NANOCARRIERS FOR TOPICAL DELIVERY OF RESVERATROL.

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Purpose: The aim of the present work was to develop a nanocarrier-based formulation for topical delivery of resveratrol.

Methods: Trans-resveratrol (t-res) was encapsulated in liposomes, ethosomes or transferosomes, by a modified hand-shaking method followed by extrusion. All the formulations were characterised in terms of mean diameter, size distribution (I.P.), t-res loading, t-res stability upon encapsulation during storage. The nanocarriers containing t-res were then introduced in cellulose-based gel to allow their final administration on the skin and the viscoelastic properties of the resulting formulation were investigated. Finally, we studied the inhibition of reactive oxygen species (ROS) in human keratinocyte (HaCaT) cell line stimulated with H2O2 for 24 h and then incubated with the t-res containing nanocarriers.

Results: All the t-res containing carriers were characterised by a very high (close to 100%) encapsulation efficiency, a negligible t-res release at 4°C and stability of resveratrol in its trans form. The carriers only slightly influenced the viscoelastic characteristics of cellulose-based gels. Nanocarriers encapsulating t-res reduced, in a concentration-dependent manner, ROS production induced by H2O2 and this effect was higher when using t-res-encapsulating nanocarrier, with the higher effect observed in the case of ethosomes.

Conclusions: In this work nanocarriers with high encapsulation efficiency, high physical stability and negligible t-res release during storage at 4°C were prepared. To allow their final administration on the skin, the nanocarrier can be easilisy loaded in cellulose-based gels without altering its rheological properties. Moreover, the use of t-res-encapsulating ethosomes led to an efficient antioxidant activity. Further ex vivo and in vivo studies will clarify the role of the different carrier when administered on the skin.