EFFECT OF HHP TREATMENT ON LIPID OXIDATION PROCESSES IN MANGALICA BACON

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Introduction

Food industry is facing increased consumer expectations, so permanent innovation has a major role to play. Consumers want both enjoyable and nutritious, aesthetic, preservative-free and affordable products at the same time. High hydrostatic pressure treatment can provide a suitable solution to meet all these requirements, but it is also worth investigating the possible side effects caused by the pressure. The preservative process can catalyse certain chemical and biochemical reactions that can lead to taste and odor defects. These degrading processes include lipid oxidation, commonly known as rancidity. In addition to the fact that oxidation adversely affects the organoleptic properties of the product, it also poses a serious risk to health, so it is necessary to slow down and inhibit its course as much as possible.

Resato FPU 100-2000 high hydrostatic pressure machine

The three Mangalica breeds: Swallow-bellied, Blonde and Red

Materials and methods

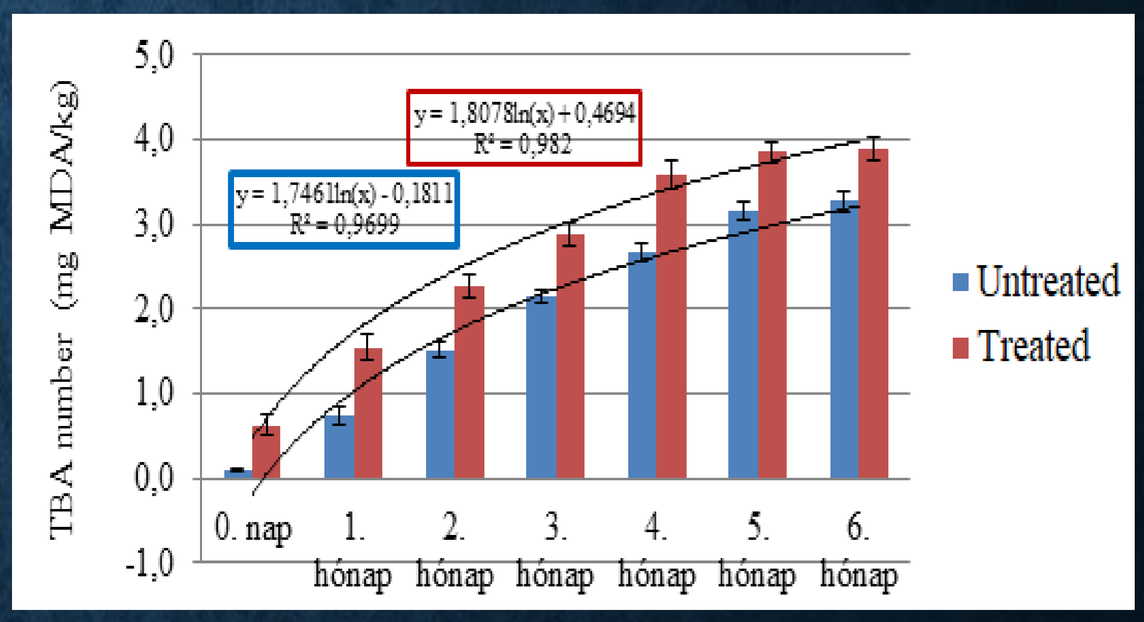
To perform the experiment, pre-chilled, vacuum-packed mangalica bacon was used, which, after the proper preparation, was subjected to a hydrostatic preservation process of 500 MPa for 5 minutes. After the treatment, a storage test was performed, which was continued for six months. During the measurements, a predetermined work plan was followed, and the lipid oxidation values of the pressure-treated and non-hydrostatic samples were determined separately. In all cases, the instrumental examination was followed by a sensory qualification, which was managed to pass with the involvement of twenty people.

An important temperature-based approach to lipid degradation was also considered. During the experiment, three different household temperatures were selected, which differed by 10 °C, so when evaluating the results, there was an opportunity to determine the coefficient characterizing the temperature dependence of the reaction, the Q10 value,

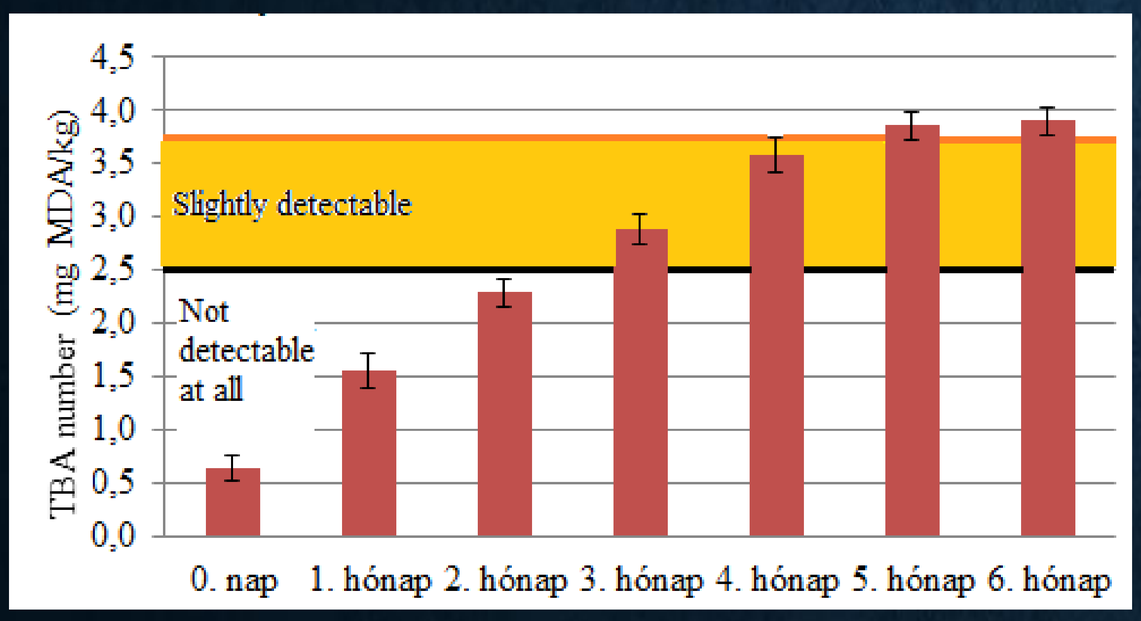
Results

In addition to the high hydrostatic pressure preservation process, the germicidal and enzyme inactivating effect, and the ability to tender in certain pressure ranges, it has been clearly established that it can be a catalyst for undesirable processes. The concentration of malonial dialdehyde characterizing the degree of lipid oxidation showed a visible difference between the control and the samples exposed to the conservation method. The difference was seen at each measurement time point, but the extent was different.

Subjective reviews that complemented the instrumental analysis also yielded interesting results. Critics only stated in the fourth test that they had experienced a foreign taste or odour, albeit only slightly.



TBA number change during the sixt months of storage



Sensory evaluation of pressure treated samples

Conclusion

Based on the measured data and the feedbacks, it was concluded that the limit of sensory detection is lipid degradation at 2.5 mg MDA / kg. During the sixth and seventh sensory tests the range of clearly perceptible rancidity was reached, the lower value of which was determined to be 3.7 mg MDA / kg TBA.

The hypothesis that higher storage temperatures will result in higher thiobarbituric acid numbers has been confirmed. By increasing the storage temperature by 10 degrees Celsius, the concentration of malonial dialdehyde doubled over the one-month period studied.