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FILAMENTS FOR 3d PRINTING BASED ON POLYMERIC COMPOSITE OF POLY-HYDROXYBUTYRATE / BACTERIAL CELLULOSE MICROPARTICLES FOR APPLICATIONS IN TISSUE ENGINEERING.

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Currently have been growning the interest in biopolymers to produce biomaterials using 3D printing, since they are biodegradable, biocompatible and non-toxic. Among all natural polymers, poly-hydroxybutyrate (PHB), which is a polymer produced from bacteria Alcaligeneseutrophus, it is a renewable, linear, semi-crystalline and belonging to the class of polyhydroxyalkanoates. The main disadvantage of this biopolymer is excessive cost of production and some deficiencies in its properties, such as low mechanical resistance and thermal instability. In this work, the polymers composite filaments based on PHB and bacterial cellulose (BC) were prepared using a single-screw homemade extruder. BC wastes from the Brazilian Biocellulose Company were used as a sustainable and low-cost alternative. Scanning electron microscopy (SEM) showed good compatibility between the materials. Thermal properties were evaluated by thermogravimetric and differential scanning calorimetry analysis. The dynamic mechanical analysis was used to determinate of the mechanical properties of the compositefilaments. ThePHB/BC filaments were carried out to printed 3D scaffolds with excellent quality. Our results demonstrated that the new filaments prepared are attractive candidates for use in 3D printing for applications in tissue engineering.