

Abstract

Carrots are widely distributed in the market throughout the year for highly frequent use by the food service industry as well as by individual consumers in their daily diet. Recently, there is also an increasing demand for fresh-cut carrots in various shapes. In this study, we report our findings on deaeration treatment of acidic electrolyzed water containing carrot pieces to drive the water into the cut pieces for more effective disinfection. Carrots were hollowed out by using a 10 mm diameter cork borer to prepare 1 mm thick disks as test samples. The disks were produced from four tissues: epidermis, phloem, cambium and xylem. Then, they were immersed in sterilized water, sodium hypochlorite solution (available chlorine 200 mg·kg⁻¹) or acidic electrolyzed water (water electrolyzer ROX-10B, pH2.6, available chlorine 30 mg·kg⁻¹) for 30 to 60 seconds as “immersion lots”, or immersed in one of the above solutions before deaerated by a suction pump as “deaeration lots”. The microbial density of each treated tissue was determined using standard methods agar. Gas chromatography was also used to determine the respiration rate as an indicator of physiological activity of the disks. The deaeration treatment reduced the microbial density of the disks more significantly in the deaeration lots than in the immersion lots. The bactericidal effect was more prominent at the xylem than at the phloem, probably because the xylem has wider intercellular spaces than the phloem. The respiration rate was increased by the electrolyzed water treatment and found higher in the deaeration lots than in the immersion lots.