

FORMING OF BIOFILM BY SULPHATE-REDUCING BACTERIA ON STEEL IN THE PRESENCE OF DERIVATIVES OF TRIAZOLAZEPINE

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According to modern presentations, microbial corrosion is considered as the bioelectrochemical process, which takes place on the surface of metal, in biofilm.

Biofilm consists of the mixed associations of microorganisms and their metabolites in which exopolysaccharides prevail. The biofilm formed by sulphate-reducing bacteria is especially complex as the biofilm contains various forms of sulphides and exopolymers.

One of the stages of the biofilm formation on a metallic surface is adhesion. Microorganisms attach to the hard surface, adapt there and form corrosive microbial association. Modern strategy of estimation of microbial corrosion is studying of biofilm formed by sulphate-reducing bacteria on the surface of corroding metal. On the current stage of studies of the biofilm formed by sulphate-reducing bacteria on the surface of the low-carbon steel the occurrence of biogeochemical processes in the cell electrical microspace could be justified. In the stratum that 1000 – 2000 micromicrons thick the accumulation and transformation of the biogenic materials containing sulphur and iron takes place and the ratio of these elements determines the direction of the biofilm-metal interaction.

We have determined that derivatives of triazolazepine show properties of biocides to corrosion-dangerous microorganisms and inhibitors of microbial corrosion of the low-carbon steel. Literary information about influence of nitrogen containing heterocyclic compounds on the creation of the biofilm formed by sulphate-reducing bacteria on the surface of metal is scanty.

The purpose of our work is to study development of in the presence of derivatives of triazolazepine.

The object of research was the association of sulphate-reducing bacteria, obtained by us from ferrosphere corroding underground pipeline. Bacteria were cultivated in the liquid nutrient medium of Postgate „B” at 28 ± 2 °C. The experiments were carried out in air-tight retorts with standards of steel St3PS of cylindrical form (h=10mm, d=16mm) in the medium of Postgate „B”, inoculated 3 days' association of sulphate-reducing bacteria (titre is 10^8 cells in 1 ml) with derivatives of triazolazepine and without them. Display was 168, 240, 336 hours. Concentration of matters was 0,5 g/l. Biofilm from a surface of steel was taken off in the fixed volume of a 0,1N phosphatic buffer with ultrasound (35 kHz). The quantity of bacteria's cells in biofilm and plankton was determined by the method of maximum tenfold dilution.

It was showed that derivatives of triazolazepine influence on the quantity of sulphate-reducing bacteria as in biofilm and in plankton. The quantity of bacterial cells diminishes to 7-8 orders in the biofilm, formed on the surface of steel and only to 5-6 orders in the plankton. It provides protective action of derivatives of triazolazepine in the conditions of microbial corrosion of the low-carbon steel.