

**Title** Structure related changes during moistening of freeze dried apple tissue  
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### **Abstract**

The knowledge and interpretation of the relationships between structure and properties in foods is of considerable interest. In the present work, freeze dried apple tissue was assumed as a basic plant food structure and some chemical and physical changes associated with a gradual moistening were monitored in order to (a) observe their reciprocal interactions, (b) clarify whether they could be related to water activities ( $a_w$ ) and/or the glass transition temperatures ( $T_g$ ) and (c) investigate into the role of the insoluble cell walls structure. Water activity, glass transition and collapse temperatures, shrinkage, consistency, colour and volatiles released were considered in respect to the degree of hydration. The results showed that complex interactions occur among these changes, and that the insoluble fraction plays a role affecting the dependence of such changes from both  $T_g$  and  $a_w$ . For most properties the main changes occurred at  $a_w$  0.40–0.50 with  $(T - T_g)$  in the range of 50–60 °C.