

Combining chitosan and vanillin to retain postharvest quality of tomato fruit during ambient temperature storage

ABSTRACT

Tomato, being a climacteric crop, has a relatively short postharvest life due to several factors such as postharvest diseases, accelerated ripening, and senescence that trigger losses in quantity and quality. Chemicals are widely used to control postharvest disease. Inaptly, it leads to detrimental effects on human health, environment and it is leads to increased disease resistance. Chitosan and vanillin could be an alternative to disease control, maintain fruit quality, and prolong shelf life. The aim of this research was to evaluate the potential of chitosan and vanillin coating on the tomato fruit's physicochemical quality during storage at 26 ± 2 °C/ 60 ± 5 % relative humidity. Chitosan and vanillin in aqueous solutions i.e., 0.5% chitosan + 10 mM vanillin, 1% chitosan + 10 mM vanillin, 1.5% chitosan + 10 mM vanillin, 0.5% chitosan + 15 mM vanillin, 1% chitosan + 15 mM vanillin, and 1.5% chitosan + 15 mM vanillin, respectively, were used as edible coating. The analysis was evaluated at 5-day intervals. The results revealed that 1.5% chitosan + 15 mM vanillin significantly reduced disease incidence and disease severity by 74.16% and 79%, respectively, as well delaying weight loss up to 90% and reducing changes in firmness, soluble solids concentration, and color score. These coatings also reduced the rate of respiration and the rate of ethylene production in comparison to the control and fruit treated with 0.5% chitosan + 10 mM vanillin. Furthermore, ascorbic acid content and the antioxidant properties of tomato were retained while shelf life was prolonged to 25 days without any negative effects on fruit postharvest quality.

Keyword: Respiration rate; Color score; Lycopene; Vitamin C; Postharvest disease; Postharvest losses