**ABSTRACT**

Fresh and dried leaves of *Lawsonia inermis* (Henna) were used in extracting dyes with variety of solvents such as ethanol, acetone and distilled water. To our knowledge, acetone has been used for the first time as solvent to extract henna dye. These extracted dyes were used as sensitizers in Dye-Sensitized Solar Cells (DSSCs). A sum of six DSSCs were fabricated. Spectroscopic studies (UV–Visible and FTIR) were recorded for all the six dyes extracted and for the photo-anodes prepared. J–V Characterization study was performed for all the cells and parameters such as Voc, Jsc, Vm, Jm, fill-factor and efficiency were calculated for the prepared cells. To our knowledge, the efficiency of DSSCs with sensitizer extracted from henna leaves with acetone and distilled water as solvent has been reported for the first time. It was seen that amongst all the cells prepared, the one with dye extracted from dried leaves using acetone as solvent showed higher efficiency of 0.351% with fill-factor of 0.3765.