Fabrication of PVP nanofibers incorporated with gold nanoparticles synthesized by Curcuma xanthorrhiza rhizome extract

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Gold nanoparticles have become an intense topic of research interest because their unique properties such as catalytic, electrical, magnetic and optical properties. They are extensively used in diverse areas including energy, catalysis and biomedical application. Due to their large surface area and capability of supporting cell adhesion, polymeric nanofibers are used as carriers for drug delivery, wound healing, and biocatalysts, etc. In this study, green synthesis, an environmentally friendly method, was chosen to produce gold nanoparticles (AuNPs) using the spices plant grown in Indonesia *Curcuma xanthorrhiza* as the source of reducing agent. The characterization of the synthesized AuNPs was performed by UV-Visible spectroscopy (UV-Vis), X-Ray diffraction (XRD), Transmission Electron Microscope (TEM) and Energy Dispersive X-Ray Spectroscopy (EDS). The results from UV-Vis, XRD, TEM and EDS supported the successful synthesis of AuNPs. The data from dynamic light scattering measurement showed that the average size of Au-NPs obtained from this study was 47.6 nm and the TEM images revealed that the Au-NPs contained spherical, triangular, hexagonal, and rod shapes (Figure 1). The AuNP-loaded polyvinylpyrrolidone (AuNP/PVP) nanofibers were fabricated by electrospinning method. The AuNP/PVP nanofibers were characterized by Scanning Electron Microscope (SEM) and Fourier Transform Infrared Spectroscopy (FTIR). The SEM imaging (Figure 2) demonstrated that the electrospun AuNP/PVP nanofibers having diameter of 852 $\pm$ 108 nm (mean $\pm$ SE). The data from FTIR showed that the absorption band at 1651 cm-1in PVP nanofibers has shifted slightly suggesting the presence of AuNPs in the nanofibrous composites. Confirmation of the incorporation of AuNPs into the PVP nanofibers by TEM and EDS is in progress. Then the biocompatibility testing with NIH 3T3 fibroblasts will be carried out to determine the potential of AuNP/PVP nanofibers as biomaterials for skin tissue engineering.

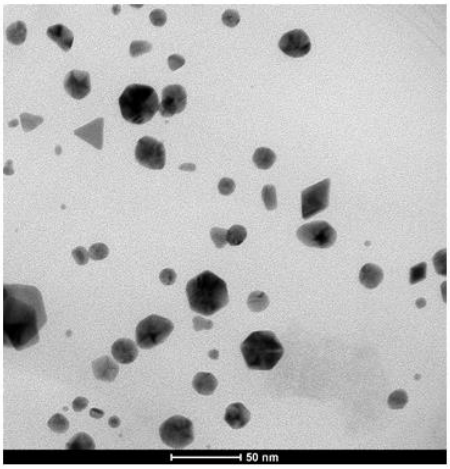

Figure 1

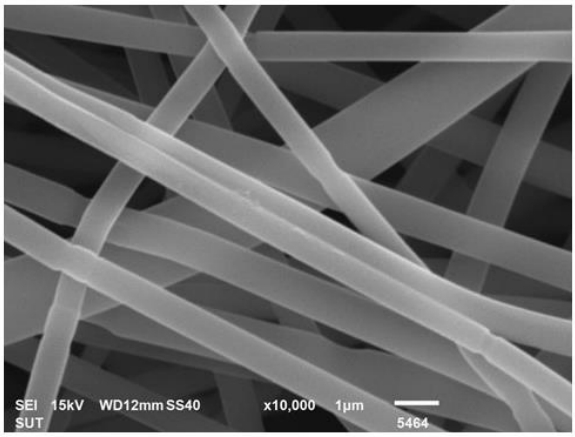

Figure 2