# EFFECT OF HIGH HYDROSTATIC PRESSURE TREATMENT ON LIQUID WHOLE EGG WITH NISIN AND LYSOZYME

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## Introduction

Day by day, the consumers show more interest in healthy and nutritive food products. Usually, heat treatment is the most widely used process to prevent food alteration. Although, it also showed that high temperature could damage thermo-sensitive food (and thermo-sensitive food materials like proteins). Egg and its products are one of these products that studies showed that egg proteins are damaged by temperatures used in conventional heat treatments. To prevent this, minimal processing technologies as High Hydrostatic Pressure (HHP) are taken into consideration. To reinforce the conservation ability of HHP treatment, some additives can be added to Liquid Egg products.
The aim of this study is to determine the effects of different pressures of HHP treatment and nisin and lysozyme concentrations on the rheological proprieties of Liquid Whole Egg (LWE).

## Materials and method

A central composite design was carried out for these purposes with pressures between (226-400 MPa) and nisin and lysozyme concentrations (between 0-6.35 and 0.16-1.5 mg/l consecutively).
The different Nisin and Lysozyme quantities were added to liquid Whole Egg, then packed sous-vide in polyethylene bags. The HHP treatment was processed depending on the pressure and the samples were held for 5 min at room temperature. The samples were directly stored in the refrigerator room for 29 days.
To determinate the rheological properties, an Anton Paar MCR 92 rheometer was used with a CC27 measuring system between 10 and 1000 1/s shear rate at 20 °C.

Table 1 . Experimental scheme of Central Composite Design

| | HHP (mPa) | Nisin (mg/l) | Lysozyme (mg/l) |
|---|---|---|---|
| *L:A-a | 266 | 3 | 1 |
| *H:A-a | 435 | 3 | 1 |
| *L:B-a | 350 | 0 | 1 |
| *H:B-a | 350 | 6,35 | 1 |
| *L:C-a | 350 | 3 | 0,16 |
| *H:C-a | 350 | 3 | 1,84 |
| Cube001a | 300 | 1 | 0,5 |
| Cube002a | 400 | 1 | 0,5 |
| Cube003a | 300 | 5 | 0,5 |
| Cube004a | 400 | 5 | 0,5 |
| Cube005a | 300 | 1 | 1,5 |
| Cube006a | 400 | 1 | 1,5 |
| Cube007a | 300 | 5 | 1,5 |
| Cube008a | 400 | 5 | 1,5 |
| Cent-a | 350 | 3 | 1 |
| Cent-b | 350 | 3 | 1 |
| Cent-c | 350 | 3 | 1 |

## Results and Discussion

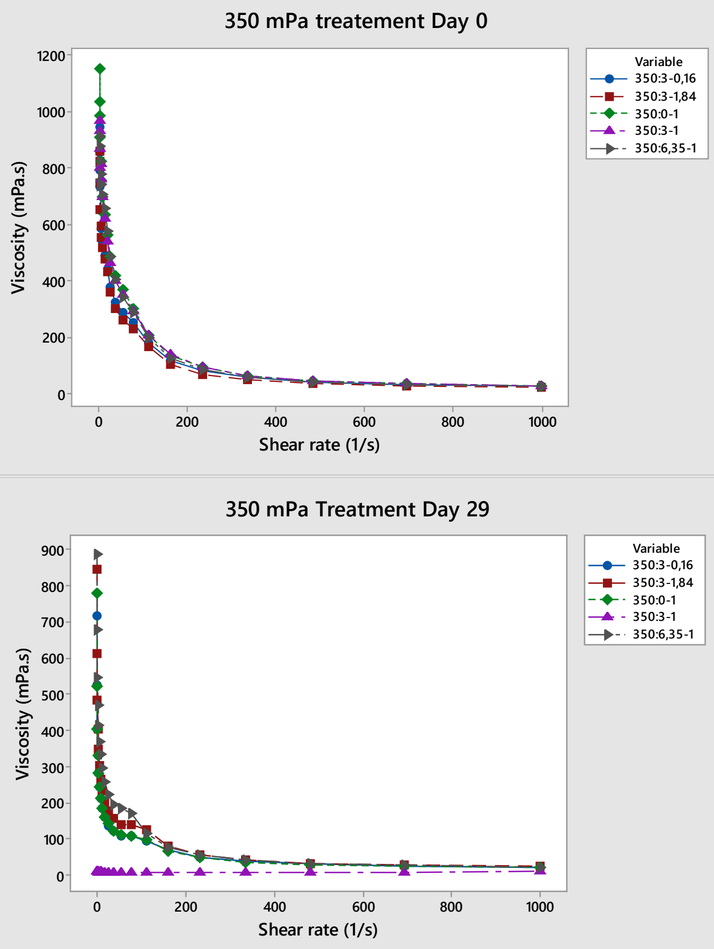


Figure 1. Apparent Viscosity of Liquid Whole liquid with nisin and lysozyme treated with 350 mPa Day 0 and Day 29

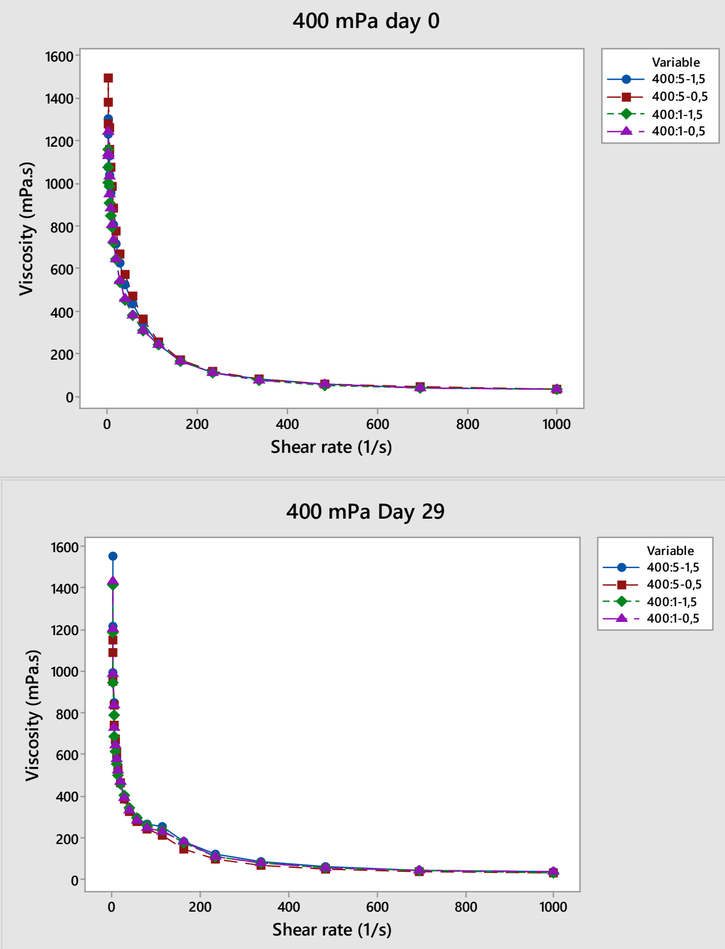


Figure 2. Apparent Viscosity of Liquid Whole liquid with nisin and lysozyme treated with 400 mPa Day 0 and Day 29

The following Figures 1. 2. show the apparent viscosity of whole liquid with nisin and lysozyme treated with 350 mPa and 400 mPa in different days.
the WLE treated with 350 mPa exhibit a lower apparent viscosity than the samples treated with 400mPa. Meanwhile, sample with the minimum nisin concentration showed the highest apparent viscosity. This is completely changed in the last day of storage where the sample with minimum nisin concentration (0) showed the lowest apparent viscosity and the highest one was for the sample with the highest nisin concertation (6,35mg/l).

As mentioned above, the samples treated with 400 mPa showed the highest apparent viscosity comparing to all samples (226, 300, 350, 400 and 435 mPa). Thus, samples with the highest nisin and lysozyme concentration (5 and 1,5 mg/l consecutively) just after the treatment.

Reaching the last day of storage, the sample with highest concentration of nisin still show the most elevated apparent viscosity.

## Conclusion

The effect of High Hydrostatic Pressure treatment is significant on the rheological proprieties of the Whole Liquid Egg during the storage time. At the same time, the ad of nisin showed more effectiveness than the lysozyme. The more the concertation of nisin is high more the effect is exhibited.

## Acknowledgement

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