Antibacterial Activity of Silver Deposited Vein Graphite Against Waterborne Pathogenic *Escherichia coli* Synthesized by Chemical Reduction Method

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Graphite is one of the common materials using for the fabrication of composite materials. Graphite oxide, graphene oxide and many other materials are used as effective antibacterial substances, but most of them are expensive and need highly toxic chemicals for the synthesis. Nowadays, silver is considered as a most effective antibacterial material. Therefore, this study was focused on synthesizing cost effective less hazardous antibacterial material using silver and graphite. Graphite sample was purified by acid leaching, followed by modifying the surface with Conc. HNO_3. The silver graphite composite material was synthesized using $AgNO_3$ as precursor and tri-sodium citrate as reducing agent. X-ray diffractometry and Scanning electron microscopy investigations of the synthesized silver graphite composite revealed that the pure crystalline nano silver particles were deposited on the graphite surface. Antibacterial efficacy of the synthesized material was investigated using waterborne pathogenic *Escherichia coli*. The antibacterial test was carried out against *E. coli* using prepared composite samples according to the shake flask test. A commercial antibiotic (Ofloxin-200 mg) was used as the positive control. The samples were drawn at times 0, 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 5 and 6 hours by counting the number of surviving bacterial colonies on Eosin Methylene Blue (EMB) Agar, using plate count method according to standard procedures. After 24 hours, the results showed that surviving bacterial colonies contained in counted petri plates of all the synthesized composites with different Ag: Graphite ratios were reduced, with the time in an efficiency of over 98%. Therefore, this study suggests that Ag-vein graphite composite synthesized via chemical reduction method can be effectively used as an antibacterial agent against *E. coli.*

Keywords: Graphite, Silver, Composite material, Antibacterial testing