

A novel approach for biogenic synthesis of silver chloride nanoparticles using leaf extracts of *Cissus quadrangularis* and their antibacterial efficacy

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Plant materials are emerging as an exciting resource for the development of non-toxic noble nanoparticles. In this study, we demonstrated a single step method for synthesis of silver chloride nanoparticles (AgCl-NPs) using leaf extract of *Cissus quadrangularis* under ambient condition. It was found that aqueous AgNO₃ when treated with leaf extract of *C. quadrangularis* was reduced leading to the formation of AgCl-NPs which was continuously monitored by measuring the change in absorbance at different time intervals using UV-visible spectral studies. The synthesized particles were characterized by FTIR, XRD and FE-SEM to understand the nature, size and shape. The average size of the AgCl-NPs was found to be 13 nm. The antibacterial activity of AgCl-NPs was evaluated against Gram positive and Gram negative bacterial pathogens by minimum inhibitory concentration (MIC) test. Results showed that AgCl-NPs could inhibit the growth of tested bacteria and their MIC values were less than 7 µg/mL. Thus, the leaf extract of *C. quadrangularis* could be used as a bio-reactant for the biogenic synthesis of AgCl-NPs and it can be used as potent antibacterial agent.

Keywords: Biosynthesis, AgCl-NPs, *Cissus quadrangularis*, FE-SEM, antibacterial activity.

Biography

P. Velusamy has completed his Ph.D from Centre for Advanced studies in Botany, University of Madras. At present he is serving as faculty member in the Department of Biotechnology, SRM University, India. He has served as postdoctoral fellow in the Department of Biomedical Sciences at Academia Sinica, Taiwan and Department of Biotechnology at Chonnam National University, South Korea during 2004-2009. He is actively involved in, to explore the mechanism of antimicrobial activity with using biogenic nanoparticles. He has published 20 research papers, in reputed journals and serving as an editorial board member of reputed.

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Development and applications of enzymatically reticulated hydrocolloidal films

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Interest in using biodegradable materials is strongly increasing because of the consumer's awareness of environmental damage caused by plastics of petrochemical origin, more than 250 million tons of which are still produced each year throughout the world. Therefore, the development of the so-called "bioplastics" is happening as a consequence of the need to derive more carbon for chemical processes from renewable molecules instead of oil reserves. Some new biodegradable materials are produced utilizing renewable biomass sources through the recycling of agricultural by-products, with the concurrent goal to manage lower waste amounts and reduce environmental pollution. However, since petrochemical-based materials are known to exhibit good mechanical performance, heat sealability, effective barrier to gases, and are available at low cost, further efforts for preparing market compatible bioplastics are needed. Although transglutaminase (TG) was mostly studied for its ability to posttranslationally remodel different proteins *in vivo*, its reaction has also attracted the attention as an effective way to manipulate the structure of proteins outside the living cells. One promising exploitation of TG as crosslinker is related to the production of new protein-based bioplastics with desired mechanical and gas barrier properties. In this respect, we obtained hydrocolloidal films of either pectin or chitosan in the presence of different plant and milk proteins able to act as substrates of the enzyme. The features of the composite films produced suggest the possibility to obtain enzymatically "tailored" molecular networks conferring desired characteristics to specific bioplastics with potential applications not only in food industrial sector but also for pharmaceutical and agricultural applications.

Biography

Raffaele Porta is full professor of Biochemistry at the Faculty of Agricultural Sciences of the University of Naples "Federico II" and member of the Editorial Board of "Open Biotechnology Journal" (Bentham Sci.Publ.), "Enzyme Research" (Hindawi Publ.Co.), and "Journal of Biotechnology and Biomaterials" (OMICs Publ.Group). He carries out research activity at the Dept. of Food Science of the University of Naples "Federico II" and the use of the enzyme transglutaminase to produce hydrocolloidal films was his current most important field of investigation. His activity is documented by more than 100 articles published on journals endowed with high impact factors and by 25 chapters in worldwide distributed books.

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