

The development of agricultural production and food economy is inseparable from the use of plant protection products. Stricter legislation, to ensure a high level of protection of human and animal health and the environment, necessitates the search for new solutions that minimize the negative impact of toxic chemicals, especially pesticides.

Therefore, the aim of the project is to develop innovative immobilized formulations of plant protection products that will be formulated with environmentally friendly, fully biodegradable polymers. Basically, two types of biodegradable polymer carriers will be obtained; one based on lactide, glycolide and polyethylene glycol block copolymers and the other based on copolymers containing poly(ethylene glycol) blocks and butylene succinate. These copolymers will then be components of compatible polymer blends formed with derivatives appropriately modified by grafting with ϵ -caprolactone and trimethylene carbonate - dextrans or starches.

In the project, the composition of polymer matrices will be developed in such a way that, with the simultaneous degradation of the material, it is possible to release the active compound as efficiently as possible to effectively inhibit the growth of the undesired plant, the formulations prepared will be subjected to preliminary degradation tests in soil, water and activated sludge, allowing for evaluation of the degradation mechanism and optimum composition. It will be also evaluate the release of the active substance from the systems produced in water and soil under laboratory conditions and carried out to evaluate the effectiveness of new use preparations of selected herbicides (metazachlor and pendimethalin) on pre-selected species commonly known as nuisance (weeds).

The proposed controlled release system for agriculture and horticulture prolongs the stability period of concentrated active agents and also contributes to the reduction of intensive pesticide treatments. The proposed systems should significantly reduce the negative impact of pesticides on humans, fauna and flora due to the reduced use of agrochemicals in the environment.

We hope that the results will be promising for the introduction of sustainable plant protection chemicals as substitutes for traditional unstable preparations that are over-used in agrochemicals that cause serious health and environmental problems. First and foremost, the limitation of hazardous herbicides introduced into the environment must become one of the major problems in the near future.