

**Title** Relationship between colour and biochemical composition of skin from onions cv. Red Baron bulbs cured at different temperatures

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### **Abstract**

Onions are cured to reduce incidence of neck rot and prevent water loss from the inner scales by forming a complete dry outer skin. Red onion skins contain anthocyanins, mainly comprising peonidin and cyanidin derivatives, which give them their characteristic colour. Additionally, it has been suggested that formation of brown compounds in onion skin may be related to the conversion of quercetin glucosides to quercetin aglycon. This study aimed to determine the compounds responsible for colour change in the skins of red onions cv. Red Baron after curing at different temperatures. Onions cv. Red Baron were cured at 20, 24 and 28°C (industry standard) for 6 weeks then transferred to cold storage (0°C) for a further 6 months. Onion skin was sampled after curing and after 6 months of cold storage. Objective colour, non-structural carbohydrates, flavonols and individual anthocyanins were measured. Immediately after curing, fructose concentration in onion skins was significantly higher in those cured at 28°C, although after 6 months of cold storage, those cured at 20°C had a higher fructose concentration. There were no differences in quercetin aglycon or glucose concentrations over time or between onions cured at different temperatures. After curing, onions cured at 20°C had higher concentrations of quercetin 4'-glucoside, quercetin 3,4'-diglucoside, cyanidin and peonidin glucosides. However, after 6 months of cold storage, onions cured at 24°C maintained higher concentrations of these compounds. Onion skin hue angle (H°) was higher in onions cured at 28°C and H° was negatively correlated with total anthocyanins (-0.704) and total flavonols (-0.639). The negative correlation between total flavonols/total anthocyanins with H° suggest that differences in skin colour between onions cured at different temperatures may be due to a difference in flavonol and anthocyanin glucoside concentrations found in the skin tissue.