



Modifications of membrane phospholipids in response to extended aging in pork loins

Elizabeth Donaldson, Wan Jun Wu, Michael Chao

Kansas State University, Department of Animal Sciences and Industry, Manhattan, KS 66506

Introduction

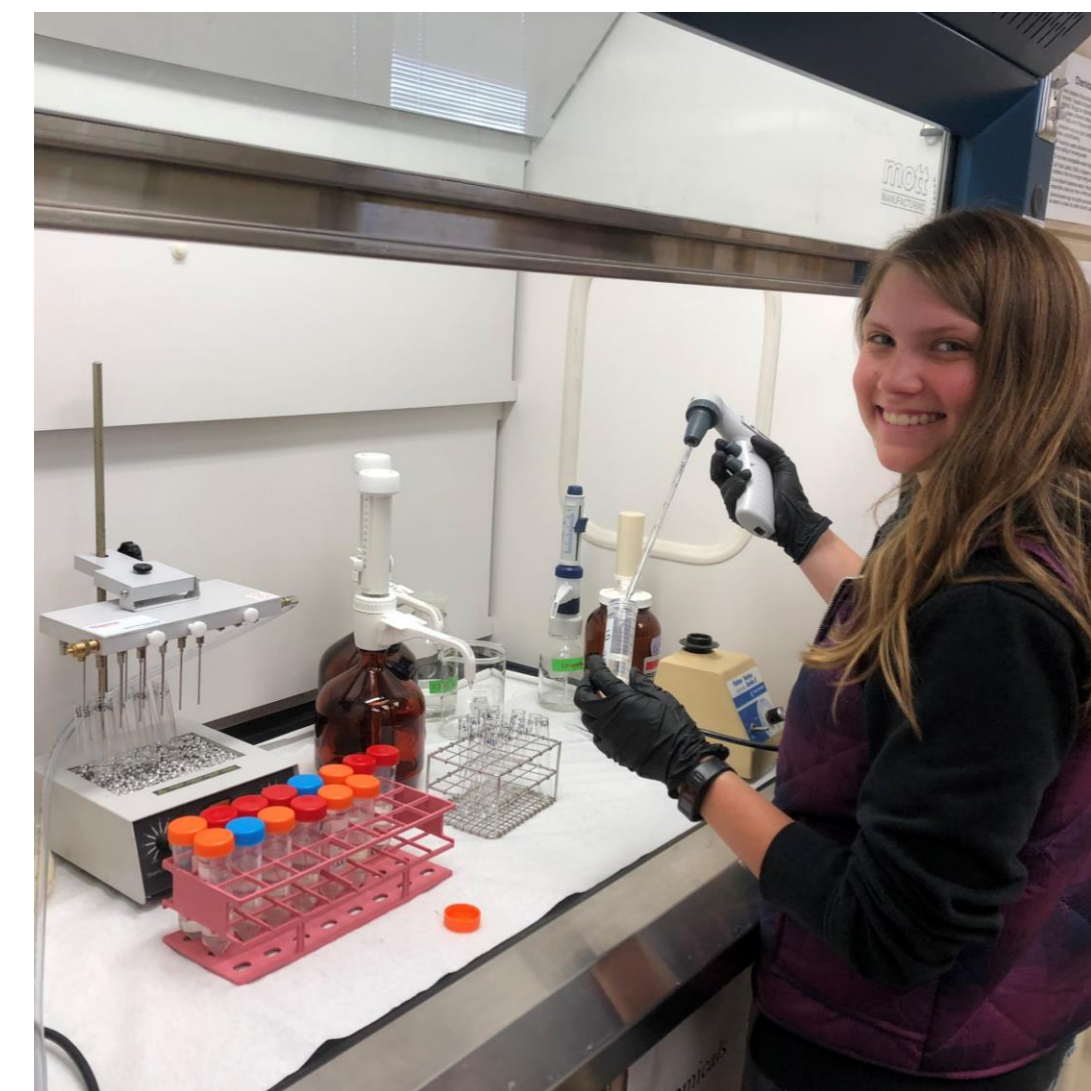
- Meat quality deterioration during the aging process is partially caused by phospholipid oxidation.
- Reducing phospholipid oxidation can lead to extended shelf life of packaged meats.

Objective

- The objective of this study was to evaluate modifications of phospholipids in three different aging periods (1, 8, 21 days).

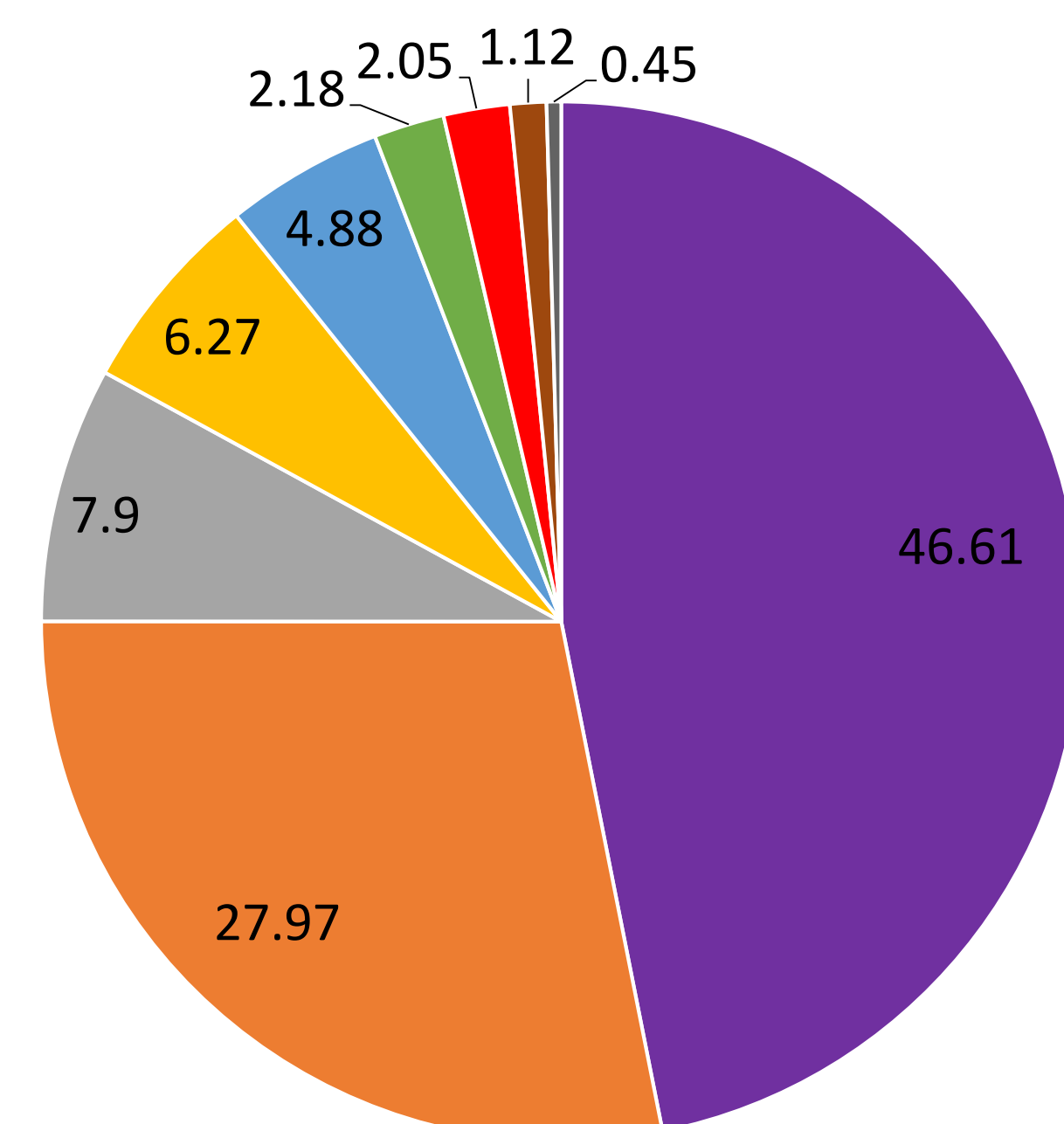
Materials and Methods

- In this study, Duroc sired crossbred pigs were processed at a commercial harvest facility in the Midwest.
- Loins from 20 carcasses were collected at one day postmortem.
- Three chops containing the longissimus muscle were vacuum packaged and aged at 2-4 degree C for either 1, 8 or 21 days.
- The lipid was extracted from each sample using the Folch method and prepared for analysis.
- The samples were taken to K-State Lipidomics Research Center where mass spectrophotometry was used to analyze phospholipid species (n=60).



Results

Overall Phospholipid Percentages



- phosphatidylcholine
- alk(en)yl, acyl glycerophosphocholine
- phosphatidylethanolamine
- phosphatidylinositol
- sphingomyelin
- alk(en)yl, acyl glycerophosphoethanolamine
- phosphatidylserine
- lysophosphatidylcholine
- lysophosphatidylethanolamine

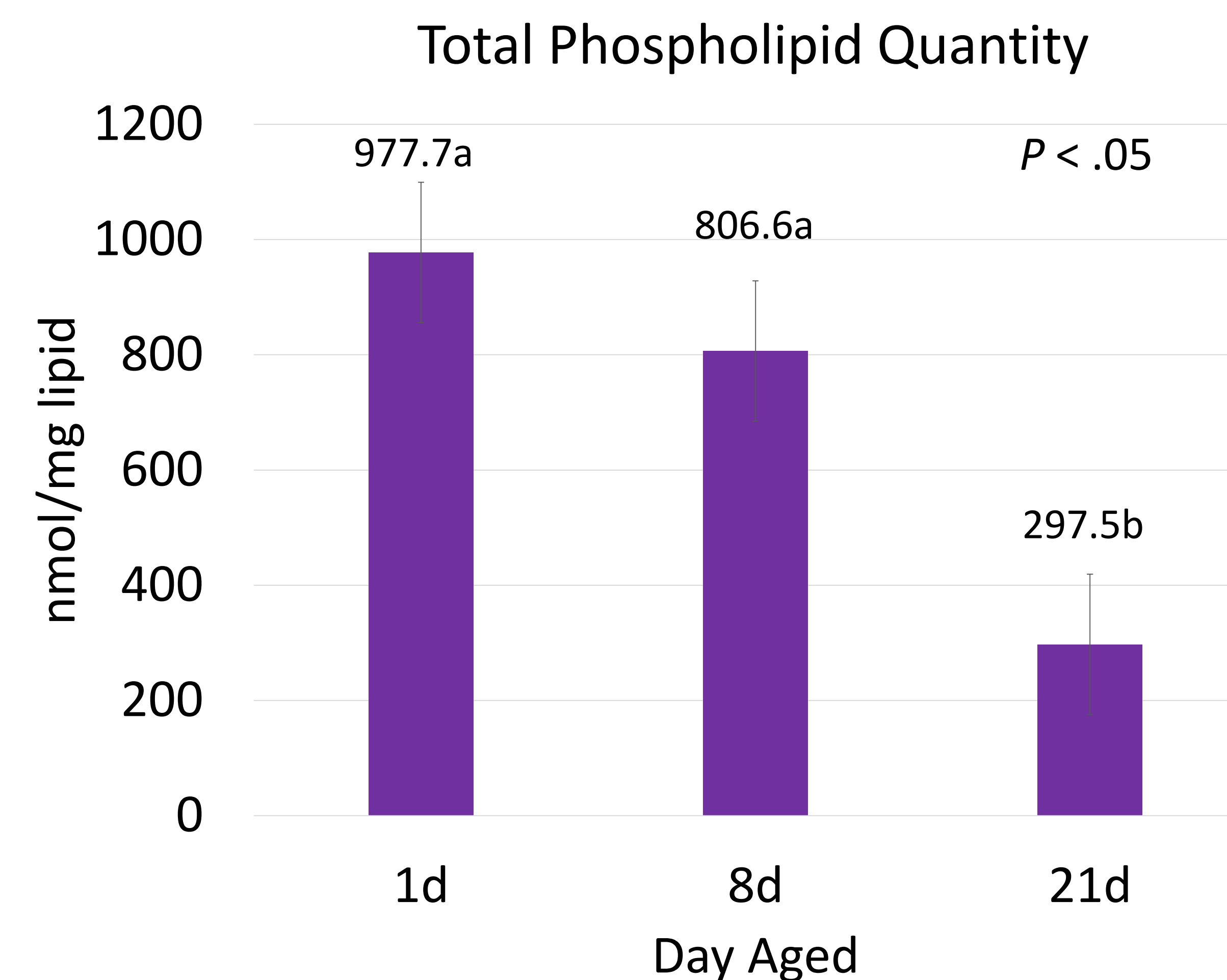


Figure 1. Alterations of total phospholipid quantity over three aging periods.

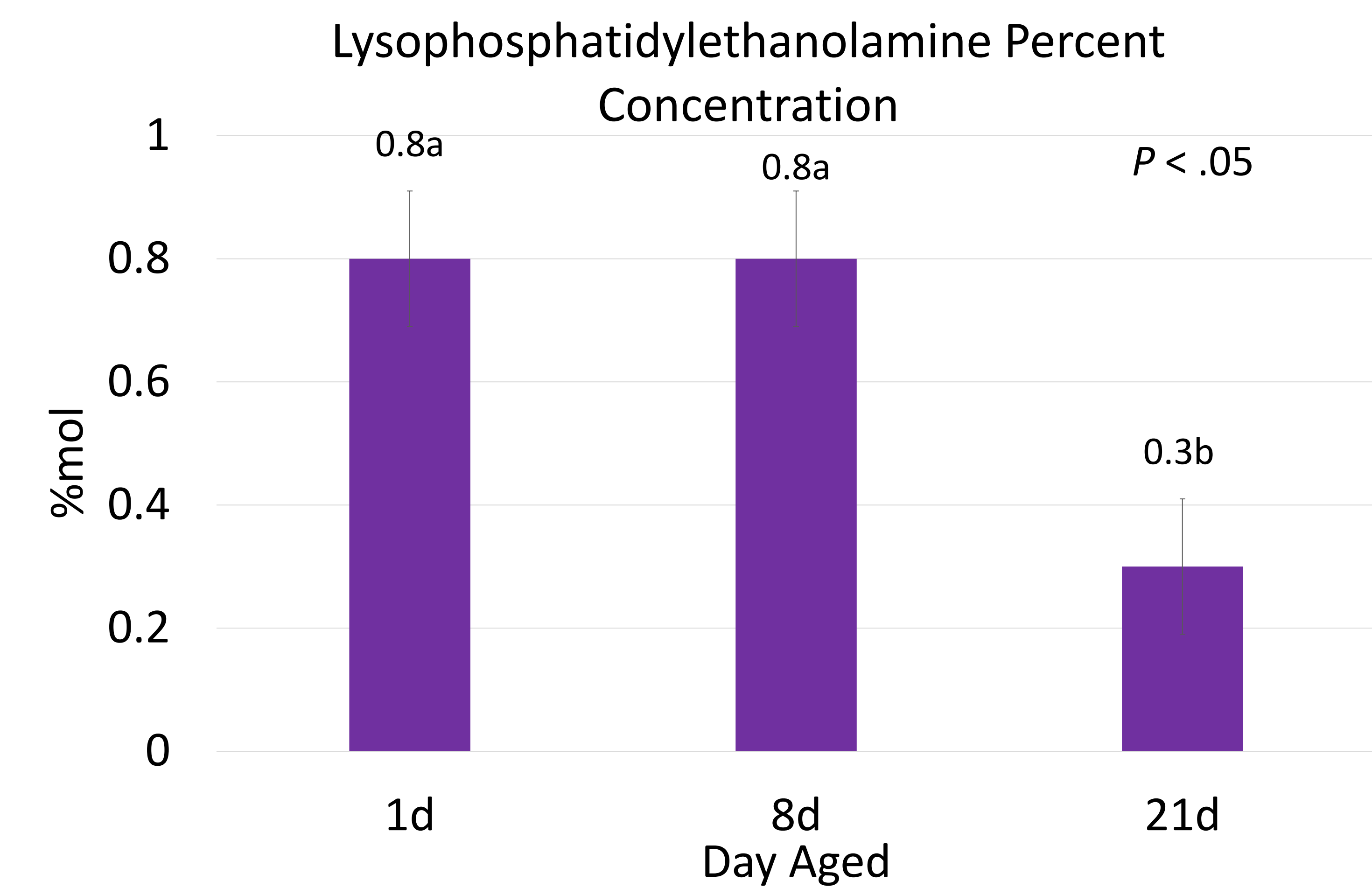


Figure 2. Alterations of molar percent of lysophosphatidylethanolamine over three aging periods.

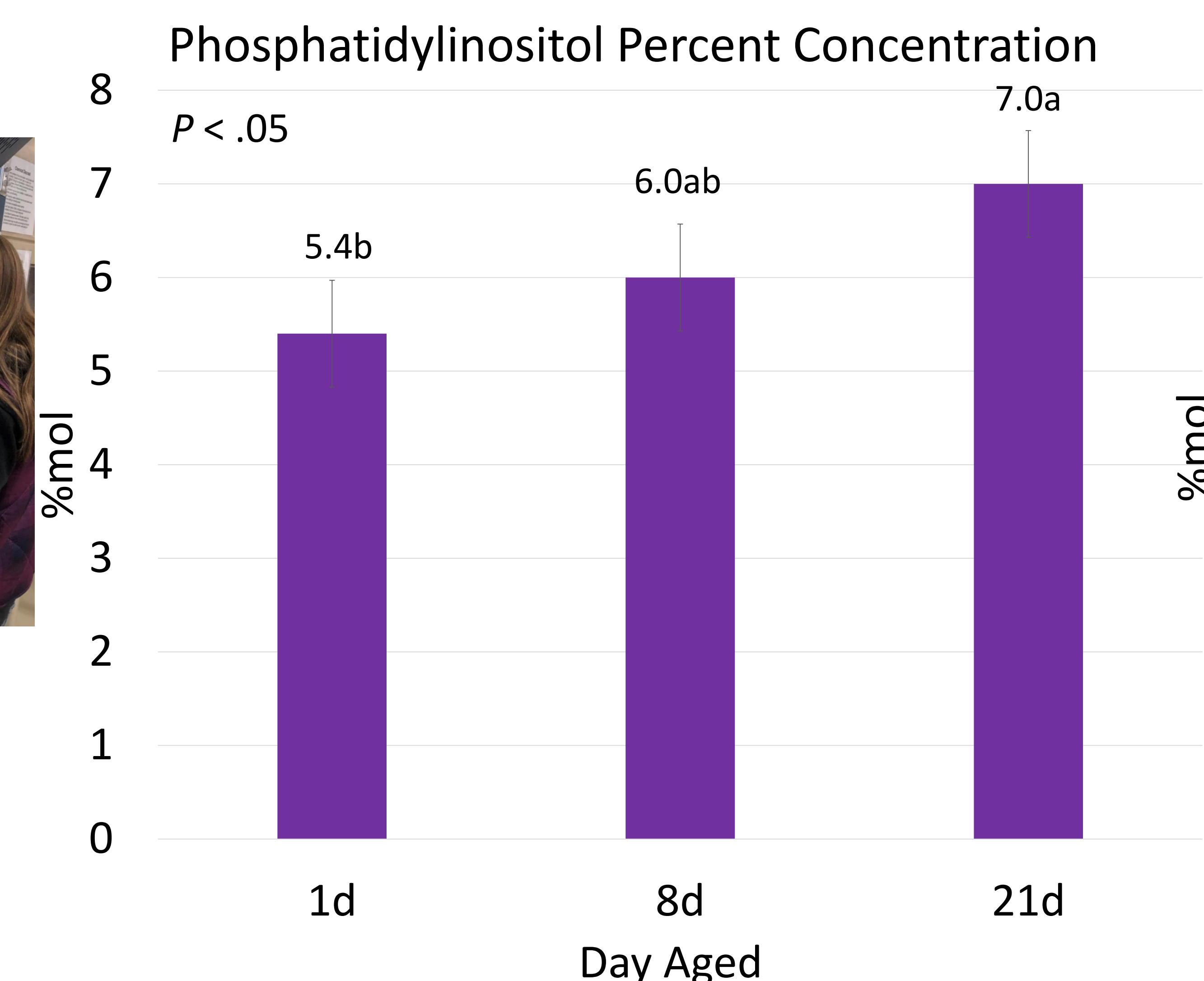


Figure 3. Alterations of molar percent of phosphatidylinositol over three aging periods.

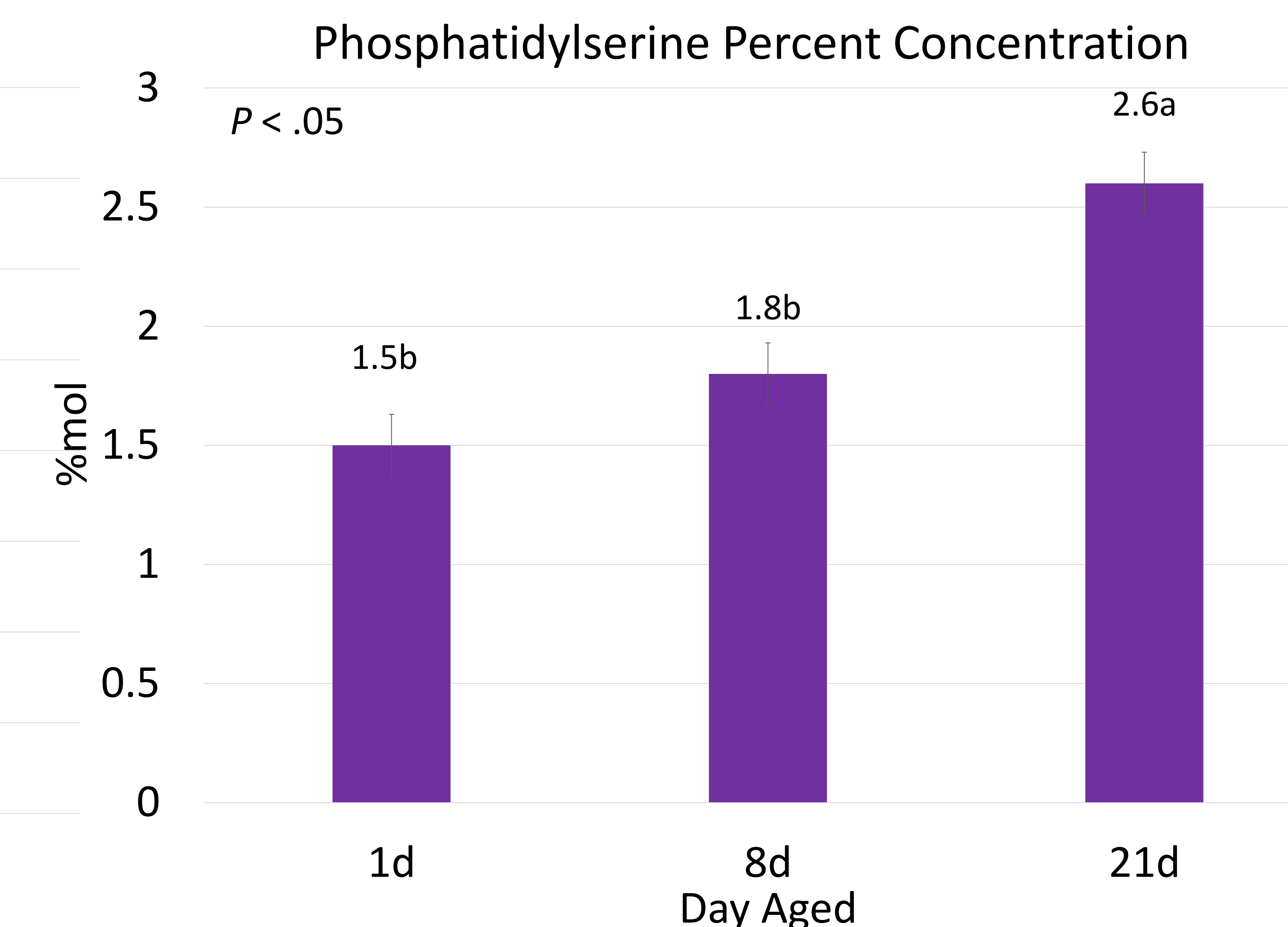


Figure 4. Alterations of molar percent of phosphatidylserine over three aging periods.

- There were no significant differences in percent concentration for any other phospholipid classes among the aging periods.

Conclusions

- Phospholipids experience significant degradation throughout the aging process.
- Certain phospholipid classes like phosphatidylinositol and phosphatidylserine are more resistant to degradation compared to other classes.
- More research on alterations of phospholipids during aging will help to shed light on shelf-life extension in pork.