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| Title | Green synthesis and characterization of silver nanoparticles by using Bryophyllum pinnatum and the evaluation of its power generation activities on bio-electrochemical cell | | |
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| Abstract |  |
| In this work, silver nanoparticles (Ag NPs) have been synthesized through an eco-friendly, cost-effective green approach by using Bryophyllum pinnatum leaves (BPL) extract and the power generation activity of the BPL bio-electrochemical cell has been investigated with these Ag NPs. The formation of Ag NPs was probed by X-ray diffraction (XRD), UV–visible spectroscopy, Fourier transforms infrared (FT-IR), Energy dispersion X-ray spectroscopy (EDX), and Field emission scanning electron microscopy (FESEM). The XRD studies indicated the formation of face-centered cubic (FCC) Ag NPs of an average crystallite size of about 18 nm. The FESEM images have shown spherical Ag NPs, and the average particle size was found as 35.49 nm after size distribution analysis. A significantly broad absorption peak centered at around 465 nm was revealed by the UV–visible spectra of Ag NPs, which indicated the formation of Ag0 from Ag+. Moreover, the NPs have been applied on BPL bio-electrochemical cells to examine the power generation performance of the cell. It is observed that Ag NPs exhibited a potential role in improving open circuit voltage, short circuit current, and the power generation of BPL bio-electrochemical cells. This study demonstrates a simple, cost-effective, and eco-friendly synthesis approach of Ag NPs and the excellent performances of Ag NPs on electricity generation systems of bio-electrochemical cells. The impact of Ag NPs in the bio-electrochemical cell is a meaningful research work that may open a new platform to develop potential bio-electrochemical cells. | |