

**Abstract** The antagonistic side effects of chemical medications led to the search for safe strategies such as biogenic agents. Correspondingly, this study aims to create biogenic, appropriate, auspicious and innovative therapeutic agents like *Galaxaura elongata* (GE), *Turbinaria ornata* (TO) and *Enteromorpha flexuosa* (EF) macroalgae-based silver nanoparticles (Ag-NPs). The Ag reduction and the creation of Ag(GE)-NPs, Ag[TO]-NPs and Ag(EF)-NPs have been validated using UV-visible spectroscopy, Fourier transform infrared spectroscopy (FTIR), scanning electron microscope (SEM) and zeta potential analysis, and the chemical composition of macroalgae crude extracts was estimated through gas chromatography-mass spectrometry (GC-MS). These findings suggest that macroalgae bio-capped Ag-NPs have magnificent biological potentials for safe biomedical applications.