

Title Extending the shelf life of the new bimi[®] broccoli by controlled atmosphere storage

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Abstract

The new Bimi[®] broccoli is a natural hybrid between kailan (*Brassica oleracea* Alboglabra Group) and conventional broccoli (*Brassica oleracea* Italica Group). This new *Brassica* has a tender stem (similar to asparagus) and a small floret. Its mild flavour (compared to conventional cvs) makes this vegetable ideal for fresh-cut purposes, besides their nutritional benefits. However, Bimi[®] is very perishable, being yellowing, stem bent, off-odors and off-favours the main sensory quality parameters affected during its postharvest life. Controlled atmosphere storage (CA) has been described as a very effective technique to maintain broccoli quality. The aim of the present work was to study changes in the respiration rate, sensory quality, pH, titratable acidity, total soluble solids, stem firmness and colour changes under 5 different CO₂ controlled atmosphere storage (5, 10, 15, 20, 25 kPa CO₂ + with 10 kPa O₂ + balanced with N₂) throughout 27 days at 2, 5 and 8°C. A control under air conditions was used. The initial respiration rates of 36, 43 and 50 mg CO₂ kg⁻¹h⁻¹ decreased after minimal processing, reaching the lowest values after 6-8 days, and subsequently increasing from day 8 to the end of the shelf life with a rate of around 35% for all samples. The better sensory scores were reached under 10 kPa CO₂. However CA of ≥ 15 kPa CO₂ avoided stem bent during 27 days at 2 and 5°C. Samples stored at 8°C were excluded due to yellowing and the high stem bent observed. Low moisture loss (0.5-1 %) was registered after 27 days for both storage temperatures. Stems showed a luminosity increase around 23% after 6 days, without differences at both temperatures. The initial pH (6.0) rose approximately 3.5% after 6 days at both temperatures, with no changes until the end of the storage. Initial titratable acidity (TA) values (0.18 g citric acid 100 mL⁻¹) did not show changes during 19 days at both storage temperatures. However, after 27 days T A content increased between 14-40% for both storage temperatures, showing the higher the CO₂ concentrations the lower the T A increases. No stem firmness and soluble solids content changes were found throughout storage at both temperatures. In conclusion, CA storage with 10-15 kPa CO₂ (+ 10 kPa O₂ balanced with N₂) provides great benefits for

keeping the quality of Bimi[®] broccoli during cold storage, reaching an acceptable sensory quality after 27 days of shelf life at 2 to 5°C.