

## BIOFILM BIOMASS OF SULPHATE-REDUCING BACTERIA ON THE SURFACE OF POLYPROPYLENE UNDER THE INFLUENCE OF PARACETAMOL

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Bacterial biofilms form on natural and artificial materials and play a critical role in their biodegradation/biodamage (Andreiuk et al., 2005; Kanematsu & Barry, 2015; Gu, 2018; Gulizia et al., 2024). Environmental pollution with chemical compounds can affect the processes of bacterial biofilm formation (de Araújo & de Oliveira, 2020). In particular, paracetamol, one of the most popular medications (Freo et al., 2021), has been found in the environment (Al-Kaf et al., 2017).

We have previously shown that the medical preparation “Infulgan”, containing paracetamol (10 mg/mL), at a concentration of the latter 0.2% in the nutrient medium, did not affect the biomass of the biofilm of sulfate-reducing bacteria of the *Desulfovibrio oryzae* strain NUChC SRB1 formed on the surface of steel samples, but increased the rate of the corrosion process (Tkachuk et al., 2025). Given that microbial communities involved in the biodegradation/biodamage of materials also develop on artificial polymeric materials, the aim of this work was to study *in vitro* the biomass of the *D. oryzae* NUChC SRB1 biofilm on the surface of polypropylene in the presence of paracetamol.

The study used a 5-day culture of sulfate-reducing bacteria *D. oryzae* NUChC SRB1 (accession number in GenBank is MT102713.1) (Tkachuk et al., 2020) with a turbidity of 0.5 McFarland (in sterile 0.85% NaCl). The studied bacterial culture was grown in liquid Postgate’s “C” medium in 5 ml Eppendorf tubes under anaerobic conditions at a temperature of  $29 \pm 2$  °C for 35 days. The experiment was carried out without the addition of bacterial culture and paracetamol (sterility control), with the addition of only culture (culture control) and with the addition of culture and paracetamol (experiment). A sterile solution of the medical preparation “Infulgan” (10 mg of paracetamol in 1 mL of solution) was used as a source of paracetamol. The final concentration of paracetamol in the culture medium was 0.2% (w/v). To assess the biomass of the formed biofilm after the incubation time, the contents of the polypropylene tubes were poured out, and their inner walls were treated and stained with crystal violet according to the method described earlier (Tkachuk & Zelena, 2024). The number of parallel repetitions of the study was 4. The results of the study were statistically processed using the Microsoft Excel 2010 program.

It was found that the mass of crystal violet dye that stained sterile polypropylene was  $0.84 \pm 0.10$  mg/L. The biomass of the biofilm formed by the studied culture in the absence of paracetamol was  $2.17 \pm 0.20$  mg/L. In the presence of paracetamol, no significant differences in the biomass of the bacterial biofilm were observed - it was  $2.95 \pm 0.42$  mg/L. The results obtained are consistent with previously obtained data that a 0.2% solution of paracetamol does not affect the biomass of the *D. oryzae* NUChC SRB1 biofilm on the surface of an artificial material such as steel (Tkachuk et al., 2025). Considering that the content of paracetamol in wastewater is  $0.7 \times 10^{-8}$ – $0.246 \times 10^{-4}$ % (Al-Kaf et al., 2017), it is important to investigate the biodegradation processes of artificial materials (plastics, steel) at such concentrations of this pollutant. The obtained data will allow a deeper understanding of the mechanisms of interaction between environmental pollutants and microbial communities that form biofilms.