

Abstract

Scope and objective: Horticulture is one of New Zealand's fastest growing export sectors but always requires sea or air transport to distant markets. This increases the risk of products being exposed to fluctuating temperatures through breaks in the cool chain. These will be particularly significant for crops such as green asparagus, which has a very short shelf life necessitating air transport. The objective of this study was to investigate the influence of the extent, timing and duration of temperature abuse on the quality of asparagus stored in modified atmosphere packages. Methodology: Asparagus bundles were cooled to 2°C and packaged in intact or micro-perforated polyethylene bags. Several cool chain scenarios were implemented to simulate the range of temperature abuse conditions that could be experienced during sea and air transport. These cool chains included continuous storage at 2°C, temperature abuses of 10 and 20°C early or late during storage, and combinations of these. Quality was assessed at different times during storage as bundle weight loss, visual appearance and odour, changes in breaking and cutting and force of the individual spears and consumer liking. Results and conclusion: The polyethylene packaging proved inappropriate for the storage of asparagus, since an optimal atmosphere could not be established. No influence of temperature on toughening (as determined through breaking and cutting force) could be observed. Weight loss increased with the extent of temperature abuse. Odour ratings showed temperature abuse up to 10°C for a longer time period being more favourable than short term abuse up to 20°C. Additionally, the samples subjected to a period at 20°C developed off-flavours and were rated significantly more bitter by the consumer panel. The timing of the temperature abuse (and thus timing of transport) also influenced visual appearance and odour. Transport directly after harvest will be preferable to transport after an extended storage period.