

## NanoInnovation 2020

### Geometrical features and sterility assessment of 3d printed PCL-HA scaffold

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Polycaprolactone (PCL) and hydroxyapatite (HA) composite are widely used in tissue engineering (TE) [1,2]. The thermoplastic feature and the ability of PCL to be mixed with some additives by melt compounding technology make it suitable to be processed with a wide variety of additive manufacturing (AM) techniques [3] to create scaffolds with controllable geometry and porosity.

The current challenge is to ensure the reliability and reproducibility of 3D printed scaffolds and evaluating their sterility degree; unfortunately, these two aspects are addressed separately in the literature, being considered as independent steps of the 3D printing process.

The study aims to give a feedstock for creating a 3D printable composite of PCL + 10 HA% wt that has sterility features, hence useful for bone TE applications. We analyzed morphological structure (pore size, strand distance and thickness) and evaluated sterility of 3D printed scaffolds following the method established from the United States Pharmacopeia (USP) [4]. Finally, we seeded scaffolds with Human Adipose Tissue Stem Cells (hASC) and we performed viability and proliferation tests.

#### References

- [1] Zhang et al. Sci. Technol. Adv. Mater. 2016, 17(1), 136-148.
- [2] Kim et al. Mater. Lett. 2018, 220, 112-115.
- [3] Bastianini et al. J. Compos. Sci. 2018, 2(2), 31.
- [4] United States Pharmacopeia-USP 40/NF 35. <1223> Validation of alternative microbiological methods.

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