

Title: **Essential oil drug delivery from biofunctional textile**

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A biofunctional textile with poly(ϵ -caprolactone) nanocapsules full of oregano vulgar essential oil (OEO) is believed to be of great interest for medical devices for the antimicrobial environment that provide.

OEO has been encapsulated in poly(ϵ -caprolactone) by nanoprecipitation method and have been applied onto textile substrates, such as cotton and polyamide, by a foulard finishing process. A higher nanocapsules content has been obtained on polyamide rather than on cotton due to the more hydrophobic character of polyamide. Drug delivery with physiological serum and physiological serum /ethanol (80:20) mixture has been carried out. The treated fabrics were submerged, at semi-infinite bath conditions, into a thermostated bath.

The mathematical model has allowed the determination of the release behaviour. The results demonstrate that the release mechanism is significantly influenced by the hydrophobicity and the affinity of nanocapsules and the textile into the release mechanism. For cotton, there were not quantitative results in the release, so there is not drug delivery determination. For polyamide, the release was anomalous and the total oil release could not be determined. Comparison to nanocapsules of poly(ϵ -caprolactone) containing Gallic acid shows that the diffusion of OEO is three times faster.

Although further studies are required, we thus can conclude that nanocapsules of poly(ϵ -caprolactone)containing OEO are very promising candidates for medical applications.

Keywords: poly(ϵ -caprolactone), nanocapsules, nanoprecipitation, biofunctional textile, drug delivery, mathematical model.