

Double layer coating in combination with modified atmosphere packaging preserve postharvest quality of fresh-cut melon during storage

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The objective of this study was to evaluate the effectiveness of antimicrobials such as herbal essential oils and coating materials to improve microbial stability of fresh cut melon. The melons "tashkandi" were harvested at commercial maturity in Mashhad, Iran. After washing and decontaminating with 200 ppm solution of calcium hypochlorite, the Peel and core were removed and flesh were cut to pieces of 4 cm long and 9 grams weight. Fresh cuts were immersed respectively in 1% alginate solution(2 min), 1% calcium chloride(2 min) and different solutions of chitosan(0, 1% and 2%)(2 min) and air dried at room temperature for 8 min. Thyme essential oil(0, 0.25% and 0.5%) were incorporated in chitosan solutions. Coated fresh cuts and control were packed in modified atmosphere (10% CO₂) and PETE clamshell containers and preserved in 4°C for 8 days. Physicochemical characterization of the cut melons (total soluble solids, titratable acidity, color, texture and weight loss) were measured in 4 day intervals. Microbial and sensory tests were done at the end of preservation duration. Results showed that fresh cut melons treated by 1% chitosan had higher acidity and firmness. Color parameters redness(a*) and brightness(L*) were higher in this treatment. Furthermore fresh cut melons treated by 1% chitosan had higher acceptability and lower total counts and mold and yeast compared with other treatments. Results revealed that fresh cut melons treated with 0.5% thyme essential oil had lowest weight loss, lowest total count and lowest O₂ in package. Furthermore results showed that fresh cuts packed in modified atmosphere had lower weight loss and more acidity compared with normal package. Modified atmosphere packaging of fresh cuts leads to lower redness(a*) and higher brightness(L*) and lower total count and mold and yeast. Totally it was concluded that coating material consist of chitosan(1%) and thyme essential oil (0.5%) and modified atmosphere packaging(10% CO₂) can be evaluated as a safe and effective treatment that decreased microbial growth and maintain most qualitative parameters, color indices and sensory characteristics in fresh cut melons.

Keywords: fresh cut melon, chitosan, sodium alginate, thyme essential oil, modified atmosphere