

## Spatial Distribution of Cellular Water in Pear Fruit: An Experimental Investigation

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**Abstract :** Highly porous and hygroscopic characteristics of pear make it complex to understand the cellular level water distribution. In pear tissue, water is mainly distributed in three different spaces namely, intercellular water, intracellular water, and cell wall water. Understanding of these three types of water in pear tissue is crucial for predicting actual heat and mass transfer during drying. Therefore, the aim of the present study was to investigate the proportion of intercellular water, intracellular water, and cell wall water inside the pear tissue. During this study, Green Anjou Pear was taken for the investigation. The experiment was performed using  $^1\text{H-NMR}$ - T2 relaxometry. Various types of water component were calculated by using multi-component fits of the T2 relaxation curves. The experimental result showed that in pear tissue 78-82% water exist in intracellular space; 12-16% water in intercellular space and only 2-4% water exist in the cell wall space. The investigated results quantify different types of water in plant-based food tissue. The highest proportion of water exists in intracellular spaces. It was also investigated that the physical properties of pear and the proportion of the different types of water has a strong relationship. Cell wall water depends on the proportion of solid in the sample tissue whereas free water depends on the porosity of the material.

**Keywords :** intracellular water, intercellular water, cell wall water, physical property, pear

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