LIPID PEROXIDATION OF *RHODOPSEUDOMONAS YAVPROVII* IMV B-7620 UNDER THE INFLUENSE OF COBALT (II) CHLORIDE AND FERRIC CITRATE

Bulka I, Komplikevych S, Zinkovska V, Kulishko N, Ishchak O, Maslovska O.
Ivan Franko National University of Lviv
e-mail: irabulka05@gmail.com

Depending on the dose heavy metal compounds are toxic to organisms. Bacteria *Rhodopseudomonas yavorovii* IMV B-7620 can oxidize different substrates and survive under the influence of high concentrations of heavy metal ions. The interest in the development of bioremediation technologies using these bacteria has been increasing. Free radicals targeting different cell biopolymers are formed under the influence of ferrum and cobalt. Lipid peroxidation due to the action of free radicals leads to cell damages and is one one the main causes of their death. The aim of this work was to investigate the influence of cobalt (II) chloride and ferric citrate on processes of lipid peroxidation of *R. yavorovii* IMV B-7620.

R. yavorovii IMV B-7620 were grown in modified medium ATCC № 1449 with sodium citrate (12 mM). Cobalt chloride was added to the medium at concentrations of 1–15 mM, and ferric citrate at concentrations of 1–12 mM. Metal salts were not added into control. The content of diene conjugates (DC), lipid hydroperoxides and thiobarbiturate reactive species (TBARS) was determined in the cell-free extract of bacteria.

In the control experiment, at increasing the duration of bacterial cultivation, the DC content decreased, and the lipid hydroperoxide – increased. The addition of metal salts into culture medium led to increase in the content of lipid peroxidation products, compared to control. The formation of DC during the cultivation of bacteria *R. yavorovii* IMV B-7620 with the metal salts addition into the culture medium indicates a free radical mechanism of damage of cell lipids. At the addition of cobalt chloride and ferric citrate into the medium, the content of lipid hydroperoxides increased by 6.56 and 3.95 times, respectively up to 10 days of cultivation. The enhancement of content of lipid hydroperoxides with the simultaneous increase in duration of bacterial cultivation indicates a chain mechanism of propagation of free radical processes in cells. By the prolongation of cultivation of bacteria the content of lipid hydroperoxides was reduced, but the content of TBARS was increased. The highest TBARS content due to cobalt chloride and ferric citrate addition observed at 14 days of cultivation (854 µmol/mg of protein and 551 µmol/mg of protein, respectively). This is, probably, due to the instability of lipid hydroperoxides in the presence of ferrum and other metals with variable valence.

Therefore, cobalt chloride and ferric citrate cause intensification of lipid peroxidation processes. Increasing the concentration of free radicals in *R. yavorovii* IMV B-7620 cells under exposure with cobalt chloride and ferric citrate may cause cell death.