



ANALISIS PERUBAHAN KUALITAS UNTUK PENDUGAAN UMUR SIMPAN PRODUK STROBERI KERING BEKU

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INTISARI

Salah satu buah segar yang dapat diolah menjadi produk kering adalah buah stroberi. Namun, proses pengeringan *thermal* pada buah stroberi segar memiliki kerugian berupa hilangnya senyawa bioaktif dan terjadinya perubahan warna yang tidak diinginkan. Selain itu, perubahan suhu selama penyimpanan dapat mempengaruhi gradien merusakkan produk, seperti kadar air, peningkatan jumlah mikroorganisme alami produk, atau juga perubahan sifat fisik dan kimia akibat reaksi biokimia. Oleh karena itu, dibutuhkan teknologi lainnya yang dapat melindungi warna, rasa, nutrisi, penampilan dan keseragaman selama proses pengeringan dan penyimpanan, yaitu pengeringan *non-thermal* menggunakan *freeze-drying*. Tujuan dari penelitian ini adalah untuk mengidentifikasi perubahan karakteristik kualitas fisik, kimiawi, dan mikrobiologi dan menentukan pendugaan umur simpan produk stroberi kering beku yang dikemas menggunakan kemasan primer dan sekunder.

Stroberi varietas *Mencir* dengan tingkat kematangan 100% dikeringkan menggunakan *freeze-drying*, kemudian dikemas dengan kemasan primer plastik monolayer Nylon ketebalan 75 micron dan kemasan sekunder aluminium foil *standing pouch* dan disimpan pada suhu penyimpanan -18°C , 25°C , 35°C , dan 45°C . Selanjutnya, dilakukan perbandingan antara stroberi kering beku yang dihasilkan dengan stroberi kering beku yang beredar di pasaran dan stroberi kering beku yang diberi perlakuan awal dehidrasi osmotik.

Pengujian parameter kualitas meliputi fisik (warna, tekstur), kimiawi (kadar air, vitamin C, total fenolik, total asam, aktivitas antioksidan DPPH), dan mikrobiologi (a_w , *total plate count* bakteri). Pendugaan umur simpan produk stroberi kering beku dihitung menggunakan metode *Accelerated Shelf-Life Testing* (ASLT) dengan persamaan Arrhenius digunakan untuk menentukan parameter kritis kualitas fisik dan kimiawi yang diuji. Pendugaan umur simpan stroberi kering beku tanpa perlakuan awal berdasarkan pendekatan Arrhenius dengan parameter kritis kadar air adalah 77 hari pada suhu -18°C , 33 hari pada suhu 25°C , 28 hari pada suhu 35°C , dan 24 hari pada suhu 45°C .

Kata kunci : *accelerated shelf-life testing*, kemasan, kualitas, stroberi kering beku



ANALYSIS OF QUALITY CHANGES FOR SHELF LIFE ESTIMATION OF FREEZE-DRIED STRAWBERRIES PRODUCTS

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ABSTRACT

One of the fresh fruits that can be processed into dried products is strawberry. However, thermal drying of fresh strawberries has the disadvantages of loss of bioactive compounds and unwanted color changes. In addition, temperature changes during storage can affect product deterioration gradients, such as moisture content, an increase in the number of natural microorganisms in the product, or changes in physical and chemical properties due to biochemical reactions. Therefore, another technology is needed that can protect color, flavor, nutrition, appearance, and uniformity during the drying and storage process, namely non-thermal drying using freeze-drying. The objective of this study was to identify changes in physical, chemical, and microbiological quality characteristics and determine the estimated shelf life of freeze-dried strawberry products packed using primary and secondary packaging. The objective of this study was to identify the physical, chemical, and microbiological quality characteristics and determine shelf life estimation of freeze-dried strawberry products packaged using primary and secondary packaging.

Freeze-dried strawberries were made using fresh strawberries of Mencir variety with 100% maturity level with the freeze-drying method, then packed with primary packaging of Nylon monolayer plastic with 75-micron thickness and secondary packaging of aluminum foil standing pouch and stored at storage temperatures of -18°C , 25°C , 35°C , and 45°C . Furthermore, a comparison was made between the freeze-dried strawberries produced with freeze-dried strawberries on the market and freeze-dried strawberries pre-treated with osmotic dehydration.

Quality parameter testing includes physical (color, texture), chemical (moisture content, vitamin C, total phenolic, total acid, antioxidant activity), and microbiology (aW, total plate count bacteria). The Arrhenius equation was used to determine the critical parameters of the tested quality parameters. The shelf-life estimation of freeze-dried strawberries was calculated using accelerated shelf-life testing method with added the Arrhenius equation for the critical physical and chemical quality parameters. The shelf-life estimation of freeze-dried strawberries based on the Arrhenius approach with a critical parameter of water content is 77 days at -18°C , 33 days at 25°C , 28 days at 35°C , and 24 days at 45°C .

Keywords: accelerated shelf-life testing, freeze-dried strawberries, packaging, quality