

Abstract:

Texture is an important though complex and variable quality parameter in fresh horticultural products. Product water status, cell wall physical properties and tissue structure interdependently determine tensile strength, firmness and elasticity, which all together characterise texture. Short-term effects on texture under unfavourable conditions during shelf life may be functionally different from those occurring during long-term storage. Despite many efforts, the interactions between these parameters are still poorly understood. During recent years, new methods such as the acoustic impulse-response method have become available to non-destructively analyse the elastic texture components. Although water status is normally destructively investigated, the pressure bomb, in combination with pressure volume analyses, can non-destructively measure water potential, osmotic potential and turgor in several products. An experiment was designed to study the effects of water status on tissue elasticity. During transpirational dehydration water potential, fresh mass, the quasi-static compressive apparent elastic modulus E and the dynamic acoustic stiffness S were concomitantly determined on radish tubers. With decreasing water potential and increasing water deficits the apparent E declined linearly ($r^2 = 0.69$) and exponentially ($r^2 = 0.80$), respectively. When water deficits increased beyond the turgor loss region (at water potentials < -1.2 MPa or relative water deficits > 0.12) the slope of this relationship largely declined. In contrast, S showed only a weak tendency to change with both parameters ($r^2 = 0.06$ and 0.12). The results may indicate that S is either not a true indicator of mean tuber elastic properties, that it is more closely related to cell wall properties and structure, or that the measurement of S is less robust than that of E , at least in radish tubers. Additional investigations are clearly desirable.