# Overdosing 2,2-dibromo-3-nitrilopropionamide (DBNPA) biocide accelerates the corrosion of X80 pipeline steel

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## Abstract

Microbiologically influenced corrosion (MIC) [1] induced by sulfate reducing bacteria (SRB) is a common and tricky problem in pipelines. Presently, biocides are used generally to inhibit MIC in offshore oil and gas fields [2]. The concentration for biocide application should be determined according to the actual situation of the site. Excessive dose use of a biocide may lead to environment pollution and economic losses in industrial production and transportation systems. While inadequate use can not protect steels effectively, it sometimes may even cause more severe corrosion than normal. The 2,2-dibromo-3-nitrilopropionamide (DBNPA) is a biodegradable biocide widely used in oil and gas pipeline maintenance. However, the practical application generally faces the confusing problem that the effective dose of biocide for MIC prevention is unclear.

In this study, the effect of different concentrations of DBNPA on the corrosion behavior of X80 pipeline steel in the presence of SRB has been investigated. The results show that the corrosion rate was reduced by 20.2%, if DBNPA was supplied at 150 ppm. However, the corrosion rate increased by 1.5 times ($p = 0.002$) at 1000 ppm DBNPA over the one without DBNPA addition, although scanning electron microscope (SEM) images show that sessile SRB cells were almost all killed with 1000 ppm DBNPA addition. Further chemical composition analysis shows that a high concentration of DBNPA might attack the steel and cause a chemical corrosion of steel. Thus, a comprehensive evaluation is needed to determine the proper dosage of biocides in actual applications.

**Keywords** MIC; X80 pipeline steel; Biocide; DBNPA; Sulfate reducing bacteria

## Reference

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