Contribution ID: **343** Type: **Oral**

Effect of Sterilization by Gamma-Irradiation on Biocompatibility of Starch-Based Polymers and Composites Suitable for Stem Cell Growth

Tuesday, 25 April 2017 17:30 (20 minutes)

Studies with biodegradable starch-based polymers have recently demonstrated that these materials have a wide range of properties, which make them suitable for use in several biomedical applications, ranging from bone plates and screws to drug delivery carriers and tissue engineering scaffolds. A novel non-toxic biodegradable starch based polymer was developed for use in tissue engineering applications. The starch and its blends consisted of: 100 % starch, starch mixed with 10 % cellulose acetate & 10 % acrylic acid & 5 % carboxy methyle cellulose and starch mixed with 10 % cellulose acetate & 10 % carboxy methyle cellulose. Scaffolds were sterilized by ionizing radiation and cells were allowed to grow on the designed scaffolds. Biocompatibility evaluation of such blends was carried out using Hep-2 cells, which were cultured in direct contact with the different starch blends for 72 hours and observed in light and scanning electron microscopy (SEM). Viability was assessed using the light microscope, DNA content, nitric oxide content, lipid perocidation and MTT assay. Also, the effect of low level laser energy (LLLI) on enhancing the proliferation of cells on such scaffolds, were examined , where cells were exposed to He:Ne laser at doses 1, 2.5 and 5 J/cm2 every daily for a duration of two days. Both types of starch-based polymers exhibit biocompatibility that can allow for their use as biomaterials. Starch mixed with 10 % cellulose acetate & 10 % carboxy methyle cellulose.blends were found to be the less cytotoxic for the tested cell line, although cells adhere better to starch cellulose acetate surface. Exposure to 2 J/cm2 He:Ne laser greatly enhanced cell proliferation on all of the given scaffolds.

Country/Organization invited to participate

Egypt

Primary author: Ms EL NAGGAR, Abdel Wahab (National Center for Radiation Research and Technology Atomic Energy Authority, Egypt)

Co-authors: Mr SENNA, Magdy (National Center for Radiation Research and Technology Atomic Energy Authority); Mr REFAAY, Sanaa (National Center for Radiation Research and Technology Atomic Energy Authority); Ms KORRAA, Soheir (National Center for Radiation Research and Technology - Egyptian Atomic Energy Authority, Egypt)

Presenter: Ms KORRAA, Soheir (National Center for Radiation Research and Technology - Egyptian Atomic Energy Authority, Egypt)

Session Classification: A07

Track Classification: FUNDAMENTAL AND APPLIED RADIATION CHEMISTRY RESEARCH