

***In Vivo Investigation in Human Skin Permeability of Nanoparticle Vitamins Formulations Using Confocal Raman Spectroscopy***

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We employ confocal Raman spectroscopic techniques to investigate the permeation of skin product on human skin. The aim of the present study is to measure and investigate *in vivo* the penetration profile of the formulation into the stratum corneum which is composed of corneocytes and intercellular lipid matrix. In our study, the volar forearm of female volunteers treated with three different vitamins formulations (with and without nanoparticules) was measured following typical application of 2-5 mg/cm<sup>2</sup> on human skin. The active ingredients permeation into the stratum corneum of the epidermis was measured between 0 to 24hrs using a Confocal Raman System (Rivers diagnostics) coupled to a 785 nm laser excitation. The depth profile was measured at 2µm intervals from the skin surface toward the interior up to 100µm. The analysis of the collected spectra revealed that the formulation remains on the skin surface (stratum corneum) ( 0 to 15µm) in most cases and nothing has been detected below 20µm after 24hrs. These results highlights that confocal Raman spectroscopy, in conjunction with other analytical techniques, has a potential for rapid noninvasive measurements of the skin permeation of vitamins active formulations by providing information changes occurring at the molecular level.