

**Title** Effect of postharvest UV-B radiation and visible light on health and sensory related parameters in plums (*Prunus domestica* L.)

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### Abstract

The potential for improvement of fruit quality was investigated on freshly harvested plums of the Victoria and Avalon cultivars. The plums were grown in the experimental orchard at Bioforsk Vest Ullensvang Research Centre in Western Norway. The plums were irradiated for 12 h per day during a period of 4 days at 10 °C and 95-98% RH, either with visible light (Vis) at 25-30  $\mu\text{mol photons m}^{-2} \text{ S}^{-1}$  or visible light + UV-B radiation at 0.20  $\text{W m}^{-2}$ . Control plums were held in the dark in the same room. All plums were exposed individually on one side. The colour of the exposed side was measured non-destructively prior to chemical analysis of detached skin halves (front and back sides) and four parts of the flesh (front and back sides divided into parts adjacent to the skin and the stone). Phenolics were extracted from skin halves in methanol (10 mM HCl) and analysed for anthocyanins by the pH-difference method. The flesh parts were analysed for titratable acidity and soluble solids. The plums lost 2-6 % of their weight upon treatment, significantly more in radiated fruits. Ripe Victoria plums lost more water than not-so-ripe ones. Both titratable acidity and soluble solids had higher values in the flesh close to the stone with a slightly higher value on the exposed side. Soluble solids increased in ripe Victoria plums upon both radiation treatments. In the not-so-ripe Victoria plums the increase was significant only in the outer flesh for UV-B + Vis, while Vis only decreased the content of soluble solids. Soluble solids in Avalon plums were unaffected by the treatments. UV-B + Vis increased the redness ( $a^*$ ) but did not affect yellowness ( $b^*$ ) or lightness ( $L^*$ ), whereas visible light only had no effect. The radiation treatments did not have an effect on the anthocyanin contents in ripe Avalon plums or ripe Victoria plums. Not-so-ripe Victoria plums had lower anthocyanin contents than the ripe ones. The difference became insignificant after UV-B + Vis treatment. The experiment shows that both sensory and health-related properties in plums can be changed by postharvest radiation treatments. While a taste-related property (soluble solids) could be improved in ripe plums, a health-related property (anthocyanin contents) was easier to increase in unripe plums. Addition of UV-B radiation had stronger or different effects than just visible light. Whether such treatments are commercially feasible is an open question.