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ANALYTICAL CHEMISTRY
BIOCHEMISTRY
BIOMEDICINE

2021

2021July 26-27
Webinar

3rd International Conference on **Biomedicine & Pharmacotherapy**

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Making the hospital a safer place by the sonochemical coating of all its textiles with antibacterial nanoparticles

A sonochemical method was developed for coating surfaces. It was applied to coat metals, ceramics, polymers. Glasses, textiles and even paper. It demonstrated that a large variety of properties can be imparted to the substrate. It can make the surface magnetic, conductive, fluorescent, antibacterial, and antiviral.

As far as coating textiles it is considered the best coating technique since cotton coated with CuO nanoparticles that was washed 65 cycles in Hospital washing machines (75 or 92 OC) revealed 83 % of the particles on the cotton at the end of this long process¹. For making textiles antibacterial we employed ZnO, CuO, and Zn_{0.11}Cu_{0.89}O as the coated layer on the textiles (cotton, Polyester, Nylon and their mixtures). The killing mechanism of the bacteria was due to the creation of ROSs. Hydroxyl radicals, superoxide anions, and singlet oxygen were detected as a result of the reaction of the metal oxide with water.

This coating technique was applied to medical devices as well. Contact lenses, Urinal Catheters and Cochlear electrodes were all coated with metal oxide nanoparticles and exhibited excellent antibacterial properties.

It is worth mentioning that we own two sonochemical roll to roll coating machines and are attempting to introduce in the market new face masks. Finally, the SONO MASK that is currently being sold all over the market is a demonstration of a technique that has gone all the way from the laboratory to the market.

Biography

Aharon Gedanken has obtained his Ph. D. From Tel-Aviv University. He has published more than 880 papers in reputed journals and his H-Index is 98 according to the Web of Science and 110 according to Google Scholar. He has been serving as an editorial board member of 8 Journals. He was the Israeli representative in the NMP committee of the European FP7 program. He served as the chairman of the Chemistry Department and the Dean of the Faculty of Exact Science. He was awarded prizes of Israeli Chemical Society and the Israeli Vacuum Society for Excellence in Research.

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The genistein by loading into transferrinosomes as new possible adjuvant in the oxidative stress-related neurodegenerative diseases

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Genistein (GEN) is a soy-derived isoflavone, and its antioxidant and neuroprotective activity has been reported by several authors. Promising results have been obtained both in vitro and in vivo studies, but several drawbacks such as low oral bioavailability, poor water solubility, and rapid metabolism/excretion limit GEN's clinical applications. The aim of this study was to overcome those limitations by loading GEN in transferrinosomes (GEN-TF) and use GEN-TF as a potential therapeutic or preventive strategy in neurodegenerative diseases. Several GEN-TF complexes were administered and tested on H₂O₂-induced oxidative damage in PC12 cell line by means of MTT, LDH and flow cytometer assay. All the obtained genistein carrier were able to improve GEN internalization in PC12 cells, reducing ROS and the amounts of apoptotic cells generated by H₂O₂ treatment, strengthening the neuroprotective activity of GEN. The experimental data indicate the GEN-TF2 as the most promising drug delivery system in terms of antioxidant activity and oxidative stress reduction in our PC12 cells model. These results suggest that GEN-TF2 could be used as adjuvant therapy in oxidative stress-related neurodegenerative diseases.

Biography

Rossana Migheli has completed his PhD in 1995 from Sassari University and postdoctoral studies from Sassari University School of Medicine. She is a researcher in Sassari University School of Medicine directs the cellular laboratory of Pharmacology. She has published more than 50 papers in reputed journals. The your research in recent years has mainly concerned the neurochemistry of natural and synthetic antioxidant molecules in neuronal models in vitro and in vivo of oxidative stress. She used different technologies in order to evaluate new strategies for the administration of drug therapies.

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