KINETIC PROCESSES IN A PLASMA OF BARRIER DISCHARGE IN ATMOSPHERIC AIR: INFLUENCE OF WATER VAPOR ON BIOLOGICAL ACTIVITY OF THE GENERATED MEDIUM

V. Yu. Bazhenov, A. V. Ryabtsev, I. A. Soloshenko, V. A. Khomich, V. V. Tsiolko, A. I. Shchedrin, A. I. Kuzmichev[1], *V. I. KRyzhanovsky*[1], *I. L. Mikhno*[2]

Institute of Physics, Nat. Acad. Sci. of Ukraine
(46, Nauky Prosp. Kyiv 03028, Ukraine; E-mail: tsiolko@iop.kiev.ua),
[1]National Technical University of Ukraine 'Kyiv Polytechnical Institute"
(37, Peremogy Prosp., KPI-2230, Kyiv 03056, Ukraine),
[2]Institute of Epidemiology and Infective Diseases
(4, Protasov Yar Str., Kyiv 03038, Ukraine)

S u m m a r y

Theoretical and experimental investigations of the water vapor influence on the biological activity of the medium generated by barrier discharge in atmospheric air are performed. Numerical calculation of the component composition of the particles generated by barrier discharge in dry and moisture air shows that moistening of air, on the one hand, results in the ozone concentration reduction, but, on the other hand, it results in an increase of the concentration of such a biologically active compound as N_2O_4 and formation of other active compounds – molecules of hydrogen peroxide H_2O_2, nitric HNO_3 and nitrous HNO_2 acids, and HO_2NO_2 radicals in the discharge. Experiments on the processing of spores have shown that moistening of air leads to an increase of the biological activity of the medium generated by barrier discharge. On basis of experiments and theoretical calculations, one can insist that the rise of the medium activity is connected with the generation of hydric compounds H_2O_2, HNO_3, HNO_2, and HO_2NO_2.