



NEW UV-BLOCKER FOR SUNSCREEN WITH HIGH BACTERICIDAL ACTIVITY

(PROJECT N° P-250)

Sun protection:

Sunblock typically refers to opaque sunscreen that is effective at blocking both UVA and UVB rays and uses a heavy carrier oil to resist being washed off. Titanium dioxide and zinc oxide are two of the important ingredients in sunblock. Unlike the organic sun-blocking agents used in many sunscreens, these metal oxides do not degrade with exposure to sunlight. However, photoreactivity of commercially available suntan lotions and their components (mainly TiO₂) leads to formation of Reactive Oxygen Species (ROS), which are responsible for example for DNA damaging and skin ageing.

Multifunctional ZnO – biopolymer

Presented nanocomposites are based on nanoparticles of zinc oxide (ZnO). The surface of nanoparticles is additionally modified with biocompatible polymer - chitosan (CS).

The main advantages of the invention are:

- excellent absorption of UVA/UVB,
- low refractive index,
- chemical stability,
- antibacterial activity against resistant bacterial strains (*Staphylococcus aureus*, *Escherichia coli*),
- lack of cytotoxic effect against human keratinocytes.

The offered material is based on ZnO nanoparticles, modified with biocompatible polymer – chitosan. The material is characterized with high absorption properties of the sun's ultraviolet (UV) radiation. Also, high antibacterial activity against resistant bacterial strains and the absence of cytotoxic activity against human skin cells of the material were confirmed.

Application: cosmetics, sunscreen, skin care, medical applications

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Multifunctional ZnO – biopolymer composite resolves the risks associated with the use of semiconductor nanoparticles as active ingredients in sunscreen.

The material is the subject of patent application and the invention is still developed by the scientists from Faculty of Chemistry, Jagiellonian University.

Currently the Centre for Innovation, Technology Transfer and University Development (CITTRU) is looking for the entities interested in the commercial applications of the described solution. CITTRU is looking for the business partners for joint research and development projects involving the above research topic.

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