Title: **Environmental Effects of ^{223}Ra Radiopharmaceuticals**

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Abstract:

In thesis was studied the possibility of extracting the nanoparticles of titanium dioxide or hydroxyapatite with bounded ^{223}Ra by root system of tested plant species *Avena sativa* and *Zea mays* as a model for phytoremediation technologies. The thesis obtains data to assess the potential of residues radioactivity and nanomaterials entering the food chain. There was also verified an experiment of ^{223}Ra phytoextraction, in the form of nitrate, in effects on addition of EDTA, which was conducted in Bachelor thesis. This experiment was repeated because of its results, which were inconsistent with generally described phytoextraction efficiency improvements after adding the complexing agents. In this work was primary studied translocation of radioactive material from the root to shoot. Experimentally was confirmed the extraction of nanoparticles with bounded ^{223}Ra and translocation into shoot. In the case of *Avena sativa,* capturing of nanoparticles hydroxyapatite with bounded ^{223}Ra was 53 % of which 88 % of activity was recovered in roots and 12 % in shoots. Capturing nanoparticles of titanium dioxide with bounded ^{223}Ra to plants *Avena sativa* was 49 % of which 92 % of radioactivity were detected in roots and 8 % in shoots. In experiments with plants *Zea mays* plants capturing was slightly lower and translocation was similar as in experiments with plants *Avena Sativa*. In experiments of ^{223}Ra phytoextraction with EDTA, which were repeated for the reason described above, it was again shown, that in this case the addition of EDTA significantly reduced capture ^{223}Ra and greatly increase translocation to the shoot.