PHYSICAL PROPERTIES OF CROSS-LINKED CHITOSAN ELECTROSPUN FIBER MATS

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Chitosan is the deacetylated derivative of chitin, which is the second most abundant polysaccharide found in nature, after cellulose. Chitosan has several interesting properties such as biodegradability, lack of toxicity, antifungal effects, and acceleration of tissue regeneration, hemostatic nature and immune system stimulation that make it an attractive material for medical applications[1].

Chitosan fiber mats were successfully processed by electrospinning. The as-spun fiber mats were neutralized with ethanol and cross-linked with glutaraldehyde. It was observed that the mean fiber diameter decreases from 243 ± 43 nm down to 215±53 nm and that the processing conditions do not alter the initial deacetylation degree of the polymer.

Polymer crystallinity index shows a decrease from 61 % for the Protasan material down to 17 % for the cross-linking fiber mats. A swelling index up to 1000 % was observed for the cross-linked samples. Preliminary MC-

3T3-E1cell culture showed good cell adhesion and proliferation in the cross-linked chitosan fiber mats.

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References

1. Sencadas V., Correia D. M., et al. Carbohydrate Polymers 87:1295-1301, 2012.

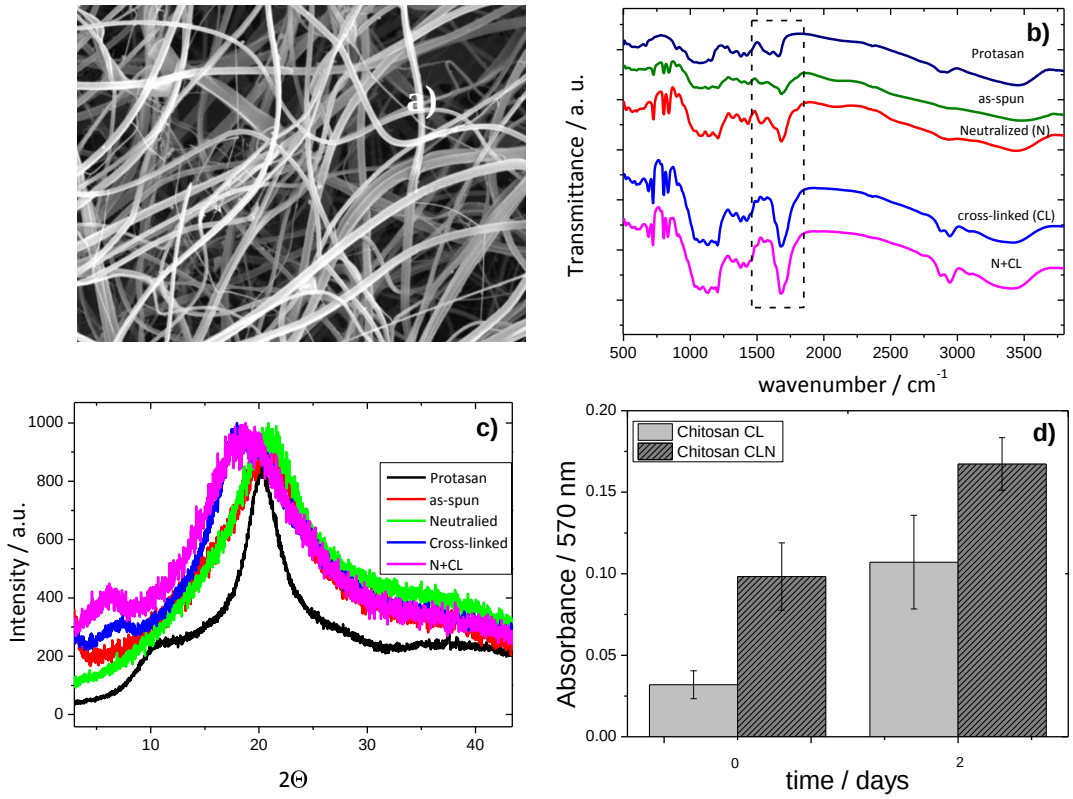

Figure 1: a) Chitosan electrospun membrane after neutralization and cross-linking, b) FTIR spectroscopy results for the different chitosan membranes, c) Evolution of crystallinity index after different processing conditions and d) MTT absorbance results after cells seeded for 0 and 2 days on neutralized and cross-linked chitosan fibers. Values are mean ± SD.