

**Title** Optimum controlled atmospheres minimise respiration rate and quality losses while increase phenolic compounds of baby carrots

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### **Abstract**

Baby carrot is a very perishable product mainly due to the abrasion of the cylindrical carrot root segments. The influence of four different controlled atmospheres (CA) (air, 2 kPa O<sub>2</sub> + 15 kPa CO<sub>2</sub>, 5 kPa O<sub>2</sub> + 5 kPa CO<sub>2</sub> and 10 kPa O<sub>2</sub> + 10 kPa CO<sub>2</sub>) was studied to maintain quality and prolong the shelf life of baby carrots. Respiration rate (RR), the content of vitamin C, carotenoids and phenolics by HPLC as well as the sensory quality of baby carrots during storage at 4 °C were evaluated. The lowest RR was observed in baby carrots stored under CA containing the lowest O<sub>2</sub> concentrations. Baby carrots under low O<sub>2</sub> atmospheres preserved the highest vitamin C content, as well as the individual carotenoids. The wound-induced phenolic compounds, mainly trans chlorogenic acid, increased two fold in baby carrots stored under 5 kPa O<sub>2</sub> + 5 kPa CO<sub>2</sub>. In general, CA maintained the overall visual quality of baby carrots up to 8 days. Controlled atmosphere of 5 kPa O<sub>2</sub> + 5 kPa CO<sub>2</sub> can be recommended as an optimum atmosphere to maintain quality of baby carrots, increasing bioactive compounds such as chlorogenic acid and avoiding anaerobic fermentation in case of temperature abuse.