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Mini Review

Chitin-Lignin Complex as New Green Tissue-Carrier for Innovative Pro-Aging Cosme-Nutraceuticals

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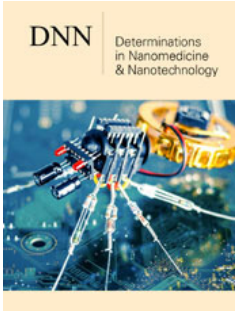
ISSN : 2832-4439



Abstract

The Chitin-Lignin (CL) complexes seem to represent new biodegradable and active carriers useful for making innovative drugs, diet supplements and Cosmetics. CL, made by two natural biopolymers, may be entrapped into the fibers of tissues that realized by the electrospinning Technology, has been used to realized innovative Cosmeceuticals and nutraceuticals. This complex is also considered active because the enzymatic degradation of chitin and Lignin give rice to skin active compounds.

Keywords: Chitin; Lignin; Tissues; Nanotechnology; Cosmeceuticals; Nutraceuticals; Natural polymers

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Submission: July 16, 2025
Published: September 18, 2025

Volume 3 - Issue 4

How to cite this article: Pierfrancesco Morganti.Chitin-Lignin Complex as New Green Tissue-Carrier for Innovative Pro-Aging Cosme-Nutraceuticals. Determ in Nanomed & Nanotech. 3(4). DNN. 000567. 2025.
DOI: 10.31031/DNN.2025.03.000567

Introduction

Chitin and Lignin are both natural polymers made from crustaceans and tree structures respectively [1-4]. They are biodegradable chemical complex-compounds that, recovered by the natural sources may be used to produce green carriers and products, according to the circular economy (Figure 1 & 2). These innovative complexes have the ability to entrap into their structure's different active ingredients, both hydro and liposoluble, for making new products, human and eco-friendly, used as Medical Devices, Cosmeceuticals or nutraceuticals [5-10]. Naturally when the used ingredient is characterized by a micro and nano-dimension, both activity and effectiveness of the realized products result notably increased [5-7]. However, it is interesting to underline the possibility to entrap natural ingredients into the Chitin-Lignin complexes (CLc) for making biodegradable fibers and tissue-carriers characterized as new drugs, nutraceuticals or cosmeceuticals, according to the ingredients used and selected by their biological and physicochemical characteristics [7,10-12]. According to our previous papers, the entrapment may be done mixing together the solutions of chitin nanofibrils nano lignin electrospinning the obtained gel with the selected polymeric by the electrospinning technology. The obtained specialized tissues personalized may be used as innovative carriers, alternative to emulsions, gel ad powders [2,5,13]. Naturally the tissues may be personalized by the use of selected ingredients for obtained innovative Cosmeceuticals and/or nutraceuticals that may controlled *in vitro* and *in vivo* to verify effectiveness and safeness. Therefore, they may be considered new green structures because made by natural ingredients 100%biodegradable and hypoallergenic because free from water, emulsifiers, preservatives, fragrances and other chemicals, often cause of allergic and sensitizing phenomena [2,5,13,14]. Moreover, these new tissue-carriers could be useful to produce, for example, innovative pro-aging products, having shown to be free from side effects and to be able to increase skin penetration of the selected active ingredients entrapped into their fibers, in a better way, when compared to the usual emulsions [15]. The efficacy of any ingredients, in fact, has been determined not only for their own effectiveness, but also for the capacity shown regarding the penetration through the skin layers and the skin annexes [15].

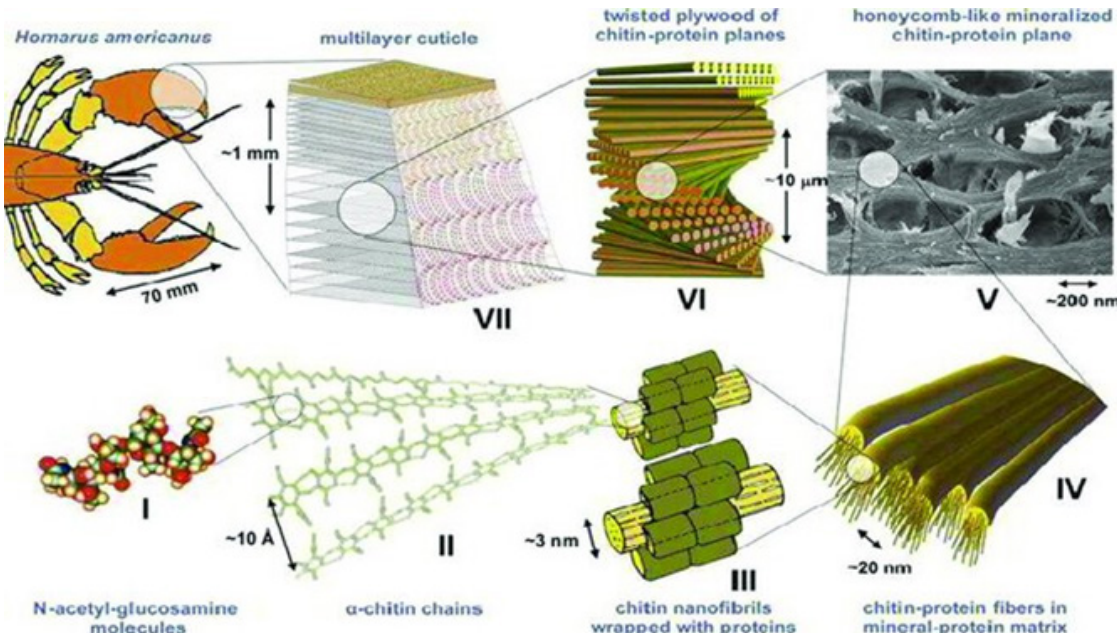

Figure 1: Chitin source and recovery [3].

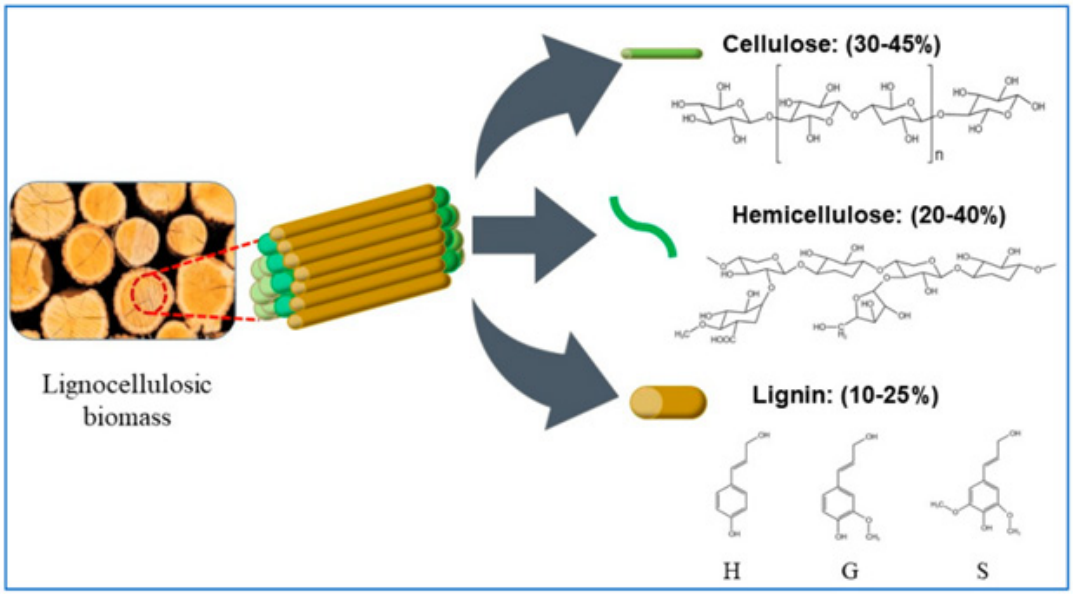

Figure 2: Lignin source and recovery [4].

Conclusive Remarks

Natural polymers, such as Chitin and Lignin, specifically at their micro/nano dimension represent a new area of Research of great interest. The nano dimension, in fact, can show atomic-like behaviours characterized by a higher surface compared to the bulk materials [16,17]. Due to their morphology and physicochemical characteristics, the Chitin-lignin nanoparticles seem to result a new carrier to make innovative products. It is interesting to underline that both the polymers are 100% biodegradable and obtainable at low cost and with a low consume of water and energy as well as the electrospinning necessary to produce the reported healthy tissues and bio-eco-compatible products [5-7,18-20]. Moreover, both the two polymers are not only useful as an innovative carrier but could represent source of active ingredients, when degraded by the skin enzymes.

Author Contributions

Idea of manuscript, writing-original draft preparation a review, editing and supervision Pierfrancesco Morganti. The author declare that have read it and agree to the publishing version.

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