

## Abstract

A number of contaminants have been detected in the environment, including pharmaceuticals. Their presence in soil, water sources can have a toxic effect on organisms due to their constantly increasing concentration. The method of phytoremediation uses the ability of plants to absorb these contaminants and detoxify them by various mechanisms.

The aim of this work was the phytoextraction of ibuprofen using maize (*Zea mays*) from aqueous solutions. Phytoextraction of ibuprofen after cultivation with added dextromethorphan was also carried out. The quantitative amount of extracted ibuprofen was detected by HPLC with UV detection. Ibuprofen has been very well extracted by plants. In the presence of dextromethorphan, the efficiency of phytoextraction was decreased.

The phytoextraction efficiency of ibuprofen was 0.10 mg per gram of leaf fresh weight, while in the presence of dextromethorphan, the phytoextraction efficiency was 0.09 mg per gram of leaf fresh weight.

After phytoextraction of ibuprofen, the antioxidant capacity was determined by FRAP method of leaf and root extracts of the plants, of which the highest values were observed in the roots of plant grown with ibuprofen in combination with dextromethorphan. The phenolic compounds were also detected in leaves and roots, where the highest percentage of phenolic compounds was detected in root with both drugs present in the medium. The amount of proteins was measured by the Bradford method. The highest protein concentration was found in the leaves of plants grown with ibuprofen and in the roots of plants grown with both drugs. In gels after native electrophoresis, ascorbate peroxidase activity was detected, where there were many isoforms observed in the root extracts, peroxidase activity with the highest activity in the roots with grown with ibuprofen in combination with dextromethorphan in the medium, and shikimate dehydrogenase activity, which reached the highest value in the extract of the leaf containing ibuprofen. Superoxide dismutase activity was under the limit of detection.

The activity of total soluble and membrane-bound peroxides was determined by DAB method. The activity of total peroxides was highest in the leaves of plants containing both drugs in the medium and in the roots with added dextromethorphan. Membrane-bound peroxidases were present in both the roots and leaves of plants with both ibuprofen and dextromethorphan in the medium. Guaiacol peroxidase activity was not detected in the leaves, while in the roots its activity reached its highest value in the plant group with ibuprofen in the medium.

Key words: phytoextraction, dextromethorphan, ibuprofen, enzymatic activity