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Can Chitin Became Yaluronic Acid Acting as Vehicle and Active Ingredient?

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ABSTRACT

The probable synthesis of Hyaluronic acid made by Chitin saccharide units is explained and reported together with the use of the Chitin polymer to make a novel tissue-vehicle (tissue-carrier) used to realize innovative cosme-nutraceuticalsThese novel products have been characterized for their effectiveness and safety,as reported from some examples.

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Chitin and Hyaluronan

Chitin is a sugar-like polymer recovered in crustaceans, insects, yeasts and fungi but not in humans where his presence persists by chitinase genes only.What happens when Chitin enters into the human body by the crustacean-food or the topical activity of some insects and microorganisms ? It has been supposed that the Chitin nanofibrilar crystallites , transformed by the chitinase in 9/7 saccharide units, are synthesized in Hyaluronic acid by the hyaluronan syntethase[1,2]. What its mechanism of action? The polymeric unit, acting as a needle, would enter through the inner surface of the cell'plasma membrane (Chitin in) into the extracellular cytoplasmatic space (Chitin out) where would be transformed in Hyaluronic acid by the hyaluronan syntethase as reported in figure 1.

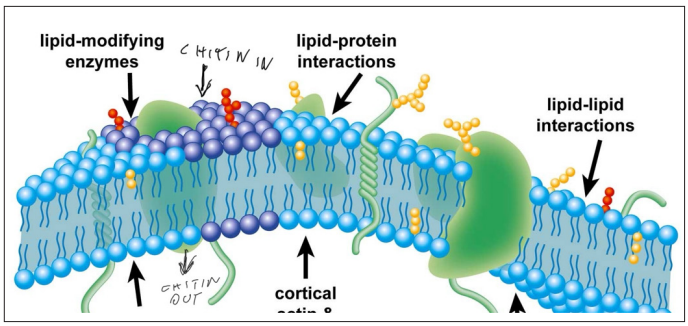

Figure 1: The Chitin crystallite acting as a needle enter through the plasma membrane of the cell (Chitin in) coming out at the level of cytoplasm (Chitin out) where it is transformed in Hyaluronic acid (Courtesy of Morganti [2])

Chitin,Tissue-Carrier and Cosme-Nutraceuticals

Chitin, in its nanosize known as Chitin Nanofibrils (CN), covered by positive electrical charges in their surface, have been complexed by the gelation method with the electronegative Nanolignin (NL), obtaining the relative CN-NL complex, as reported by figure 2 [3].

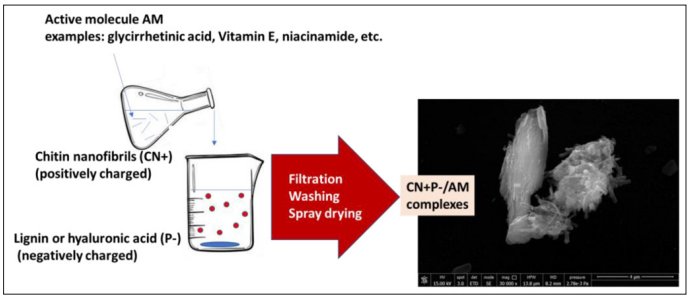

Figure 2: Method to make the complex CN-NL by the gelation method (Courtesy of Coltelliet al [3])

This complex, encapsulatig selected active ingredients, has been electrospun with natural polymers to obtain the programmed innovative cosmeceutical. Just to clarify: the tissue, embedded by CN-NL represents the vehicle called *tissue-carrier*, while the tissue embedded by the CN-NL encapsulating active ingredients is the *activated-carrier* i.e the programmed cosme-nutraceutical [4-6]. Naturally the effectiveness and safety of the obtained cosme-nutraceutical depend by the final programmed and selected polymers and active ingredients used as well as by the *in vitro* and *in vivo* control carried out [3]. By all these studies it has been possible to obtain a specialized cosmeceutical to be applied on the skin or a nutraceutical to be taken by oral route [3-8].

Conclusive Remarks

However it is interesting to underline is that these innovative products are not only free of preservatives, emulsifiers, fragrances, colors and other chemicals necessary to make the usual emulsion often cause of allergic and/or sensitization phenomena, but posses also a better e delivery system thanks to the micro-dimension of the complex-CH-NLand are packed by biodegradable foils of gauze-papers or alluminium [7,8]. In conclusion the proposed innovative cosme-nutraceuticals result skin- and environmentally-Friendly according to the actual consumer requests.

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Conflict of Interest and AI Contribution: Both the authors declare no Conflict of interest and no the use of AI.

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