Development and Characterization of a Pectin and Allantoin Hydrogel

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For this project, pectin was selected as recent studies suggest that it is a good scaffold to develop hydrogels for biomedical applications; pectin is a polymer composed of linear chains of D-galacturonic acid, which upon cross-linking they form a sturdy support matrix for the active ingredient which in this case is allantoin (5-ureidohydantoin); which is known for speeding up the healing process by aiding in the release of dead cells and promoting healthy tissue renewal.
For the hydrogel development, were established the temperature, mixing velocity and time, and drying parameters as well; allantoin concentrations were set at 90% and 100%. Final hydrogels comprise 2 well-differentiated faces, one face rich in allantoin and one rich in pectin, these were characterized by swelling kinetics, FTIR spectroscopy, and contact angle. The morphology and topography were determined by scanning electron microscopy (SEM) and confocal laser scanning microscopy (CLSM).
FTIR spectroscopy validated that the pectin and allantoin molecular structure did not change and that the hydrogel remains physical. However swelling kinetics results showed significative differences between the 2 concentrations of allantoin, although this variance is only 10%. Z-stack analysis by CLSM and SEM images correlated this result with the allantoin

distribution within the hydrogels.

Keywords:
Pectin, Allantoin, Hydrogel and Wound healing.