Abstract

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The Effect of Frozen Storage on The Quality of Atlantic Salmon

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Abstract

The purpose of this research was to determine the quality changes in Atlantic Salmon stored at different freezer temperatures over 12 months. Salmon fillets were sliced into ~60g to 65g individual samples (length = 7.3 cm, diameter = 4 cm, thickness = 2 cm), packaged under vacuum and stored in the refrigerator (3 hours) prior to freezing and pre-frozen samples were also tested. The fresh and pre-frozen salmon were placed randomly at different freezers (freezer 1 = - 7°C, freezer 2 = -12°C, freezer 3 = -18°C, freezer 4 = -29°C and freezer 5 = -77°C for 12 months and sampled monthly. Quality measurements included freeze loss, thaw loss, weight loss, lightness (L*), thiobarbituric acid reactive substances (TBARS), volatile flavor composition (hexanal) (GC-MS), firmness, water holding capacity (WHC), scanning electron microscopy (SEM) analyses (surface pore numbers and size), moisture content, ash, and sensory evaluation. In general, quality was retained to a greater extent in salmon held at -29°C and -77°C during the one-year storage compared to other storage temperatures. The shelf-life prediction was calculated for each quality indicators by the application of a zero-order reaction model. The quality limit of each quality indicator (weight loss and TBARS) was established according to their correlation with the results of sensory evaluation tests. The shelf-life was defined as the earliest date when each characteristics criteria reached to its limit. The predicted shelf life of freshly frozen Atlantic Salmon was 250.60 days-7°C; 274.58 days-12°C; 368.30 days-18°C; 509.61 days-29°C, and 452.99 days-77°C. While the shelf life of pre-frozen Atlantic Salmon was 244.71 days- 7°C; 289.77 days-12°C; 349.00 days-18°C; 410.85 days-29°C; and 402.98 days-77°C. Based on several quality parameters having minimal variation between 4 to 9 months at home freezer temperatures, energy savings could be realized by use of higher freezer temperatures for storage of salmon.

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Biography

Wesam Al-Jeddawi is currently working as an executive director of laboratory services at Core Catalyst Food Sciences in the United States. He is responsible for the overall operation and administration of the laboratory, including the employment of competent personnel, equipment, safety, laboratory policies, quality assurance and test reports. His career niche at the interface of academia and food industries from 2008 to the present. He is a PhD candidate in food technology at Clemson University. He received a master's degree in food science from Clemson University, USA in 2014 (Latin Honor: Cum Laude). He has many publications in international journals. He has participated with several posters and presentations in many conferences in the U.S. and abroad. He is a member of the editorial board in the journal of food research (The Canadian Center of Science and Education) and Advances in Science, Technology and Engineering Systems Journal (ASTESJ), United States.