QUALITY CHANGES IN IKURA (Oncorhynchus keta) AFFECTED BY SALT, THERMAL PASTEURIZATION, AND STORAGE TIME

Abstract

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Salmon caviar or ikura are popular food produced from eggs of Pacific salmon principally chum salmon (Oncorhynchus keta) and pink salmon (O. gorbuscha). Salmon caviar should have 3.5-5% of water phase salt (WPS) to inhibit the growth of Listeria monocytogenes and recommended pasteurization protocols (6 log reduction of L. monocytogenes) is 2 minutes at 70°C. However, thermal processing may lead to undesirable texture changes, so a kinetic study of textural change was conducted.

Brining also influences the eggs quality such as pH, water activity and protein properties. Protein denaturation temperatures (PDT), pH, water activity in ikura at different WPS (0, 3.23%, 3.76%, 3.91%, 4.10%, 4.23%, 5.24% and 7.17%) were determined. PDT were measured by differential scanning calorimetry. PDT correlated with texture for unsalted roes heated at 70°C for different
times (1, 6, 11, 15, 19, 23, 27 and 31 min). Two films with different oxygen transmission rates (OTR, 40 and 62 cc/(m²·day) ) were used as packaging for ikura of 5.24% WPS in a 60-day-long shelf-life study. The PDT increased significantly (92 to 96.5ºC) \((P<0.05)\) with an increase in WPS from 0 to 7.17% which followed a polynomial trend \((R^2=0.99)\), pH did not appear to be affected. Compression force of the unsalted roes decreased linearly \((R^2=0.89)\) with increasing heating time. Ikura from both packaging all had significant decreases \((P<0.05)\) in pH, water activity and firmness of texture; however no significant difference were observed between ikura in two packaging \((P>0.05)\). CIE L*a*b* as the color parameters of ikura in different films had no significant change during the storage \((P>0.05)\). The malondialdehyde contents in both slightly and synchronously increased \((P>0.05)\) at the beginning and started to have a significant difference \((P<0.05)\) later with ikura in higher OTR films having a higher rate of malondialdehyde formation.

These results indicate that an appropriate increase in WPS could make pasteurization at higher temperature for a shorter time possible reducing the undesirable softening that occurs to salmon caviar following pasteurization. Also for film packaged salmon caviar, using the materials with lower oxygen transmission rate could efficiently slow the speed of lipid oxidation during the storage.