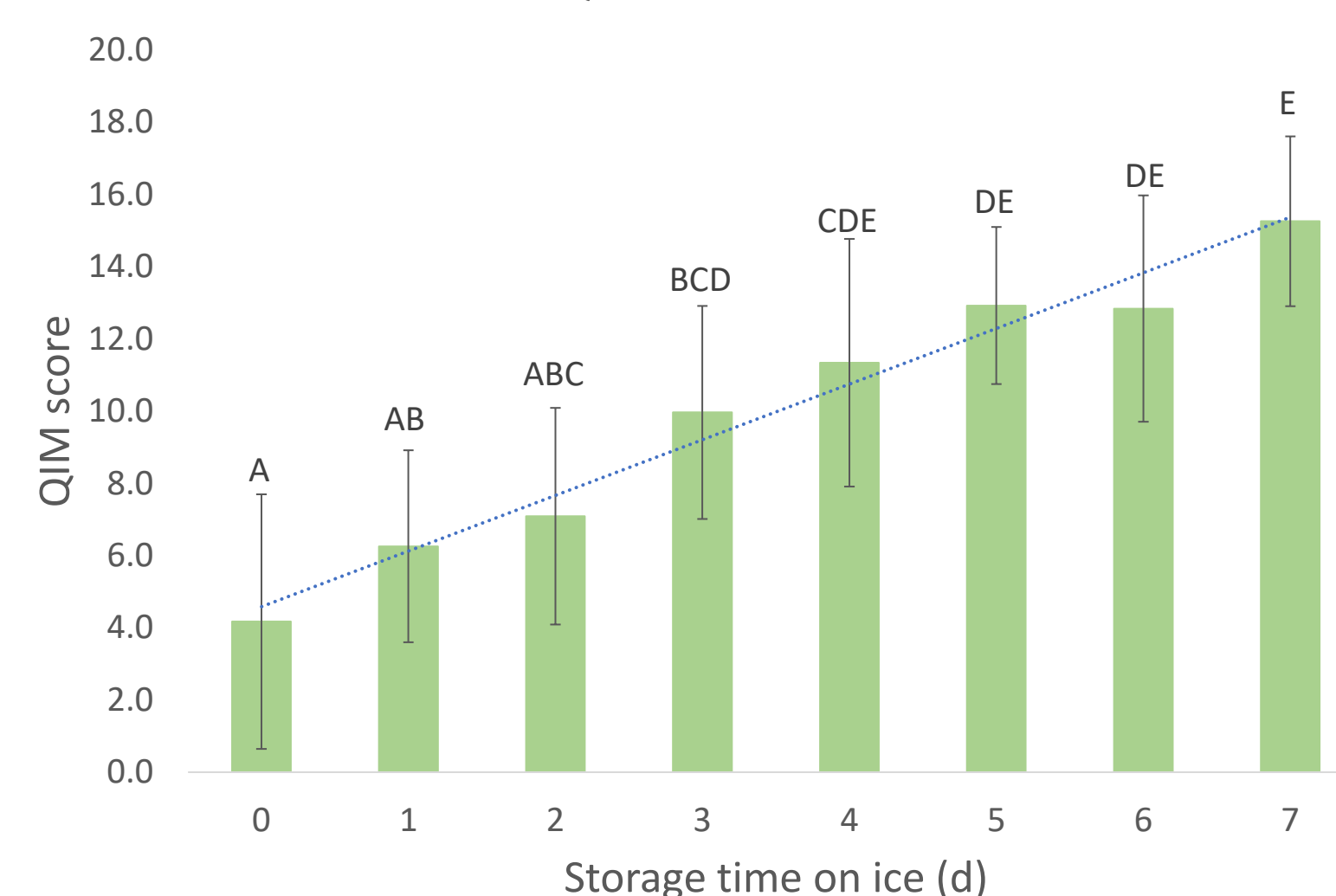
TVB-N values



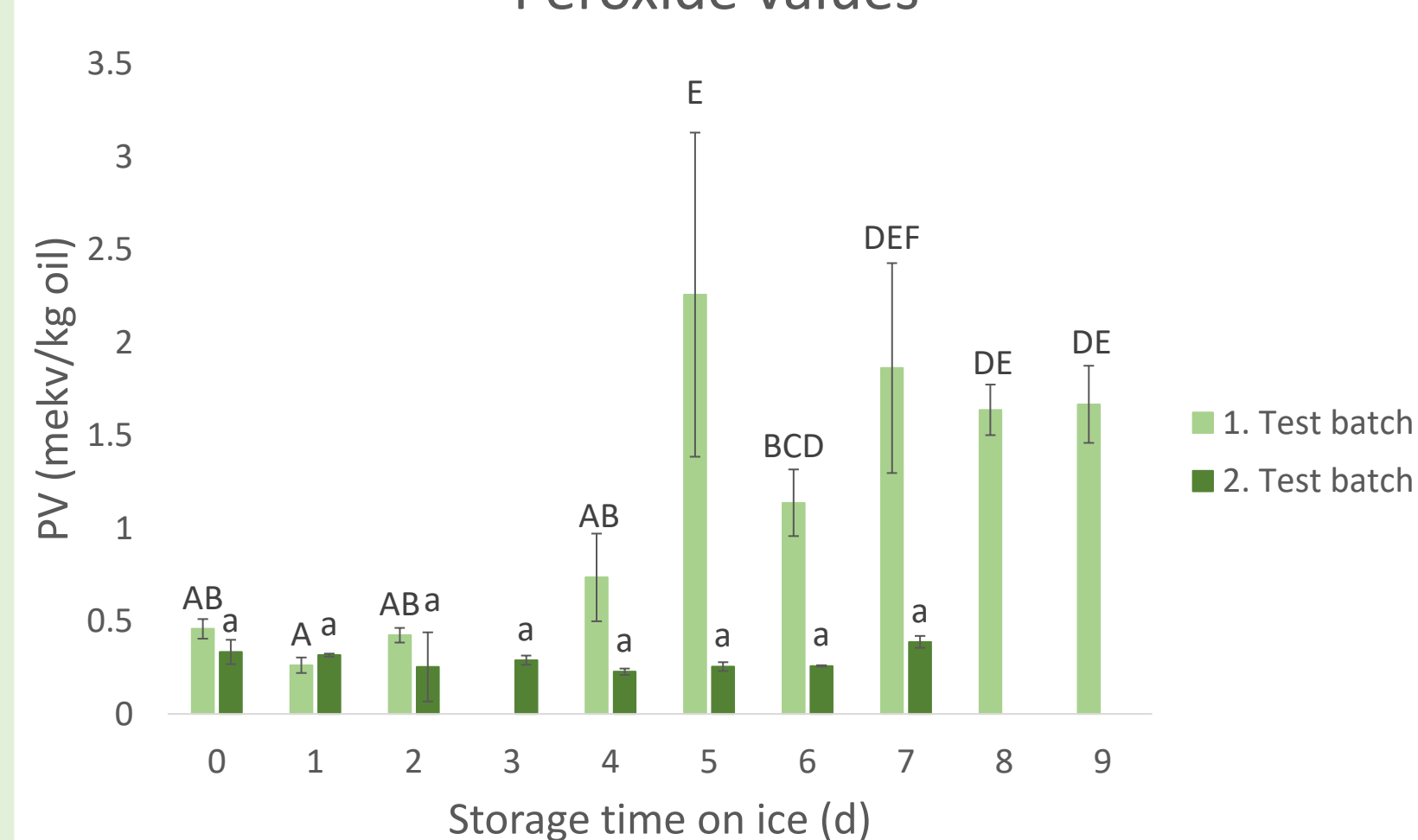
pH values



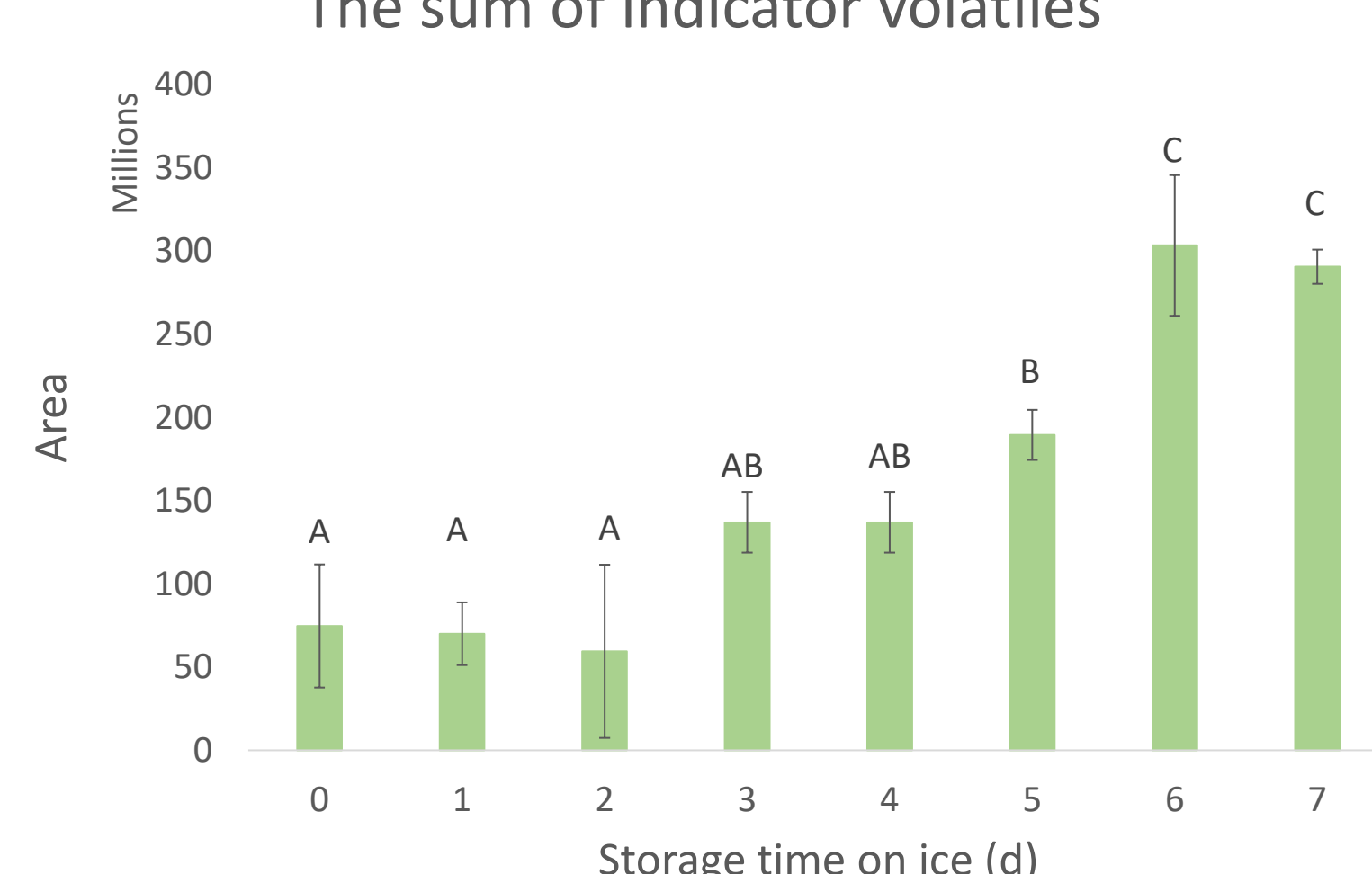
QIM scores



Peroxide values



The sum of indicator volatiles



TURUN
YLIOPISTO