

Abstract

The production of ready-to-eat bagged salads continues to increase year upon year and the search for a higher quality leaf to harvest, transport, wash, dry and pack with a longer shelf-life is a continuing process. In order to further facilitate the improvement of baby salad leaves, young leaves were studied to diagnose the term 'processability' and subsequently manipulate leaf processability in species including *Lactuca sativa* L. leaf type.

The processability of baby salad leaves was defined as the ability to withstand postharvest washing and packaging processes that are involved in the production of ready-to-eat bagged salad. Key leaf traits were identified in leaves classed as 'good' or 'poor' processing quality. Leaf irreversible extensibility (% Plasticity) and epidermal cell area are key processability traits linked to the plant cell wall. These traits were manipulated in *L. sativa* cv. Ravita (lettuce type lollo rosso) through salt or mechanical stress treatment to increase shelf-life by 3 days.

In order to manipulate baby leaf shelf-life the time of day of harvest was studied in 3 different environments. This resulted in increased shelf-life associated with the key processability traits for certain baby leaf crops if the harvest was performed at the end of the day and not the morning. Leaf carbohydrate concentrations, in particular sucrose were implicated in the improved processability.

The cell wall has a key role in the determination of processability and to manipulate the cell wall a fragment of a xyloglucan endotransglucosylase/hydrolase gene with xyloglucan endotransglucosylase (XET) enzymic activity was isolated and sequenced (AJ577755) from *L. sativa* cv. Ravita. This fragment was inserted back into *L. sativa* cv. Valeria in an antisense orientation and demonstrated to be expressed by northern analysis. T₂ plants 19-3 and 19-5 showed a reduced cell wall co-localised XET activity linked to processability trait related changes in the epidermal cell area, epidermal cell number and %P.

These key findings are discussed in terms of further scientific study and future commercial application of the technologies.