

**STUDY THE EFFECT OF EXTRACTUM ALOES FLUIDUM ON THE MITOTIC ACTIVITY OF CELLS
USING THE ALLIUM TEST**

N. A. Durnova, A. S. Sheremetyeva, D. A. Tyapkina

V. I. Razumovsky Saratov State Medical University 112 B. Kazachya Str., Saratov 410012, Russia

E-mail: anna-sheremetyewa@yandex.ru

Received 2 April 2018, Accepted 23 April 2018

The evaluation of the cytogenetic action of aloe extract liquid (Extractum Aloes fluidum) in a concentration range of 250–4000 mg/l in meristem cells of onion roots (*Allium cepa* L.) was carried out. The dynamics of onion root growth and mitotic activity index were taken into account. Analysis of preparations of *A. cepa* root cells after exposure to aloe extracts of different concentrations with respect to negative (distilled water) and positive (dioxidine 100 mg/l) control showed statistically reliable ($p < 0.05$) inverse dependence of root growth and mitotic index on concentration. Aloe extract liquid inhibits the mitotic activity of cells ($p < 0.05$) at concentrations of 500 mg/l, 1000 mg/l, 2000 mg/l, 4000 mg/l, compared with a negative control are shown. The maximum concentration of the extract showed inhibition of mitotic activity stronger ($p < 0.05$) than positive control. Aloe extract stimulated mitosis in comparison with negative control at the impact on the roots of *A. cepa* investigated the minimum concentration of 250 mg/l. Aloe liquid has opposite properties: the extract demonstrated mitosis stimulating properties at the minimum test concentration (250 mg/l), and in others (500–4000 mg/l) – inhibited mitotic activity as a result of the experiment revealed.

Key words: Aloe extract liquid, mitotic index, Allium test.

DOI: 10.18500/ 1682-1637-2018-2-3-11

REFERENCE

Fiskesjo G. The Allium Test as a Standard in Environmental Monitoring. *Hereditas*, 1985, vol. 102, pp. 99 – 112.

Guidelines for Short-term Tests for the Detection of Mutagenic and Carcinogenic Chemicals. Geneva: World Health Organization, 1985. 208 p.

Kalayev V. N. Cytogenetic Monitoring: Methods for Assessing Environmental Pollution and the State of the Body's Genetic Apparatus. Voronezh: Izdatel'stvo Voronezhskogo Universiteta, 2004. 80 p. (in Russian)

Lavrsky A. Yu., Lebedinsky I. A., Kuzaev A. F., Chetanov N. A., Artamonova O. A. Effect of electromagnetic oscillations of different frequencies on cell division in root meristem *Allium cepa*. *International Research Journal*, 2013, iss. 5 – 1 (12), pp. 43 – 45. (in Russian)

Levan A. The Influence on Chromosomes and Mitosis of Chemicals, as Studied by the Allium test. *Hereditas*, 1949, vol. 35, pp. 325 – 337.

Madic V., Jovanovic J., Stojilkovic A., Vasiljevic P. Evaluation of Cytotoxicity of “Anti-diabetic” Herbal Preparation and Five Medicinal Plants: an *Allium cepa* Assay. *Biologica Nyssana*, 2017, vol. 2, iss. 8, pp. 151 – 158.

Mashkovskiy M. D. Medicinal Products. Moskow: Izdatel'stvo “Novaya Volna”, 2017. 1216 p. (in Russian)

Ogol'tsova Zh. A., Chumachenko P. A., Mnichovich M. V., Anisimova S. A. To the Question of the Effect of Aloe on Dyshormonal Processes in the Mammary Gland in the Experiment. Materials of the Regional Scientific and Practical Conference of the Scientific Research Institute of Oncology of the Scientific Center of the Siberian Branch of the Russian Academy of Medical Sciences. Tomsk: Izdatel'stvo NTL, 2002. pp. 148. (in Russian)

Pesnya D. S., Serov D. A., Vakorin S. A., Prohorova I. M. 2011. Research of the Toxic, Mitosis Modifying and Mutagen Effect of *Heracleum Sosnowskyi*. *Yaroslavl Pedagogical Herald*, vol. 3, iss. 4, pp. 93 – 98. (in Russian)

Ryushina V. A., Gabruk N. G., Shuteeva T. A. Identification of Biologically Active Substances of *Aloe arborescens* Miller. *Scientific Bulletins. Series of Natural Sciences*, 2010, vol. 10, iss. 3(74), pp. 93 – 96. (in Russian)

Sheremetyeva A. S. Allium Test in Researches of Cytogenetic Effects of Biologically Active Substances. Expert Opinion: Proceedings of the International Scientific and Practical Conference. Vol. 1. Penza: Nauka I Prosveshenie, 2017. pp. 21 – 25. (in Russian)

Sheremetyeva A. S., Zhuk A. A., Pereverzeva Ya. O., Khomyakova U. A. Study of the Influence of Dioxygen on the Mitotic Activity of the Roots of *Allium cepa*. *Bulletin of medical Internet conferences*. 2017. <https://medconfer.com/node/14974> (Date of access: 21.03.2018.). (in Russian)

Shkarupa V. M., Barlyak I. R. Genoprotective Effect of Sodium Humate in Conditions of Induced Oxidative Stress. *Cytology and Genetics*, 2006, vol. 40, iss. 5, pp. 31 – 35. (in Ukrainian)

Shkarupa V. M., Barlyak I. R., Neumerzhitska L. V., Gumenyuk I. D. Genoprotective Effect of Sodium Humate in Conditions of Induced Oxidative Stress. *Cytology and Genetics*, 2010, vol. 44, iss. 1, pp. 54 – 56. (in Ukrainian)