

COMBINATION OF ACTIVE COMPOUNDS OF ESSENTIAL OIL AND HHP TECHNOLOGY IN CHICKEN MEAT

Khabat Noori Hussein, György Kenesei, István Dalmadi

Department of Refrigeration and Livestock Products Technology, Faculty of Food Science, Szent István University, Budapest, Hungary
Dalmadi.Istvan@etk.szie.hu

Abstract

Chicken meat belongs to a category of naturally high perishable foods. To stop or inhibit the changes antioxidants/antimicrobials or physical preservation methods can be used. High hydrostatic pressure (HHP) extends shelf life while retaining the original flavour and characteristics of food. Application of natural essential oils (EOs) or active compounds of EOs can improve the inhibition of microbes in HHP treated meat products and can result better oxidation stability. To combine ACs with HHP technology, ACs should be selected which fit to the character of meat. Allyl isothiocyanate (AITC) is a colourless, volatile and aliphatic organosulfur compound found in horseradish, cabbage, wasabi, brussels sprouts, broccoli. AITC possess strong effectiveness in causing cell membrane damage, leakage of intracellular components and inhibiting bacteria at all growth stages. The aim of this study to examine the effect of combination of AITC and HHP on the properties of raw chicken meat.

Fresh chicken breast meat was obtained from a local abattoir. Meat was cut (free from bone, connective tissue, skin and visible fat) minced using a meat grinder. The meat was then homogenized and divided into groups. Amounts of meat were mixed with 500 and 1000 ppm AITC (dissolved in 5% sunflower oil); and control (only oil). The samples then placed in polyethylene bags and heat sealed. The high hydrostatic pressure treatment was carried out at 300 or 600 MPa for 5 minutes at room temperature using the RESATO FPU-100-2000 apparatus. After treatments samples were stored at 4 ± 0.5 °C for up to 28 days. The samples were then taken at different time intervals for different analysis on day 0, 14 and 28. Later, pH, colour parameters, thiobarbituric acid reactive substances (TBARS), sensory attributes (E-nose), total aerobic cell counts were monitored.

For almost all of the parameters studied, a significant effect was demonstrated with respect to the AC concentration used and the pressure treatment level taking into account the storage time. The increasing concentration of AITC was becoming lighter ($p < 0.001$), becoming redder ($p = 0.008$) and producing a smaller number of microbes ($p < 0.001$). AITC did not change the pH of the meat ($p = 0.051$) and the TBA number did not change either ($p = 0.485$). Pressure treatment also made the samples brighter ($p < 0.001$), decreased a * ($p < 0.001$) and significantly reduced the number of microbes ($p < 0.001$). The TBA number was not influenced by pressure treatment ($p = 0.184$). All the factors except for the TBA number were significantly different. Electronic nose results have shown that all of the parameters studied had a detectable effect on the volatile components of the samples.

Key words: chicken meat, allyl isothiocyanate, HHP, storage

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