# STUDIES AND EVALUATION OF ANTICANCER PROPERTIES OF POLY(L-LACTIDE)/ $Sr^{2+}$, $Eu^{3+}$ AND $Cu^{2+}$ IONS CO-DOPED HYDROXYAPATITE POROUS SPONGE SCAFFOLDS

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A success of nanotechnology in field of physical, chemical, and medical sciences, it has now started revolutionizing the drug delivery sciences and bio-detection. The specific advantages include superior pharmacodynamics, pharmacokinetics, reduced toxicity, and targeting capability.

It is well-known that hydroxyapatite ($Ca_{10}(PO_4)_6(OH)_2$) is a form of bioceramics material and is widely used as a bone substitute due to its adequate mechanical properties and the similar composition to bone mineral. Due to the bioactivity, biocompatibility, stability, nontoxic properties, hydroxyapatite with porous surface structure and $OH^-$ groups may serve as an ideal candidate drug carrier for the delivery of a variety of pharmaceutical molecules.

Metals such as gold, copper, europium or even ionic compounds of selenium are well-known for their potential anticancer properties. The synergy of such metals could bring promising effect by complete cancer cells eradication from healthy tissue.

The hexagonal structure in apatites belongs to $P6_3/m$ space group and allows the cations to localize in two different crystallographic positions and are able to accommodate a variety of cations as substituents and could find perfect application in bone cancer therapy.

In the research there have been obtained porous scaffolds based on poly(L-lactide) (PLLA) and synthetic hydroxyapatite (HAp) co-doped with $Sr^{2+}$, $Eu^{3+}$ and $Cu^{2+}$ ions using thermal induced phase separation technique (TIPS) supported by salt leaching process (SL). The obtained series of composite sponges consist of 50 wt.% of the hydroxyapatite in PLLA/HAp systems. The structural and morphological properties of the obtained samples were determined by using XRD (X-ray powder diffraction), TEM (transmission electron microscopy) and SEM (scanning electron microscopy) techniques (Fig. 1). In the present study, experimental *in vitro* anticancer tests concerning sponge scaffolds, which may substitute bone tissue, were discussed in detail.

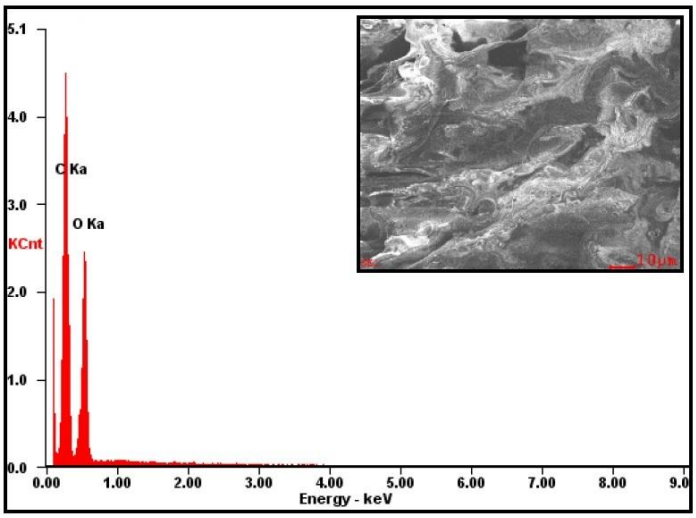


Fig. 1. Representative EDAX diagram for PLLA scaffold.