

ABSTRACT

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The environment is contaminated by increasing amounts of different types of xenobiotics. Nanomaterials are relatively “new” group of pollutants. Effective method used for decontamination of the environment can be phytoremediation which uses higher plants for biotransformation and accumulation of pollutants. The plant is suitable for phytoremediation when it can absorb, metabolize and store contaminants without significant impact on its metabolism. Influence on the function and construction of the plant can be detected at the proteome level. In this work, we observe the effect of copper oxide nanoparticles on plant proteome of *Arabidopsis thaliana*. The effect of standard copper oxide particles and copper sulfate ions was also studied in one-day and four-day period for comparison. The proteomes were compared and changes were analyzed by software PDQuest. Changes in intensity of protein spots comparing to the control sample correspond to modulation of the amount of different types of plant proteins. This modulation depends on the particle type and time of acting. Toxic effect on plants is manifested for example by reducing the amount of structural proteins or proteins involved in photosynthesis. Conversely, the amount of proteins involved in stress response was increased. One day treatment by bulk copper oxide caused decrease of intensity of six protein spots and four spots were increased. Proteome influenced by copper oxide nanoparticles shows decrease of intensity of eight spots and increase of only three spots. Longer influence of both copper oxide nanoparticles and bulk form caused a decrease of almost all spots. After short acting of copper salt a lot of protein spots were increased. On proteome exposed to copper salt for four days were detected only a few spots with decreased intensity. By comparing the results, it was found that nanoparticles are more toxic than bulk form of copper oxide. Salt was used only for comparing, because its toxicity was expected.