

## **Dimethylaminoethyl methacrylate-containing carriers with low phytotoxicity**

**N.S. Finiuk<sup>1</sup>, K. I. Yurynets<sup>2</sup>, N.D. Romanyuk<sup>2</sup>, O.S. Zaichenko<sup>3</sup>, N.E. Mitina<sup>3</sup>,  
O.L. Paiuk<sup>3</sup>, R.S. Stoika<sup>1</sup>**

<sup>1</sup> *Institute of Cell Biology of National Academy of Sciences of Ukraine,  
Dragomanov str., 14/16, Lviv, 79005, Ukraine.  
E-mail: [nataliyafiniuk@gmail.com](mailto:nataliyafiniuk@gmail.com)*

<sup>2</sup> *Ivan Franko National University of Lviv, Hrushevskoho str., 4, Lviv, 79005,  
Ukraine.*

<sup>3</sup> *Lviv Polytechnic National University, Bandera str., 12, Lviv, 79013, Ukraine.*

Cationic polymers as a promising non-viral gene delivers into the target cells recently aroused more attention due to their easy preparation and high stability. However, toxicity of these polymers is still an obstacle to the application as non-viral vectors of genetic materials for transfer to the target cells. The preliminary data for obtaining transient and stable moss transformants with some dimethyl aminoethyl methacrylate (DMEM)-containing polymers as plasmid pSF3 DNA carriers revealed higher transformation frequency in comparison with standard carrier for plant transformation polyethylene glycol (PEG) [1]. The aim of present study was to evaluate a phytotoxicity of these polymers as potential gene delivery system into plant cells.

Novel comb-like DMEM-containing polymers, BGA-21, BGA-22, 83/5c and 84/5 were synthesized via controlled radical copolymerization. Polymers at 0.0025 % and 0.025 % had not a pronounced inhibitory effects on seed germination, shoots and roots growth of *A. cepa*. The maximum inhibition of seed germination rate was 15 % under 84/5 impact at 0.025 %. The ana-telophase assay on *A. cepa* confirmed no genotoxic properties of studied polymeric carriers used at both concentrations. Polymers didn't cause any significant changes of catalase and superoxide dismutase activities. Whereas standard carrier, PEG, have more prominent impact on seed germination, enzymes activity, mitotic activity of root meristematic cells and frequency of chromosomal aberrations in *A. cepa*.

The low phytotoxicity of examined DMEM-containing polymers allows their use as a potential carriers for the gene delivery into plant cells.

1. Finiuk N, Chaplya A, Mitina N, Boiko N, Lobachevska O, Miahkota O, Yemets A, Blume Ya, Zaichenko O, Stoika R. Genetic transformation of moss *Ceratodon purpureus* by means of polyñationic carriers of DNA // Cytol Genet.-2014.-48, N 6.-P. 345-351.