Evaluation of Physiochemical Changes in Un-Boiled Eggs Stored at Different Temperatures

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Eggs are considered as powerhouse of nutrients and also it is very popular food in the world due to its nutritional value. Among that, hard boiled eggs are widely used in ready-to-eat food processing industry. However, storing of hard boiled eggs under refrigeration and freezing conditions lead to some problems including rejection of customer demands due to its textural changes. Objective of this study was to check the effect of storing temperature on textural changes in un-boiled egg white with time. Medium sized brown shell eggs collected from commercial layer farm and stored under room temperature (27 $^{\circ}$C), refrigeration (4 $^{\circ}$C) and freezing (-18 °C) conditions for 0, 6, 12, 18, 24 and 48 hours. Then the stored eggs were boiled for 100 °C for 15 minutes and egg properties were studied under Fourier Transform Infrared (FTIR) spectroscopy (ALPHA), texture profile analysis using Texture analyzer (CT3), visual observation done by using gemological microscope and color was measured using colorimeter (CR 410 Chromo meter). Sensory qualities of boiled eggs were measured using 30 untrained panelists. According to the results, frozen eggs were showing low acceptance in all organoleptic properties checked ($p<0.05$). Hardness and gumminess of eggs were effected significantly during the storage in frozen eggs from the rest of the treatments ($p<0.05$). FTIR spectrums also confirm that the textural changes in bonds of amide A (3271 cm-1), amide I (1626.2 cm-1), amide II (1539.0 cm-1), C=O stretch of COO- (1397 cm-1), asymmetric PO2- stretch (1240 cm-1). However, the color of the egg white was not significantly different ($p>0.05$) among treatments. Sensory results revealed that frozen eggs after 12 hours did show low acceptance comparing the rest. As a conclusion storing temperature of un-boiled eggs has an effect on the texture of eggs after boiling.

Keywords: Un-Boiled eggs, FTIR, Temperature, Textural changes, Hardness of egg white