Plant Based Scaffolds and potential applications

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The plant-cell wall is organized as concentric layers that vary among them on the concentration of cellulose, hemicellulose, pectin, lignin, and soluble proteins. Interestingly, plant cell walls have a natural continuous porosity with specific patterns and pore size ranges that could host animal cells and favor the exchange of nutrients and the clearance of waste. In the present work, we explored the effect of given desiccation protocols on the microstructure of several decellularized plant-based matrices, their microstructure, composition and preliminary results regarding their potential for cell culture and tissue engineering applications.

Through the exploration of physical and chemical possible modifications to the decellularized matrices we were able to conclude that the heat treatment was the one with the least volumetric reduction. Via SEM imaging we were able to verify the distribution and size of the pores from the tested matrices with an average of 72-90 μm but with sizes ranging from 50 μm up to 120 μm. Thanks to the FTIR analysis we explore the differences between the native, decellularized, and two of the treated matrices. Finally the viability assay showed cytotoxic activity, therefore at least from the biological point of view there is space for improvement.