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PLA/HA COMPOSITE FILAMENT FOR BONE TISSUE ENGINEERING

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This study aims the development of polylactic acid-nanostructured hydroxyapatite (PLA/HA) composites to manufacture a filament to be used in Fused Deposition Modeling (FDM) in order to produce porous structures for use in Bone Tissue Engineering (BTE). Samples with 0 and 10 wt% (PLA/HA) were produced and characterized by Fourier-transform infrared spectroscopy (FTIR), thermogravimetric analysis (TGA), differential scanning calorimetry (DSC), rheological parameters were optimised for reducing agglomerates and mechanical tests were performed for measuring tensile strength and Young's modulus. The results of mechanical tests showed that the addition of hydroxyapatite resulted in the reduction of mechanical properties. DSC results showed that the presence of the ceramic phase does not influence the glass transition temperature (T_g) and the degree of crystallinity of the PLA, which remains substantially amorphous, and consequently preserves the PLA degradability rate, as already noted in the literature. We conclude from the properties studied in this work that it is possible to use PLA/HA nanocomposites in order to produce porous structures for use in BTE.