

Crop Management, Post-Harvest and Packaging for Preserving Freshness and Reducing Pathogens in Edible Bamboo Shoots

Samantha A.M. Elsmore, Tom W. Lyall, Volker Kleinhenz,

Keith M. Harrower and David J. Midmore

Central Queensland University, Rockhampton, QLD

Chicken manure is commonly used on bamboo farms in Australia. Human pathogens in the manure can contaminate the surface of bamboo shoots during growth and the internal tissue during harvest. Moisture content in many vegetables is related to colour and crispness ("freshness"). Therefore, bamboo shoots are packaged in materials that reduce desiccation. However, condensation in those packets provides perfect growing conditions for microorganisms.

The effects of different packaging materials (polythene bags and open cardboard boxes) on moisture loss and appearance, and the effect of sterilisation with hypochlorite on microbial contamination of bamboo shoots cultivated with and without chicken manure were studied at Central Queensland University, Rockhampton.

Moisture loss after 30 days in the polythene packages (1.3-2.3%) was significantly lower than in the cardboard boxes (30.1-84.3% moisture loss).

Soil with chicken manure showed significantly greater microbial abundance than soil without. Several human pathogens and soil microbes (some of which are potentially harmful to humans) were isolated from within the bamboo shoots and from their external surfaces. The level of contamination was greater for bamboo grown in manure, but all samples contained the same species, namely endophytic fungi, pathogenic Enterobacteriaceae and Bacillus.

Decontamination of bamboo shoots with hypochlorite reduced, but did not eliminate, surface colonising microbes.

To provide fresh and safe bamboo shoots for markets, only sufficiently composted chicken manure should be used, harvested shoots should be decontaminated with a suitable sterilising agent and packed in a material that reduces moisture loss but prevents condensation of water.