SYNTHESIS OF TiO$_2$ NANOPARTICLES IN RUTILE PHASE, THEIR SURFACE MODIFICATION AND USE IN COSMETIC FORMULATIONS

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In this work, the synthesis and functionalization of titanium dioxide (TiO$_2$) nanoparticles through a physical process of wet milling is presented. The particles produced were functionalized using stearic acid as a functionalizing agent through a hydrothermal process. A combination of characterization techniques was used: Dynamic light scattering, differential thermo-gravimetric x-ray diffraction, and electron transmission. These techniques allowed us to determine the distribution of particle sizes, the Z potential, the crystalline phase and crystal size. Additionally, the FTIR technique was used to confirm the presence of the functional groups characteristic of the functionalizing agent. On the other hand, for the determination of the photocatalytic activity of the nanoparticles, we experimented with the degradation of methyl orange under UV radiation. The above in order to determine if the functionalized product met the international regulations of TiO$_2$ nanoparticles in sunscreens. Finally, the nanoparticles were used, once they were functionalized and characterized, in the formulation of sunscreens. The absorption efficiency of the lotions was evaluated by the UV-Vis spectrophotometry technique.

**Keywords:** Titanium-dioxide, Wet-milling, Sunscreens

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