

# A gold nanoparticles and hydroxylated fullerene water complex as a new product for cosmetics

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## ABSTRACT

Three types of gold nanoparticles (AuNPs) were synthesised with a custom-made Ultrasonic Spray Pyrolysis (USP) device, from aqueous solutions of gold (III) chloride (AuCl<sub>3</sub>) and gold (III) acetate (AuC<sub>6</sub>H<sub>12</sub>O<sub>6</sub>), with an initial concentration of Au 0.5 g/L. AuNPs were collected in suspensions of deionised (D.I.) water with the stabilisers polyvinylpyrrolidone (PVP) or polyethylene glycol (PEG), followed by the process of freeze drying the AuNPs to be useful as a new additive for the cream. The standard cream base was used as a matrix for preparation of three types of cream with AuNPs in the same concentration ratios. The third AuNPs cream was prepared with a patented hydroxylated fullerene water complex (3HFWC-W) matrix. To examine the effect of AuNPs as additive in creams, a six-week study of test creams was conducted on 33 volunteers with no dermatological diseases. During the study three main parameters of the skin were measured: Collagen quality, skin moisturisation and the epidermis-dermis function. The results of the study found improvements of collagen quality between 18-24 %, achieved due to the use of AuNPs in standard creams, while the cream with the combination of 3HFWC-W and AuNPs gave significantly higher improvements with a value of 45.7 %. It was also discovered that hydration of the skin (stratum corneum) increased by 6.4-9.6 % in standard creams with AuNPs, and 73.7 % in the 3HFWC/AuNPs` cream. Similar results were measured by the epidermis-dermis function, where 24-28 % improvement for standard creams with AuNPs was identified, and 38.4 % for the cream 3HFWC-W/AuNPs.

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