

Perpindahan Panas Selama Proses *Hydrocooling* dan Perubahan Sifat Fisik Wortel (*Daucus Carota L*) Selama Penyimpanan Dalam Suhu Rendah

INTISARI

Penanganan pascapanen produk hasil pertanian seperti wortel sangat penting dilakukan untuk menghambat kerusakan pada saat penyimpanan. Salah satu metode pasca panen yang dapat dilakukan adalah pendinginan awal dengan air (*hydrocooling*). Metode *hydrocooling* diduga dapat menghambat laju respirasi dan transpirasi dari produk. Tujuan penelitian ini adalah mempelajari perpindahan panas selama proses *hydrocooling* dan perubahan kualitas wortel yang mendapat perlakuan *hydrocooling* selama penyimpanan. Penelitian ini dilakukan dengan bahan wortel yang mendapat perlakuan *hydrocooling* dengan variasi kapasitas bahan 5 kg, 10 kg, dan 15 kg. Wortel disimpan pada ruangan bersuhu 15°C dan diamati perubahan susut bobot dan kekerasan selama 10 hari. Analisis persamaan perpindahan panas konveksi digunakan untuk mengukur perpindahan panas selama proses *hydrocooling*, persamaan kinetika orde nol untuk susut bobot, dan orde satu untuk perubahan kekerasan. Hasil penelitian menunjukkan bahwa perlakuan *hydrocooling* mampu menghambat perubahan kualitas wortel selama penyimpanan dan semakin besar kapasitas wortel yang mendapat perlakuan *hydrocooling*, maka perubahan kualitas wortel akan semakin cepat. Laju perpindahan panas konveksi proses *hydrocooling* berkisar 27,5 – 138,4 W/m².°C. Laju perubahan susut bobot wortel perlakuan kontrol berkisar 1,21 – 1,99 %/hari, sedangkan perlakuan *hydrocooling* berkisar 1,05 – 1,70 %/hari. Laju perubahan kekerasan wortel perlakuan kontrol berkisar 0,18 – 0,20 kg/hari, sedangkan perlakuan *hydrocooling*, berkisar 0,18 – 0,19 kg/hari.

Kata Kunci : *hydrocooling*, perpindahan panas, wortel, perubahan kualitas, penyimpanan

Heat Transfer During the *Hydrocooling* Process and Carrots (*Daucus carota L*) Quality Changes During Low Temperature Stored

ABSTRACT

Post harvest handling such as carrot is very important to reduce losses during storage. One of post harvest efforts is precooling using water (hydrocooling). Hydrocooling can inhibit respiration and transpiration rate from product. The purpose of this research was to study heat transfer process during hydrocooling, and quality change of carrots are hydrocooled during storage. This research uses carrot are hydrocooled with capacity variations 5 kilogram, 10 kilogram, and 15 kilogram. Carrots storage at cool storage and shrinkage change of weight loss and texture hardness for 10 days. Heat transfers during hydrocooling is analyzed using convection heat transfer methods, zero-order kinetics reaction for weight loss, and one-order kinetics reaction for texture hardness. The results showed that hydrocooling can inhibit quality change of carrots and the more carrots capacity that hydrocooled, affected to quality change of carrot during storage. The measured values of convection heat transfer coefficient (h) is ranged from 27,5 – 138,4 W/m².°C. Rate of weight loss on carrots with control treatment ranged from 1,21 – 1,99 %/day while carrots with hydrocooling treatment ranged from 1,05 – 1,70 %/day. Rate of texture hardness with control treatment ranged from 0,18 – 0,20 kg/day while on hydrocooling treatment ranged from 0,18 – 0,19 kg/day.

Keywords : hydrocooling, heat transfer, carrot, quality change, storage.