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The anti-melanogenic effect of unsaturated fatty acids covalently bonded to hyaluronan

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Whitening products based on tyrosinase inhibitors have severe side effects, which include cellular toxicity, and poor stability in the presence of oxygen and water. In this work, the effective combination of hyaluronan (HA) grafted with oleyl (HA-C18:1), linoleic (HA-C18:2) and α -linolenic (HA-C18:3) on melanin production will be demonstrated. A comprehensive material characterization as well as evaluation of chemical structure of the products was determined by nuclear magnetic resonance (NMR), Fourier transform infrared spectroscopy (FTIR), gas chromatography–mass spectrometry (GC–MS) and thermogravimetric analysis (TGA). The stability of the product was also studied as peroxidation of fatty acids during storage is well documented. In this case, the covalent bond of the fatty acids to HA increased its chemical stability without any undesirable loss of the biocompatibility of both components. On the other hand, the anti-melanogenic effect of the above-mentioned derivatives, i.e. oleyl, linoleoyl and linolenyl (HAC18:3) was studied. Particularly, HA-C18:3 derivatives were found to inhibit melanin synthesis by degradation of tyrosinase in a concentration-dependent manner being more active than α -linolenic acid itself. The combined effects of degree of substitution and solubility of the conjugates were found to be key parameters. The presence of HA delivers effectively the fatty acid to the target melanocytes. Furthermore, the whitening properties of the derivative were evaluated in a randomized, double-blind, split-face *in vivo* study on the face of 30 Chinese women. It was also determined in the volunteers that the decrease of melanin is followed by a decrease of pigmented spots and improvement of color uniformity in the skin.

Biography

Gloria Huerta-Angeles has completed her PhD at UNAM-Mexico and Post-doctorate studies from Czech Academy of Sciences. She is a Senior Researcher at Contipro a.s. a global producer of hyaluronan and human pharmaceutical final products. She has published more than 30 papers in reputed journals and is (Co) Inventor of 12 international patents in cosmetics, diagnosis, encapsulation of active compounds, and nanofibrous mats for wound healing. She has been serving as an Editorial Board Member of the journal *Carbohydrate Polymers*.

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