

Perubahan Sifat Kimia, Fisik, Termal dan Mikrostruktur Roti Beku selama Penyimpanan Beku dengan Pemasakan Awal Pengukusan

Intisari

Metode penyimpanan beku pada produk roti telah banyak diterapkan untuk mempertahankan kualitas dan memperpanjang umur simpan. Pemasakan awal dengan pengukusan dilanjutkan dengan penyimpanan beku pada roti merupakan cara efektif untuk memperlambat proses kerusakan roti. Lama waktu penyimpanan beku berpengaruh terhadap sifat fisik, kimia, mikrostruktur, termal, maupun penerimaan secara sensorik. Tujuan penelitian ini adalah untuk mengevaluasi kualitas roti dengan pemasakan awal pengukusan selama penyimpanan beku dan setelah pemasakan kembali. Penelitian dilakukan dengan factor perlakuan lama penyimpanan yaitu hari ke 0, 14, 28, 42, 56 dan 70. Parameter yang dianalisis pada roti yang disimpan beku meliputi pengujian tekstur, tingkat pengembangan volume, kadar air, kadar protein terlarut, dan keremahan (SEM), sifat termal dengan *Differential Scanning Calorimetry*, serta tingkat kesukaan. Hasil penelitian menunjukkan bahwa semakin lama penyimpanan beku maka tekstur semakin keras, tingkat pengembangan volume, kadar air dan protein terlarut semakin rendah serta pori-pori roti seakin mengecil. Tekstur roti mengalami peningkatan kekerasan seiring dengan lama waktu penyimpanan beku yaitu 8,70 N meningkat menjadi 17,44 N, sedangkan kadar air menurun dari 30,02% (b/b) menjadi 26,70% (b/b). Kadar protein terlarut tertinggi diperoleh pada hari ke-14 yaitu 1,53% dan terendah pada hari ke-70 yaitu 1,31%. Hasil Uji SEM menunjukkan terjadi pengecilan ukuran pori-pori roti disbanding roti pada hari ke 0. Hasil termogram DCS menunjukkan menunjukkan semakin lama penyimpanan beku roti dengan pemasakan awal pengukusan, suhu gelatinisasi dan enthalpy semakin rendah, serta ukuran pori-pori yang dimasak kembali juga semakin kecil. Penyimpanan roti beku hingga hari ke 56 menghasilkan kualitas roti yang belum berubah dan masih diterima oleh panelis.

Kata Kunci : Penyimpanan beku, roti beku, pengukusan.

Changes in The Chemical, Physical, Thermal and Microstructural Properties of Frozen Bread during Frozen Storage with Steamed-Precooking

Abstract

Frozen storage methods in bakery products have been widely applied to maintain quality and extend shelf life. Early cooking by steaming followed by frozen storage on bread is an effective way to slow down the spoilage process. The length of time frozen storage affects the physical, chemical, microstructure, thermal, and sensory reception properties. The purpose of this study was to evaluate the quality of bread by pre-cooking steaming during frozen storage and after re-cooking. The research was carried out with the storage time treatment factors, time of 0, 14, 28, 42, 56 and 70. Parameters analyzed in frozen bread include texture testing, volume expansion rate, moisture content, dissolved protein content and crumbs (SEM), thermal properties with Differential Scanning Calorimetry, as well as the level of preference. The result showed that the longer the frozen storage, the harder the texture, the level of volume development, the lower the water and dissolved protein content and the smaller the pores of the bread. Bread texture increased in hardness along with the length of frozen storage namely 8.70 N increased to 17.44 N, while the water content decreased from 30.02% (w/w) to 26.70% (w/w). The highest soluble protein content was obtained on the 14th day which was 1.53% and the lowest was on the 70th day, which was 1.31%. The result of the SEM test showed that there was a reduction in the pore size of bread compared to on day 0. The results of DSC thermogram showed that the longer of the frozen storage of bread with the initial cooking of steaming, the lower the gelatinization and enthalpy temperatures, and the smaller the pore size is small. Storage of frozen bread until day 56 resulted in bread quality that has not changed and is still accepted by the panelists.

Keywords: frozen storage, frozen bread, steaming

