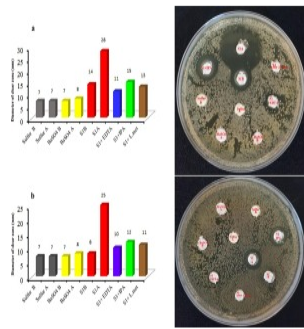


## Abstract

The expansion of new antibiotics or a new way to treat infections or prevention caused by drug-resistant Gram-negative and Gram-positive bacteria is of paramount importance as antibiotic resistance continues to increase worldwide. This study aimed to study the antibacterial piezo activity of  $\text{CaTiO}_3/\text{TiO}_2$  nanocomposite and its antibacterial memorial effect against multi-drug resistance Gram-positive, including *Staphylococcus aureus* and Gram-negative bacteria, including *Escherichia coli*. We used the disk diffusion method modified Broth macrodilution antibacterial test to study the antibacterial effect. Our results show that  $\text{CaTiO}_3/\text{TiO}_2$  nanocomposite exhibits an ~100% antibacterial ratio against *S. aureus* and *E. coli* after applying mechanical forces, it shows better performance compared to the Azithromycin. It shows antibacterial activity even 8 days after applying mechanical force. The antibacterial efficacy of the piezo  $\text{CaTiO}_3/\text{TiO}_2$  nanocomposite against multidrug-resistant is particularly promising.

## Graphical abstract



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## Introduction

Rising antibiotic resistance of bacteria and the appearance of new bacteria and viruses like COVID-19 is a worldwide problem [1]. Likewise, the outbreak of viral diseases such as avian influenza, Ebola, and nowadays, the global pandemic caused by SARS-CoV-2 have further expanded the interest in new methods to kill bacteria and viruses [2], [3], [4], [5]. Up to now a variety of methods such as using intrinsic antibacterial materials and antibacterial photodynamic methods were used to kill bacteria. These methods and