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Abstract: Investigations were carried out in anaerobic laboratory bioreactor utilizing *Desulfovibrio desulfuricans* ATCC 29577 strain. Conditions of continuous anaerobic reduction of sulfates were as follows: $[\text{ChZT}]/[\text{SO}_4^{2-}]$ ratio about 2.0 maintained with continuous sodium lactate feeding, temperature $30 \pm 5^\circ\text{C}$ and wastewater volumetric flow rate of $60 \text{ cm}^3/\text{h}$ ensuring about 7-day retention time. It was found out that biological reduction of sulfates in industrial wastes with the use of bacteria was carried out with about 90% efficacy. Trace metal ions (zinc, cadmium and lead) at 5.0 g/m^3 had a negative impact on reduction of sulfates and caused decrease in the amount of sulfides produced. Simultaneously, reduction in metal ion content by about 60% was observed.

Keywords: Industrial wastewater, sulfate-reducing bacteria, zinc, lead, cadmium.