

Iwona Kwiecień

**Koniugaty substancji biologicznie czynnych
z biodegradowalnymi oligomerami polihydroksyalkanianów
jako systemy kontrolowanego uwalniania pestycydów**

Praca doktorska
wykonana pod kierunkiem
dr hab. Grażyny Adamus, prof. nadzw. PAN
w Centrum Materiałów Polimerowych
i Węglowych Polskiej Akademii Nauk

Zabrze 2015

The conjugates of biologically active substances with biodegradable oligomers of polyhydroxyalkanoates as controlled release systems for pesticides

Abstract

The purpose of the doctoral thesis was to develop biodegradable polymeric systems for the release of the biologically active species selected from the group of pesticides, for potential use in agriculture.

The dissertation is focused on the development of synthesis methods of pesticide-oligomer conjugates in which pesticide is covalently bonded with biodegradable polyhydroxyalkanoates (PHAs) oligomers by hydrolysable ester bond. In the first part of the research, conjugates were obtained *via* (i) anionic ring-opening oligomerization of β -butyrolactone initiated by salts of selected pesticides and (ii) anionic ring-opening (co)oligomerization of β -substituted β -lactone containing bioactive moieties as a pendant group with β -butyrolactone in the presence of carboxylates as initiators. In the further part of the research, conjugates were obtained using the transesterification reaction of selected PHA biopolyesters. Two transesterification methods were developed: (i) "one-pot" transesterification dedicated for bioactive compounds with carboxyl or hydroxyl group; (ii) two-step method, through cyclic PHA oligomers, dedicated for bioactive compounds with hydroxyl group. Obtained conjugates were characterized using GPC, ^1H NMR and ESI-MSⁿ techniques.

The effectiveness of selected conjugates were confirmed during greenhouse and field bioassays conducted by Institute of Plant Protection, Sońnicowice Branch.

