

Revaluation of Catalan Low Quality Cork as Feedstock for the Additive 3D Printing Technology

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Abstract. Recently 3D printing polymeric coils have been introduced to the market combined by a plastic base and vegetal support. These dual coils own the features of biopolymer and physicochemical characteristics of the plant which it has been mixed with, resulting in a new material with a high added value. Cork properties are able to provide versatility in terms of 3D printing technology and directly compete with other plastic-based products, which have a greater environmental impact. Low quality cork is not suitable for the manufacturing of cork stoppers: byproducts, first harvesting cork, dust or even burnt cork. The use of low quality cork will increase the economic value of cork encouraging forest owners to manage their forests, which are unmanaged in Catalonia at 50%. The new material will be ecosostenible because it is PLA based and the cork percentage is greater than 20%. This study compares the physical, chemical and mechanical properties of pellets, the studied cork coil and the commercial cork coil. In general, pellets and the studied cork coil showed a higher percentage of cork than the commercial cork coil. The presence of cork material in a 3D filament can be evaluated using a chemical composition assays and scanning electron microscopy. The percentage of suberin is related to the filament cork content and allows us to compare different commercial products.

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