## Antibacterial activity of Graphene Oxide/Silver nanocomposite synthesized by sustainable process

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Graphene oxide/silver nanocomposite has excellent antimicrobial properties [1]. The traditional methods of incorporation of metal in graphene oxide usually require toxic reagents or with long periods of reaction and in high temperature [2]. The objective of this study is to develop an innovative and sustainable method of incorporating silver into graphene oxide by electron beam. This methodology does not involve toxic reagents or residues and it is carried out in a short reaction time at room temperature**.** Dispersed graphene oxide was mixed with silver in the complex form in water- isopropanol solution. The mix was submitted to a dose of radiation varying between 150 and 400 KGy. The nanocomposite GO/Ag characterization was performed by thermogravimetry analysis (TGA), X-ray diffraction (XDR), scanning transmission electron microscope coupled to the energy dispersive X-ray spectrometry (TEM/EDS). The antibacterial activity of GO/Ag was observed against Gram negative, *Escherichia coli* by plate count method. The viable cells of GO and GO-Ag was determined by plating the inoculum after 4h of exposure to different concentrations of the nanomaterials (10, 50, 100, 200 and 500 µg/mL). The results showed that for 500 µg/mL of GO, inactivation cells were ca of 5,4 %, while for GO-Ag, the concentration to inactivate all cell were 5 times lower (100 µg/mL). The silver nanoparticles size range from 20 to 50 nm. This work showed that GO/Ag nanocomposites that were widely studied by their antibacterial properties can be produce by ionizing radiation. This is a sustainable method that does not require toxic reagents and does not generate hazardous wastes. The short reaction time of some minutes and the ambient temperature also make the process attractive**.**

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**References:**

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