

ENGINEERING OF EUCALYPTUS AND CANNABIS BIOBASED MATERIALS FOR DERMIC APPLICATIONS USING 3D SIMULATION

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ABSTRACT

Cellulose fiber-based biomaterials from eucalyptus and cannabis bioresources have the potential to replace non-biodegradable materials and to be used for dermic applications. Circular economy principles are the driving force behind the development of sustainable biomaterials that can replace traditional petroleum-based products. The use of cellulose fibers, a renewable and abundant resource, provides a promising pathway towards a circular economy by reducing waste and minimizing the use of nonrenewable resources.

The research focus has been directed towards the optimization of porosity and the retention properties needed for the design and engineering of dermic systems that integrated eucalyptus and cannabis fibers, essential oils and other active molecules, presenting a broad spectrum of therapeutic properties, such as, anti-inflammatory, antimicrobial and antioxidant effects.

We were able to produce cellulose fiber-based biomaterials with eucalyptus, cannabis fibers and active biomolecules and to provide a range of sustainable alternative dermic delivery systems solutions. A range of methodologies, such as enzymatic processing, nano and micro 3D fiber modelling and optimization have been explored for producing such systems.

The results indicate that these biobased materials have shown potential for various applications, such as cosmetic and therapeutic skincare applications. However, further research is necessary to optimize their formulation and production, and to evaluate both their effectiveness and life-cycle assessment.

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