

The Effect of The Addition of Different Acids on the Functional Properties of Liquid Egg White with Storage

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Introduction

Liquid egg products require effective preservation methods to maintain their safety, quality, and functionality for use in the food industry. Acidification lowers the pH to inhibit microbial growth, thereby enhancing shelf life while maintaining the natural texture and flavor of the product. The application of food-grade acids is a common approach in food processing to extend shelf life, inhibit microbial growth, and modify functional characteristics. This study evaluated the impact of phosphoric, citric, and ascorbic acids on the functional properties of liquid egg white over a two-week storage period at 4 °C. The acids, commonly used for preservation, were added to homogenized and pasteurized liquid egg white, reducing its pH.

Methods

- Liquid egg white pH was reduced from 7.4 ± 0.2 to 5.9 ± 0.1 , 5.9 ± 0.1 and 5.9 ± 0.1 with phosphoric acid (PA), citric acid (CA) and ascorbic acid (AA) respectively.
- Color, pH, viscosity, and foaming ability and stability were measured on week 1 and week 2 after storing at 4 °C.
- Samples that didn't receive any treatment acted as reference sample.

Results

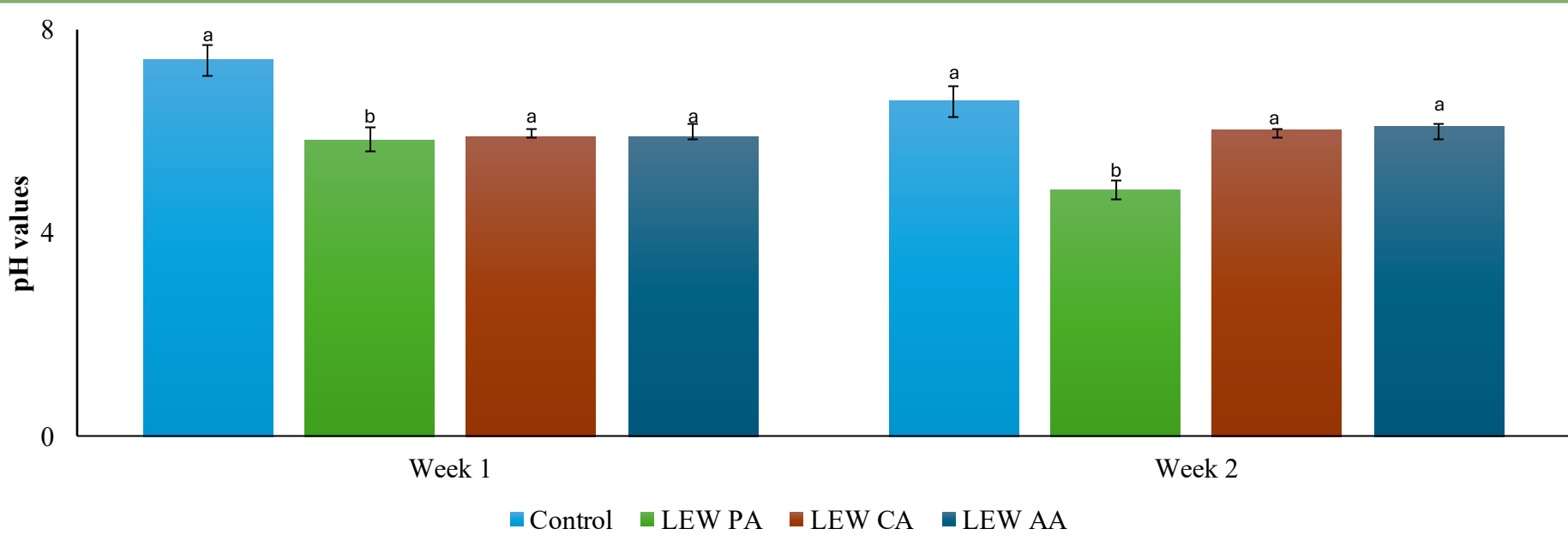


Figure1: pH values of liquid egg white after the addition of acids on 2 weeks period.

After the reduction of pH of liquid egg white, a variations in pH stability over two weeks of storage at 4°C was noticed. Phosphoric acid caused the most significant decline, while citric and ascorbic acids showed minimal pH changes.

Results

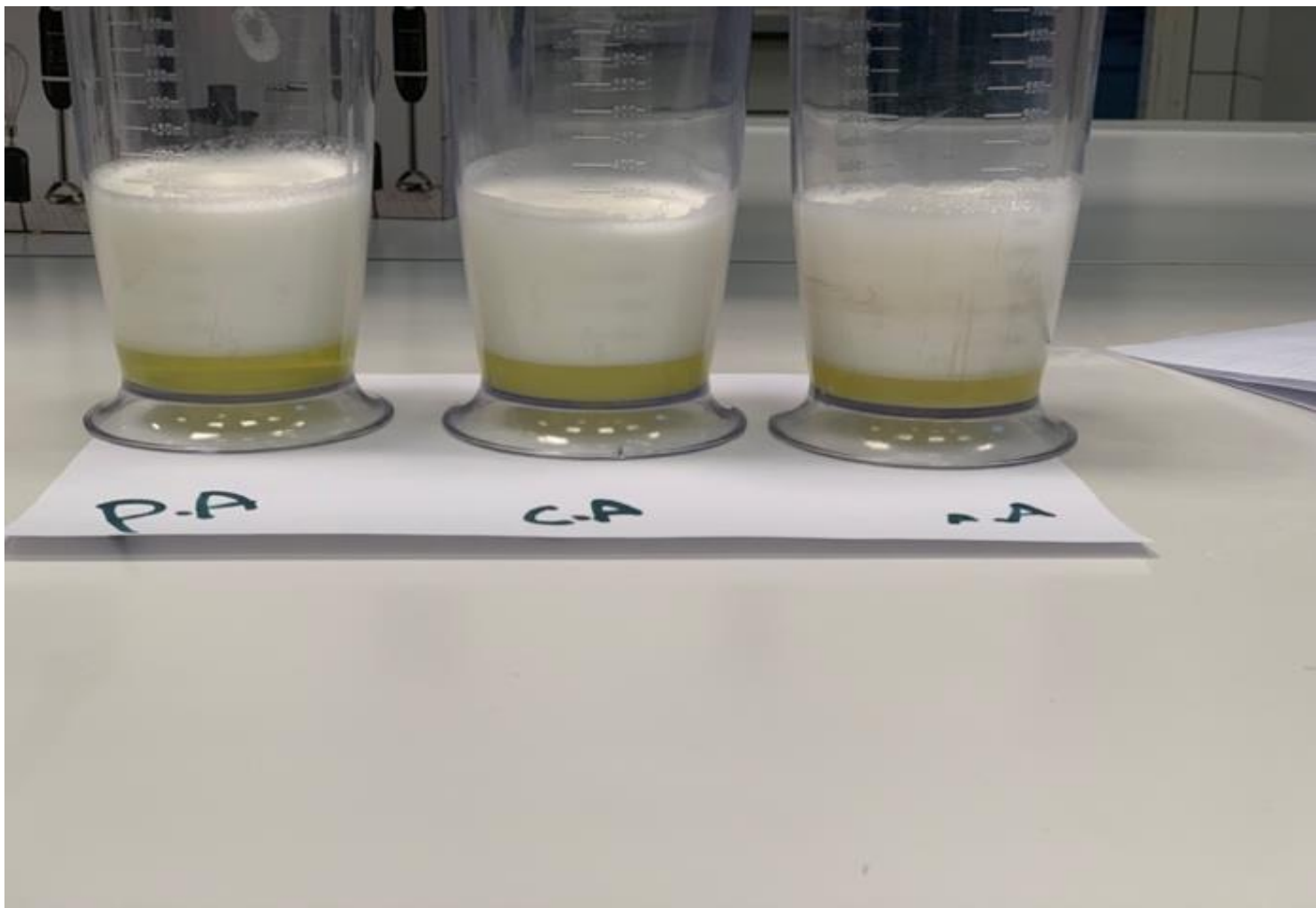


Figure2: foaming ability and stability measurement for liquid egg white with different added acids

Table1: foaming ability of liquid egg white samples treated with different acids, after a week and 2 weeks of storage.

Sample	Control	PA	CA	AA
Week 1	50%±1.2%	50±0.9%	50±1.1%	37.5±1.1%
Week 2	35±1.3%	40±0.7%	42.5±0.3%	30±0.8%

Table2: foaming stability of liquid egg white samples treated with different acids, after a week and 2 weeks of storage.

Sample	Control	PA	CA	AA
Week 1	28%±1%	30%±0.8%	30%±1.2%	27.3%±1.3%
Week 2	24.1%±1.2%	26.8%±1.2%	28.1%±1.1%	23.1%±1.7%

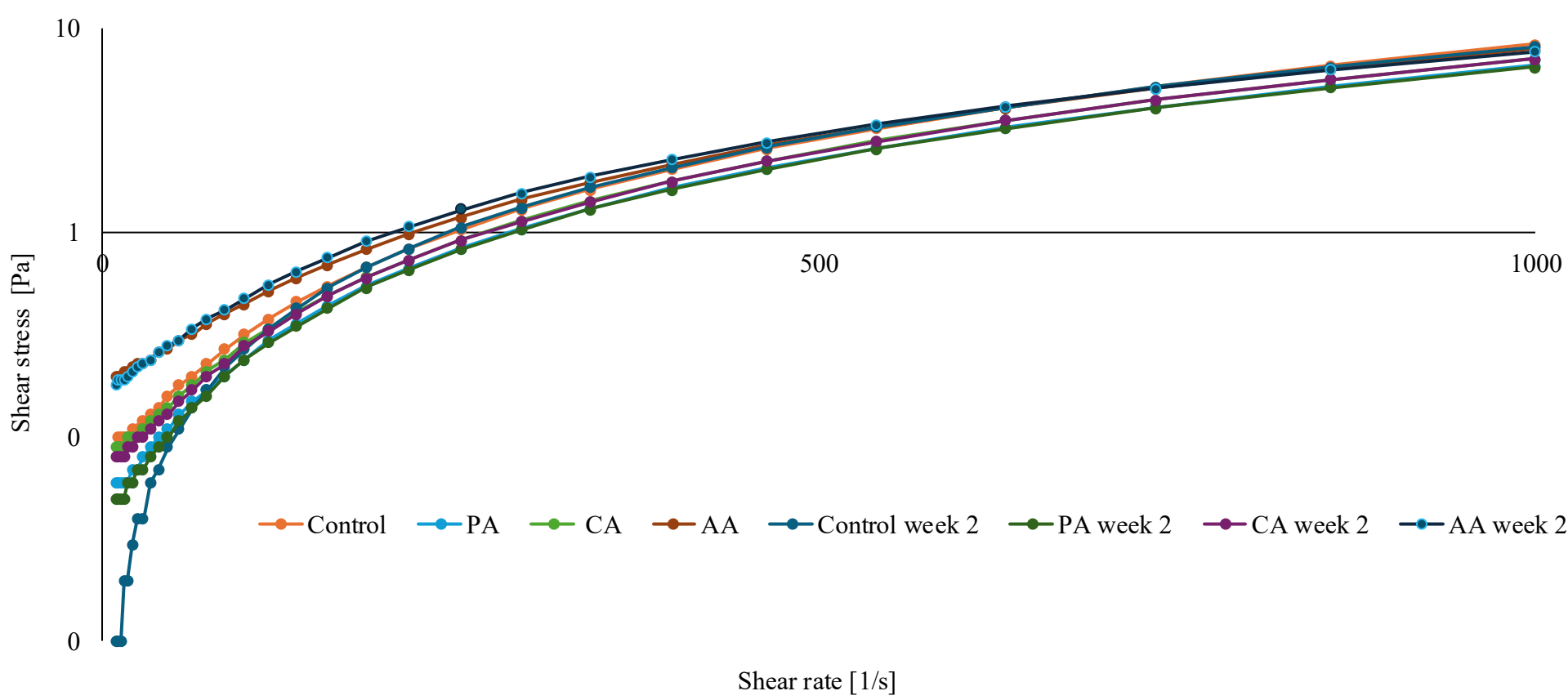


Figure 3: The flow curve (shear rate vs. shear stress) of added different acids to liquid egg white sample for 2 weeks of storage.

Conclusion

This study showed that the type of acid added to liquid egg white significantly affects its functional properties during storage. While phosphoric and citric acids preserved or improved stability and foaming, ascorbic acid reduced foaming ability and flow consistency, making it less suitable for maintaining quality.