Synthesis and characterization of gold nanoparticles synthesized from a biomaterial

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In the field of nanotechnology, biosynthesis of nanoparticles has received a considerable attention due to the growing need of developing clean, renewable and environmentally benign solvents [1,2]. In the present work, we report a green and inexpensive route for the synthesis of gold nanoparticles (Au-nps) by a simple procedure using *vetiver root* extract as the reducing agent, without the intervention of any man-made chemicals.

Addition of vetiver root extract to Au salt solution resulted in change of colour from yellow to violet-red indicating the formation of Au-nps. This was confirmed using UV-VIS spectrophotometry technique. The absorbance peak was centered near 545 nm as shown in Figure 1. The surface characterization of the synthesized gold nanoparticles was done with scanning electron microscopy (SEM) as shown in Figure 2.

Figure 1: UV-Vis spectrum of Au-nps synthesized from vetiver root extract

X-ray diffraction (XRD) analysis was done in order to study the nature of synthesized Au-nps. From the XRD data, it was confirmed that the Au-nps synthesized by the present green method were crystalline in nature. The average particle size was calculated using Debye-Scherrer equation and was found to be in the

range 38 to 45 nm. Figure 3 shows the XRD pattern of Au-nps.

Figure 2: SEM image of synthesized (Au-nps) from vetiver root extract

Figure 3: XRD pattern of Au-nps synthesized from vetiver root extract

The proposed method follows 100% green approach and gold nanoparticles synthesized by this route were found to be stable. The phytochemicals present in the plant extract act as reducing agent for synthesis of the gold nanoparticles, which hold great potential for a variety of applications in various fields.

References

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