

Abstract

The effect of controlled atmosphere (CA), active and passive modified atmosphere packaging (MAP) and air storage on fresh-cut broccoli phytonutrients was evaluated. Broccoli florets (*Brassica oleracea* L., var. *italica* cv. Marathon) washed with 100 ppm NaOCl were stored under CA (air + 6 kPa CO₂ and 3 kPa O₂ + 6 kPa CO₂), active (4 kPa O₂ + 7 kPa CO₂) and passive MAP during 12 days of storage at 1°C. Changes on phenolic compounds (flavonoids and hydroxycinnamoyl derivatives) and aliphatic and indole glucosinolates were studied. CA (air + 6 kPa CO₂ and 3 kPa O₂ + 6 kPa CO₂) and passive MAP (16.5 kPa O₂ + 5.1 kPa CO₂) preserved visual appearance and maintained external color after storage. However, exposure to high CO₂ and low O₂ resulting from active MAP (0.7 kPa O₂ + 25.1 kPa CO₂) produced off-odors and off-flavors after 9 days of storage. Total glucosinolates, both aliphatic and indol-aromatic constituents, were preserved under CA (3 kPa O₂ + 6 kPa CO₂) whereas pronounced decreases were observed under air. It was also observed that the influence of passive MAP was also important to maintain the content of glucosinolates. Caffeoyl-quinic, sinapic and ferulic acid derivatives as well as total flavonoids decreased noticeably after 12 days storage in air while were better preserved under CA (3 kPa O₂ + 6 kPa CO₂) or passive MAP. Therefore, benefits from CA (3 kPa O₂ + 6 kPa CO₂) and passive MAP include reduced rates of nutritional and quality losses and increased storage life. Since atmosphere modification using CA storage facilities are technically complex, MAP with the selected film could be used to achieve the beneficial atmospheres to preserve health promoting compounds in broccoli florets.