

**Title** Biochemical bases of appearance and texture changes in fresh-cut fruit and vegetables  
**Author** Peter M.A. Toivonen and David A. Brummell  
**Citation** Postharvest Biology and Technology, Volume 48, Issue 1, April 2008, Pages 1-14  
**Keywords** Color; Texture; Pigments; Cell walls; Biochemical changes; Fruit; Vegetables

### **Abstract**

This review describes the biochemical bases for color and firmness changes in fruit and vegetable tissues, since appearance and texture are two of the most fundamental factors affecting the quality of fresh-cut products. The intent is to provide a level of understanding that can be used to underpin future research directions in order to resolve existing issues that limit fresh-cut quality and shelf life. The biochemical mechanisms for enzymatic browning mediated by polyphenol oxidase and phenol peroxidase are described, and the importance of limiting cellular damage during the processing of fresh-cut fruit and vegetable products is emphasized. Also described are two mechanisms of chlorophyll degradation involved in discoloration events in green tissues, and examples of coloring processes specific to particular crops (white blush in carrots, discoloration of *Allium* spp., secondary browning in apples). The loss of desirable texture in fresh-cut products is a major problem. In fruit this is largely due to a continuation of cell wall disassembly events that are a normal component of ripening, and which result in declining cell wall strength and reduced intercellular adhesion. In some species the process is exacerbated by wound-response ethylene. However, wounding, water loss and ripening-related turgor changes are also important contributors to textural deterioration. In fresh-cut vegetables, water loss and damage-induced lignification are common problems. The effects of factors such as maturity at harvest, processing conditions and various treatments to mitigate quality decline are discussed.