

Review

on the dissertation work of Syzdykova Marzhan Nurlanovna «The using of chemotropic microorganisms in the treatment of organic wastewater from enterprises in the Shymkent city», submitted for the academic degree of Doctor of PhD in the specialty 8D05210 – «Ecology»

Relevance of the research topic. Environmental safety is a strategic fundamental component of the national security of the country, therefore, in accordance with the principles of state policy in the field of wastewater management, environmental problems along with the issues of integrated wastewater treatment of the enterprise for environmental protection are relevant.

Scientific results and their validity. Dissertation work of M.N.Syzdykova is devoted to the solution of ecological problems of purification of organic-containing waste water of the enterprise with the use of biocoagulant. For theoretical substantiation of the offered technology of ecological treatment of waste water the generalized review of information sources, patents and scientific developments on biological treatment of waste water, on physical-chemical characteristics of waste water of city sewerage and oil refinery is executed.

Determination of optimal conditions for the growth of *Acidithiobacillus ferrooxidans* strain and establishment of its iron oxidation rate under different temperature regimes is a valuable result for biotechnology and ecology. It was proved that the most favourable temperature is the range +30...+35 °C, at which the rate of Fe^{2+} oxidation is 0.5 ± 0.5 g/L per hour.

Especially significant is the first established efficiency of using *A. ferrooxidans* *Achl* suspension as a biocoagulant for wastewater treatment of milk processing plants. It is proved that the lactose content is reduced to $92.5 \pm 0.5\%$ and water transparency is increased by $80.0 \pm 3.5\%$.

The effectiveness of bacterial-chemical method using bentonite to reduce chemical oxidative demand in wastewater containing detergents was also confirmed. The optimum degree of COD reduction was achieved when bacterial-chemical trivalent iron (1.75 g/l) and bentonite (600 mg/l) were used together.

Mathematical planning of the experiment was carried out with the assessment of significance of the regression equation coefficients by Student's criterion, the test of adequacy of the regression equation was carried out by Fisher's criterion.

In general, the study represents a significant contribution to the development of technologies for environmentally safe treatment of industrial and municipal wastewater. Its results can become a basis for further developments in the field of water treatment and resource saving.

Practical significance of the results. The results of the conducted research have a high practical significance for environmentally safe treatment of waste water of domestic and industrial origin.

Development of effective technique of reduction of oxidative chemical demand in wastewater containing detergents using bentonite and trivalent iron opens new opportunities for improvement of water treatment systems in industry. Determination of optimum dosages of components allows minimizing reagent costs and improving treatment efficiency.

Recommendation of the dissertation work for defence. The dissertation work of M.N.Syzdykova is characterised by the principle of internal unity, represents a fully completed scientific work, has weighty scientific novelty and important practical significance.

On the basis of the above-mentioned I consider that the thesis work of Syzdykova Marzhan Syzdykova is executed on a high scientific-theoretical level, in full and corresponds to the requirements to the theses for awarding the scientific degree of Doctor of Philosophy on specialty 8D05210 – «Ecology».

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