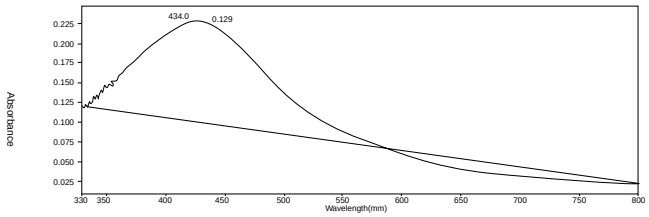
Researchn[m [(y4.35sB[(R)-40(e)-40(s)-40(e) 0 Td (sl40(e)-4J EMC /Span <</MCID 1 8>BDC 5.41.970.5 023d (2O)-40(p)-40(e)-4

silver nitrate solution was added to the ltrate slowly under magnetic stirring conditions for even coating of silver and subjected to heating at 12℃ for 10 min. e extract is used as reducing and stabilizing agent for 1mM of Silver nitrate. is one pot green synthesis was the modi ed method followed by Vigneshwaran et al. [18].

Characterization of AgNPs

rough sampling the bioreduction of Ag+ in aqueous solution



to amide C=O group. is evidence suggested the release of protein molecules that probably had a role in the formation and stabilization of AgNPs in aqueous solution.

e synthesized AgNPs was further demonstrated and con rmed by the characteristic peaks observed in the XRD image (Figure 3). e sharp di raction patterns of the XRD spectra obtained by the annealing at 200℃ indicates a pure crystalline silver structure, JCPDS card no: 04-0783. e gure shows 3 peaks at 2 values of 37.77, 44.15 and 65.25 corresponding to 111, 200 and 220 planes of silver respectively. We observed no impurity peak in the X-ray di raction pattern. All di raction peaks correspond to the characteristic face centered cubic (FCC) phase [26]. e X-rays are scattered by di raction owing to the unique crystalline structure of the material analyzed. From this, crystalline structure of the material can be obtained. Sambhy et al used this analytical method to characterize the particle structure and con rm the presence of the nanoparticles [27].

e SEM micrographs of AgNPs obtained showed that they are spherical shaped, well distributed in solution with an average size of about 56nm in Figure 4. Similar phenomenon was reported by Chandran et al. [19].

Energy Dispersive Analysis of X-ray (EDAX) gives qualitative as well as quantitative status of elements that may be involved in the formation of AgNPs. Figure 5 shows the peak in silver region at 3KeV which is typical for the absorption of metallic silver nanocrystalline due to surface plasmon resonance. e presence of strong signals from silver (90.83%) atoms in the nanoparticles and weaker signals from phosphorous (9.17%) atoms was thus con rmed. e P, O signals are likely to be due to X ray emission from proteins/enzymes present in the seaweed [28].

A TEM micrograph recorded from the silver nanoparticles deposited on carbon coated copper TEM grid was shown in Figure 6. is micrograph shows spherical AgNPs with low density dispersion and are in the range of 20-56nm in size. Characterization of nanopartiles by TEM has been reported by Sondi and Salopek-Sondi [29].

In vitro cytotoxic activity against Hep2, MCF7, HT29 and Vero cell line at di erent concentrations was evaluated and compared with the standard drug 5- uorouracil. e in vitro screening of the AgNPs showed potential cytotoxic activity against the human laryngeal cancer (Hep-2) cell line, human breast cancer (MCF 7) cell line and human colon cancer (HT 29) cell line. Less cytotoxicity of synthesized AgNPs against normal Vero cell line with IC=95µg/ml are shown in Table

‡ ‡

1. e plates were observed under an inverted microscope to detect morphological changes. e result showed that Hep2 cells proliferation were signi cantly inhibited by AgNPs with an IC_{50} value of 12.5µg/ml of the concentration, MCF7 cells with an IC_{50} value of 37µg/ml of the concentration and HT29 cells with an IC_{50} value of 49µg/ml of the concentration. us the synthesized nanoparticles were found to be potently cytotoxic agent against Hep 2 cell lines and mildly cytotoxic against MCF 7 and HT 29 cell lines. ese results indicate that the sensitivity of human cancer cell line for cytotoxic drugs is higher than that of Vero cell line for the same cytotoxic agents.

ere are reports that marine macroalgae belonging to Phaeophyta group possess antitumor activity, and sterols from *Sargassum carpophyllum* exhibited cytotoxic activity against several cultured cell lines [30]. Several cytotoxic compounds such as fucoidans, laminarians, and terpenoids stated to posses anticancer, antitumor, antibacterial and anti-proliferative properties are reported to be abundant in seaweeds [31]. ese compounds could be further explored as novel leads to cancer chemoprevention and chemotherapy and necessitates further investigation [32]. In present cancer claims the lives of approximately