MODELING OF DEACTIVATION SYSTEM FOR DIMETOATE

Vasylenko V., Sidorenko M., Mickevičius S.
Vytautas Magnus University, Kaunas, Lithuania
volodymyr.vasylenko@vdu.lt

The world community has been paying close attention to the phasing out of obsolete pesticides since the late 1990s. Thus, in the EU, the use of organochlorine pesticides is almost completely stopped, but the widespread use of organophosphorus remains a problem. Plant protection products based on dimethoate, glyphosate, chlorpyrifos, pyrimiphos-methyl (aktelik) and others are widely used in the European Union.

Based on existing systems for the deactivation of organophosphates [1], studies of their effectiveness in relation to the destruction of dimethoate have been carried out. The tests were carried out using the HPLC method.

The results of research confirm previous studies on the positive effect of micellar systems and α-nucleophiles on the deactivation of organophosphorus compounds.

The proposed composition disinfects a system contaminated with dimethoate residues within two hours from a level of several thousand ppm to the level of the quantification limit. (Table 1).

Table 1. Averaged data of dimethoate decontamination

Sample	m, mg	S_{sm}	S_{av}	RSD, %	C, ppm
Standard	14,00	5066019	5077335	0,32	-
	7,00	5088651			
Rinsing water	10013,00	14211	14224	0,13	2765
	10013,00	14237			
60 minutes	10484,20	214	217	1,74	42
	10484,20	220			
120 minutes	15031,30	72	71	1,28	14
	15031,30	72			

There was no significant difference in the kinetics of reactions when changing the surfactant from cytylpyridinium chloride to sodium lauryl sulfate in the same concentrations and in the presence of ethanol as a defoamer (5 ml/100 ml) (Fig. 1).

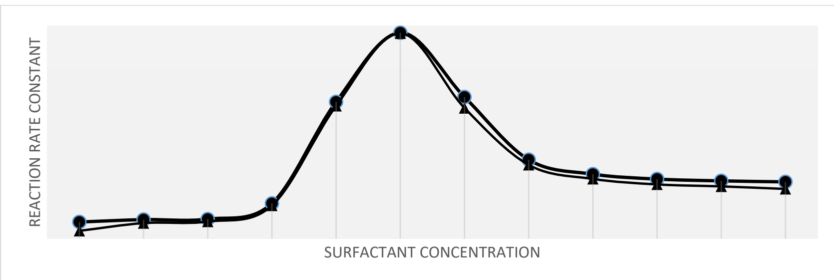

Fig. 1. Graph of the dependence of the reaction constant of the first order on the concentration of surfactants

1. Vakhitova L. N. Kinetics of the oxidation of methyl phenyl sulfide by eroxoborate anions / L. N. Vakhitova, N. V. Lakhtarenko, A. F. Popov // Theoretical and Experimental Chemistry. – 2015. – Vol. 51, № 5. – P. 297-302.