



Effect of Sodium Dodecyl Sulfate on the growth of sulfate -reducing bacteria isolated from water associated with oil production in the North Rumaila field, Basra Governorate – Iraq

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ABSTRACT

The current study included a study of the effect of chemical compounds as biocides on the effectiveness of sulfate -reducing bacteria that cause oil acidity in reservoirs. Samples of injection water used in extracting crude oil from the North Ramliyah oil wells were collected, and the number of bacteria present in that water was calculated. The effectiveness of Sodium Dodesyl Sulphate (SDS) on dormant bacteria by preparing active cultures and on wandering bacteria was used by placing wrought iron samples in active cultures for a week to form biofilms. The results showed a clear effectiveness of SDS on the growth of bacteria. The inhibitory concentration reached 30 parts per million (ppm) towards bacteria floating in the medium, while the inhibitory concentration reached 100 ppm Mtowards bacteria sheltered in the biological membrane.

Keywords:

Sulfate-reducing bacteria, Sodium Dodesyl Sulphate, Oil acidity, Petroleum microbiology.

1. Introduction

The scientist Bastin et al ,1926 considered the first to isolate sulfate -reducing bacteria (SRB) from oil production water (Ollivier, 2007). However, the use of diagnostic methods based on 16SrRNA revealed a great diversity of photosynthetic microorganisms in the complex ecosystem of oil reservoirs (Prajapat et al., 2019; Tiburcio et al., 2021).

For the purpose of improving oil production, gas, chemicals, or water are usually pumped into the wells for the purpose of increasing the pressure in the reservoirs and the oil rushing toward the production wells (Sen, 2008). The microbial communities present in the injection water contains different types of microorganisms that will enter oil reservoirs and modify the existing microbial communities (Ren et al., 2015; Pannekens et al., 2019). Sulfate -reducing bacteria (SRB) are

considered one of the most dangerous types of bacteria found in oil reservoirs. These bacteria produce large quantities of hydrogen sulfide gas (H₂S) as a result of their metabolic activities which are driven by the consumption of organic sources such as lactate, acetate, fumarate benzoate, fatty acids, and others (Negm et al., 2022). Therefore, they cause many problems in Industrial facilities, especially petroleum ones, include microbial. Corrosion occurs in injection and production wells, equipment handles, water pumping facilities, and crude oil transportation pipelines (Al-Abbas et al., 2013) and occurs as a result of cathodic depolarization through bacterial consumption of the hydrogen surrounding the metal surface or the emergence of acid differentiation cells (Yemashova et al., 2007; Kakooei et al., 2012; Tawfik et al., 2023). Liu et al. (2022) indicated that SRB is responsible for 80% of corrosion failures of operating