Raman spectroscopy in cosmetic sciences

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In vivo Confocal Raman Spectroscopy (CRS) is nowadays a powerful technique that enables label free chemical characterization of human skin and has being successfully applied to monitor and elucidate changes induced by an exogenous agent. In this talk, we will show that CRS is a most suited analytical tool for the skin cosmetic industry, especially by its ability to measure human skin in vivo and noninvasively from its surface down to the dermis. Stratum corneum is known as a skin barrier function and the integrity for the Natural Moisturize Factors (NMF) is important to avoid skin diseases as, for example, atopic dermatitis. Noninvasive measurements for the early detection of filaggrin-related atopic dermatitis can be performed by Confocal Raman to identify possible quantitative marker for FLG gene mutations. Another important application of CRS is the detection and tracking of Active Cosmetic Ingredients including information of their depth penetration and diffusion rate trough the Stratum corneum up to dermis. We will show how this information can be used by the cosmetic industry to develop new cosmetic formulations or optimize their product by finding potentially enhancer to increase their penetration and to identity the most efficient nano-encapsulating strategies to support their claim. The effect of skin exposure to infrared radiation (IR) and intense visible light is still poorly studied. The use of laptops, cell phones and tablets with intense blue light also generates concern as a possible source of human skin damage. It will be shown that CRS can be used in vivo to determine the efficacy of products against the effect of exposure to visible, IR and light blue radiation.