

ABSTRACT

Conventional cancer cell treatment still has shortcomings in the form of lack of selectivity. Efforts to increase selectivity can be done by developing natural-based drugs such as eugenol and its derivatives combined with carriers such as Graphene Quantum Dots (GQDs). This study conducted the synthesis of GQDs and N-GQDs from rice stalks and nitrogen doping. Synthesis of eugenol derivatives in the form of dieugenol and polyeugenol was also carried out. Characterization of GQD and N-GQD materials was carried out using UV-Vis Spectrophotometer, Fluorescence, FTIR (Fourier Transform Infrared), and HRTEM-EDX (High Resolution Transmission Electron Microscope-Energy Dispersive X-Ray). Characterization of dieugenol material using TLC (Thin Layer Chromatography) and NMR (Nuclear Magnetic Resonance) and polyeugenol using FTIR (Fourier Transform Infrared). The results of testing single drug compounds (eugenol, dieugenol, and polyeugenol) and combinatorial materials against DPPH free radicals showed IC_{50} values below 50 ppm so they are categorized as very strong antioxidants. The results of MCF-7 cancer cell viability show that single drug compounds have cell viability <20% which indicates very good activity in killing cancer cells. Meanwhile, combinatorial materials have cell viability values between 70-80% which shows a low value, but this shows that combinatorial materials can be used as cancer therapy drugs with slow and sustained release.

Keywords : Grafena Quantum Dot, eugenol and its derivatives, antioxidants, cell viability