Enhanced antioxidant effect of trans-resveratrol: Potential of binary systems with polyethylene glycol and cyclodextrin (Article)

Moyano-Mendez, J.R.\textsuperscript{a}, Fabbrocini, G.\textsuperscript{b}, De Stefano, D.\textsuperscript{c}, Mazzella, C.\textsuperscript{b}, Mayol, L.\textsuperscript{d}, Scognamiglio, I.\textsuperscript{d}, Carnuccio, R.\textsuperscript{d}, Ayala, F.\textsuperscript{b}, La Rotonda, M.I.\textsuperscript{d}, De Rosa, G.\textsuperscript{d}

\textsuperscript{a} Department of Pharmacy and Pharmaceutical Technology, Faculty of Pharmacy, University of Seville, Seville, Spain
\textsuperscript{b} Department of Clinical Medicine and Surgery, University of Naples Federico II, Naples, Italy
\textsuperscript{c} European Institute for Research in Cystic Fibrosis, San Raffaele Scientific Institute, Milan, Italy
\textsuperscript{d} Department of Pharmacy, University of Naples Federico II, Via Montesano 49, 80131 Naples, Italy

Abstract

Trans-resveratrol, a polyphenol extracted from Vitis vinifera, has different beneficial effects following its administration on the skin. Here the potential use of binary systems to enhance in vitro and in vivo activity of trans-resveratrol was investigated. Thus the aqueous solubility of trans-resveratrol was investigated in the presence of growing concentrations of polyethylene glycol (PEG) or β-cyclodextrin (βCD) as solubilizing excipients. Then, the solid dispersion of trans-resveratrol with PEG or inclusion complexes trans-resveratrol/βCD were prepared and characterised by different methods. Cytotoxicity and inhibition of reactive oxygen species (ROS) following H\textsubscript{2}O\textsubscript{2} challenge in the presence of trans-resveratrol, alone or associated to the excipients, was evaluated on human keratinocyte HaCaT cell line. Both the trans-resveratrol-containing binary systems induced significant reduction of H\textsubscript{2}O\textsubscript{2}-induced ROS production, especially in the case of βCD that was selected for the following phase of the study. Thus, the effect of a cream containing trans-resveratrol, alone or associated to βCD, on different skin parameters such as corneometry, colorimetry and elastometry, was evaluated on human volunteers. All patients showed a visible improvement of clinical conditions with a remarkable decrease of aging signs, but this effect was higher of the hemi face treated with the βCD-containing formulation versus formulation containing trans-resveratrol alone. © 2014 Informa Healthcare USA, Inc.