



Benzo[a]pyrene accumulation in tomato plants (*Solanum Lycopersicum*) under the model vegetation experience

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Benzo[a]pyrene (BaP) is one of the most dangerous organic pollutants, a representative of the polycyclic aromatic hydrocarbons class, a carcinogen and mutagen of the I danger class. BaP content must be obligatory controlled in all natural environments. During BaP sorption on the soil surface, it is involving in the migration processes in the soil profile and the soil-plant system uptake. Plants are exposed to BaP, and almost 45% of the toxicant in the atmosphere could be accumulated by plants. The soil - plant system is an important object of the environmental pollution control, as it reveals the process of distribution, transformation, and accumulation of BaP in plants and soil. The aim of this work was to study the BaP accumulation in tomato plants (*Solanum lycopersicum*) under the conditions of a model vegetation experiment.

The studies were carried out under the conditions of a vegetation experiment. The Haplic Chernozem soil was sifted through a sieve with a diameter of 1 mm and placed by 2 kg in 4 L pots. A BaP solution in acetonitrile was added to the soil surface based on the creation of a pollutant concentration in the soil of 400 $\mu\text{g kg}^{-1}$. The original uncontaminated Haplic Chernozem was used as a control. The soil was sown with tomato plants (*Solanum lycopersicum*) of the early maturing variety White filling 241. The experiment was replicated three times. The content of BaP in the soil of the control sample was 17.8 $\mu\text{g kg}^{-1}$, in tomato roots - 2 $\mu\text{g kg}^{-1}$, in the vegetative part of tomato - 1.0 $\mu\text{g kg}^{-1}$, in the fruits of plants the value was equal to 0.3 $\mu\text{g kg}^{-1}$.

Addition of the 400 $\mu\text{g kg}^{-1}$ BaP increased its content in the soil to 369 $\mu\text{g kg}^{-1}$. The accumulation of pollutant in the roots of the tomato plants was 244.5 $\mu\text{g kg}^{-1}$, and in the stems and fruits it reached 130.2 and 55.1 $\mu\text{g kg}^{-1}$, respectively, which greatly exceeded the control values. In the soil contaminated with BaP, the excess of the pollutant concentration relative to the control sample was 20 times. In the roots of tomato plants, the excess of the pollutant concentration relative to the control was 120 times, and in stems and fruits, the concentration excess relative to the control sample was 130 and 180 times, respectively.

Thus, there was an accumulation of the pollutant in tomato plants when the soil was contaminated with $400 \mu\text{g kg}^{-1}$ BaP. The highest concentration of BaP was found for tomato roots and exceeded control content in more than 12 times. In plant stems, the concentration of BaP reached $130.2 \mu\text{g kg}^{-1}$, and in tomato vegetative part the concentration of BaP was $55.1 \mu\text{g kg}^{-1}$, which corresponds to 55 MPC for food products.

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