Title Wounding increases the antioxidant capacity of different fresh-cut vegetables

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Abstract

Fresh-cut vegetables are natural sources of health promoting antioxidant compounds. During processing, wounding stress is commonly applied to a broad range of vegetable produce. Therefore, providing information of the effects of wounding on antioxidant activity is important for determining the real functional value of ready-to-eat vegetables. The objective of this study was to evaluate the effect of high wounding intensity stress (shredding) on antioxidant activity, total phenolics, ascorbic acid content and changes in phenylalanine ammonia-lyase (PAL) activity of different vegetable tissues. Ten different vegetables including lettuce, white cabbage, red cabbage, celery, carrots, parsnips, potatoes, sweet potatoes, zucchini and red radish were shredded using a food processor. Shredded and whole vegetables (control) were stored in 4-L jars at 15 °C. After two days of storage, PAL-activity, total phenolics and antioxidant activity were quantified using spectrophotometric techniques, whereas, ascorbic acid content was determined by HPLC. The surface area of shreds ranged form 14 to 26 cm^2/g. After storage, ascorbic acid content decreased by 11 to 82% and PAL-activity showed a 7- to 20- fold increase in all produce. Antioxidant activity increased between 13 and 442% and total phenolics increased between 13 and 191%, except for red cabbage, red radish, potato and zucchini, which showed a decrease. Changes in antioxidant activity were positively correlated with changes in total phenolics suggesting that phenolics are the main responsible compounds for the observed increase in antioxidant activity. Our results showed that fresh produce responded differently to shredding, since the changes in antioxidant activity and phenolic content were dependent on produce tissue. The accumulated phenolic compounds in each tissue had distinct antioxidant capacities.