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STRATEGIES TO INCREASE STABILITY AND BIOAVAILABILITY OF NATURAL PRODUCTS

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There is an increasing demand for natural products and plant extracts, in particular for the new generation of science-based and standardized functional botanical ingredients to formulate herbal medicinal products and healthy products, mainly represented by medical devices, cosmetics and dietary supplements. This trend is principally due to numerous health benefits of natural products and plant extracts recently reported in the scientific literature, representing new therapeutic approaches or complementary and/or alternative treatments to the current medications, and a huge opportunity to meet consumer demand. The scarce water solubility, low lipophilicity and inappropriate molecular size of many natural compounds, which undergo structural instability in biological milieu, rapid clearance and high metabolic rate, have severely limited their use. Nanomedicine represents an excellent tool to increase bioavailability and activities of natural products. Generally, nanosized delivery systems provide large surface area increasing dissolution properties and can overcome anatomic barriers. In addition, passive and active targeting can optimize the performance of the nanocarriers. Passive targeting takes advantage of the unique pathophysiological characteristics of inflamed and tumour vessels, enabling nanodrugs to accumulate in the tissues. The effect is called enhanced permeation and retention, generally obtained by the decoration with polyethylene glycol the vector surface. An intriguing strategy is to decorate the nanocarriers with special ligands in order to recognize and bind to target cells through ligand–receptor interactions. The lecture aims to describe novel nanoformulations, namely polymeric nanoparticles and lipid based-nanocarriers, which can represent successful examples to overcome these limitations of natural pleiotropic molecules, extracts and essential oils.

Keywords: Natural products, solubility and stability, bioavailability, nanocarriers

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