Title Effect of post-harvest practices on flavonoid content of red and white onion cultivars

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Abstract

Onions are major sources of flavonoids in the human diet. However, little information is available regarding the effects of long-storage or exposure to specific stress conditions on flavonoids content of onions. The aim of this work was to assess the effect of different post-harvest treatments on the flavonoid composition of two Portuguese landrace varieties of onions ('Branca da Póvoa' and 'Vermelha da Póvoa'). The evolution of the content of some major flavonols and anthocyanins was measured in red and white onion bulbs (from 2005 and 2006 harvests) during 7 months of storage, under refrigerated and under traditional bulk storage in the field. Total flavonols increased up to 64% after 6 or 7 months of storage. This increase was especially important during the first 3 months of storage (58% increase). In red onions, with the largest concentrations in flavonols, bulbs stored in the field reached higher levels of flavonoids (64% maximum) than refrigerated onions (40% maximum). For red onions, the increase after 6-months storage usually has place when the flavonol post-harvest levels are low (40–64% increase), whereas for white onions the increase after 6-months storage is important for onions with higher levels after harvest (44–60% increase). These results suggest that storage at fluctuating ambient temperatures can positively affect flavonol metabolism, while keeping the flavonols profile. There were no significant modifications of the total levels of anthocyanin pigments after 6 months of storage of red bulbs, but after 7 months total anthocyanin content was reduced between 40% and 60%. Post-harvest UV (40 kJ/m^2, 1 week storage) and ethylene (100 μL/L for 24 h, 2 months storage) treatments did only affect the flavonol content of the edible portion of onions with a profitable increase.