complemented by the hollow and porous morphology of particles observed in scanning electron microscopy (SEM) images. The thermogravimetric analysis further confirms the binding of CHX to the ZnONPs by second weight loss of 14.91% in the CHX encapsulated ZnO nanoparticles sample between 400-650 °C that is due to thermal decomposition of CHX. This is a way forward for safe and convenient intraoral dental applications.

Keywords:
Chlorhexidine, Zinc oxide, Nanoparticles, Encapsulation

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Modification of Sri Lankan vein graphite with copper (II) oxide on silicon dioxide to enhance the photocatalytic dye-degradation

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One of the major issues with water contamination is related to the wastewater discharged by the textile industry which releases approximately 20% of the dye produced worldwide as waste into industrial effluents. The dyes in wastewater are highly stable, coloured pigments that cause serious disruption to aquatic ecology. Methylene blue (MB) is a prominent cationic dye used for various applications, including the colouring of paper and the dying of fabric. Ingestion of MB can cause an elevated heart rate, vomiting, diarrhoea, and gastrointestinal system irritation. Consequently, the elimination of MB from industrial effluent has become one of the main environmental challenges. In this research, adsorption of MB dye onto surface-modified graphene oxide (GO) synthesised using Sri Lankan vein graphite was achieved under different optimized conditions. To determine the efficiency of each composite, photocatalytic degradation was observed under two conditions as dark and UV. Graphene oxide was synthesized from 4 μm graphite flakes using the Modified Hummers Method. The surface modification was attained with copper(II) oxide on silicon dioxide nanocomposite, which was prepared through the pyrolysis of silica gel in copper(II)nitrate trihydrate. The degree of photocatalysis was measured through UV–Vis spectroscopy at a maximum wavelength of 662 nm. The absorbance of the aqueous dye solution was measured with varying GO/nanocomposite ratios and contact times. The results clearly indicated that ratio of three parts of GO to one part of copper (II) oxide on silicon dioxide has the fastest rate of dye removal of 90% within 120 minutes after irradiation. Further, an increase in dye removal percentage was observed with increasing contact time between the dye and the surface-modified GO. More than 80% of photodegradation of dye was achieved with a contact time of 120 minutes.

Keywords:
Methylene Blue, Graphene Oxide, Photocatalysis, Photodegradation.