THE OXIDATIVE ACTIVITY OF SOME ORGANOPHOSPHOROUS COMPOUNDS

DOROTA BONARSKA, HALINA KLESZCZYŃSKA
and JANUSZ SARAPUK
Department of Physics and Biophysics, Agricultural University of Wrocław,
Norwida 25, 50-375 Wrocław, Poland

Organophosphorous compounds are widely used as biologically active agents. Two well-known pesticides belong to this group: dibutyl 1-butylamino-1-cyclohexanephosphonate (DBBC) and 2,4-dichlorophenoxyacetic acid (2,4-D) [1, 2]. Their oxidative properties were studied and compared with those of diethyl 9-butylamino-9-fluorenephosphonate (DEBF). All these compounds also interact with biological and model membranes [3]. Erythrocyte ghosts used in oxidation studies were treated with 10^{-5}-10^{-4} M concentrations of these compounds for 2h. The degree of lipid peroxidation was determined spectrophotometrically by measuring the malonic dialdehyde concentration in the samples, using its colour reaction with thiobarbituric acid. Two different series of experiments were performed; with and without the application of UV radiation. In the latter case, lipid peroxidation was observed, and DBBC exhibited slightly better oxidative activity than 2,4-D and DEBF. Neither oxidative nor antioxidative activity of the compounds studied were found when the lipid peroxidation in the erythrocyte membranes was induced by UV irradiation.

Acknowledgements. This work was sponsored by the Polish Research Committee (KBN), grant no 6 P04G 096 21.

REFERENCES

1. Linsel, G., Dahse, I. and Muller, E. Electrophysiological evidence for the herbicidal mode of action of phosphonic acid esters. **Biol. Plant**. 73 (1988) 77-84.
2. Suvalsky, M., Benites, M., Villena, F., Aguilar, F. and Sotomayor, C.P. Interaction of 2,4-dichlorophenoxyacetic acid (2,4-D) with cell and model membranes. **Biochim. Biophys. Acta** 1285 (1996) 267-276.
3. Kleszczyńska, H., Sarapuk, J., Bielecki, K., Grzyś, E. and Witek, S. Physiological activity of some organophosphorous compounds and their effects on the physico-chemical properties of model membranes. **Folia Microbiol**. 45 (2000) 204-206.