

CHEMISTRY AND MATERIALS SCIENCE

Hasanova Ulviyya Eynulla

Doctoral Candidate of

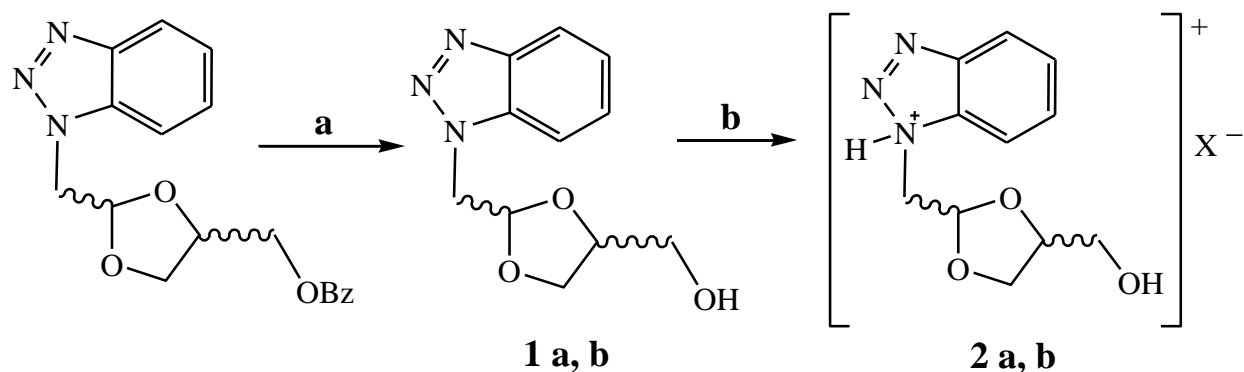
Oilgasscientificresearchproject Institute of SOCAR, Republic of Azerbaijan

SYNTHESIS AND EVALUATION OF NOVEL

(2-((1H-BENZO[D][1,2,3]TRIAZOL-1-YL)METHYL)-1,3-DIOXOLAN-4-YL)METHANOL AND IT'S SALTS AS ANTIMICROBIAL AGENTS

Biocorrosion, also known as microbiologically induced corrosion (MIC) is a major problem in the oil and gas industry. The problem of microbiological contamination of natural gas, crude oil and its processing products represents a major problem in economic terms. MIC deteriorates the metal surface through the metabolic activity of microorganisms. The main bacterial type associated with this deterioration is the anaerobic Sulfate-Reducing Bacteria (SRB), although other bacteria, e.g. acetogenic bacteria or other acid producing bacteria (APB) or methanogenic archaea can also be involved. In order to avoid the harmful effects of such bacteria on metallic materials and installations a chemical treatment with biocides is applied. [1] The term of biocide or bactericide includes all the chemicals which destroy or prevent the development of microorganisms. Benzotriazole is a heterocyclic compound endowed with multiple biological activities. [2] Some benzotriazole derivatives are widely used compounds in industrial biocides. In the present investigation, were synthesized *sis*- and *trans*-(2-((1H-benzo[d][1,2,3]triazol-1-yl)methyl)-1,3-dioxolan-4-yl)methanol (**1 a, b**) and their salts (**2 a, b**) as shown in the Scheme-1 below.

The chemical structure of the prepared compounds was confirmed using H-NMR, C-NMR and mass spectroscopic analysis. The compounds were tested as antimicrobial agents against the MIC of carbon steel in various aggressive environments using serial dilution method. It has been found that these compounds have a 92-96% bioside properties against the SRB and APB.



Reagents and conditions: (a) H₂O, NaOH, 60-70 °C, 2h; (b) HCl, r.t., 1h.

Scheme 1. Synthesis scheme and conditions of *cis*- and *trans*-(2-((1H-benzo[d][1,2,3]triazol-1-yl)methyl)-1,3-dioxolan-4-yl)methanol (1 a, b) and their salts (2 a, b)

The present study showed that *cis*- and *trans*-(2-((1H-benzo[d][1,2,3]triazol-1-yl)methyl)-1,3-dioxolan-4-yl)methanol and their salts could be a novel biocide against the growth of the SRB and APB to control corrosion in oil and gas industries.

References:

1. A. Turkiewicz, J. Brzeszcz, P. Kapusta, The application of biocides in the oil and gas industry, NAFTA-GAZ. 2013
2. Brahim El Ibrahim, Lei Guo, Azole-Based compounds as Corrosion Inhibitors for Metallic Materials, Azoles-Synthesis, Properties, Applications and Perspectives, July 2020