

Different pressures, low temperature, and short-duration supercritical carbon dioxide treatments: microbiological, physicochemical, microstructural, and sensorial attributes of chill-stored chicken meat

ABSTRACT

This work aimed to determine the microbiological, physicochemical, microstructural, and sensorial attributes of chicken meat treated with different pressures of supercritical carbon dioxide (SC-CO₂) at a low temperature for a short duration. The raw chicken meat was subjected to three pressures: 7.4, 11.4 and 15.4 MPa at 31 °C for 10 min and then stored at 4 °C for seven days. The 11.4 and 15.4 MPa treatments on the zeroth day reduced the microbial load compared to the control and 7.4 MPa treatment. Similarly, the higher pressure resulted in a decrease in the total count of yeast and mold. The SC-CO₂ had a lesser effect on the lipid peroxidation, pH, cooking loss, and water holding capacity of the treated chicken meats. Color analysis showed an increase in lightness (L*) and a reduction in redness (a*) on the sample surface. Both texture and color results were within acceptable ranges. SC-CO₂ treatment with 11.4 or 15.4 MPa at a low temperature for a short time improve microbiological safety while retaining the quality of chicken meat. These findings can be expanded and applied as an alternative for non-thermal processing of chicken meat.

Keyword: Supercritical carbon dioxide; SC-CO₂; Non-thermal technology; Microbial reduction; Raw chicken meat