

Biocidal compounds – effects on cell membrane

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Biocidal compounds are a diverse group of chemicals derived from natural, semi-synthetic, or synthetic sources. These compounds possess the capacity to disrupt the structure and functionality of cell membranes of bacterial strains found in the environment, human, and animal bodies. Biocides are utilized in various sectors, including industry, medicine, and households, to control microbial contamination.

In the field of medicine, antibiotics are employed to prevent the development of life-threatening bacterial infections in humans and animals. This group of biocidal substances actively modifies the functioning of the cell membranes of various bacterial strains. An alternative to traditional pesticides, which contribute to soil depletion, species extinction, and contamination of soil and drinking water with mutagenic compounds, are pyrethroids—natural compounds with insecticidal activity. However, they are also secreted into the soil and water, allowing them to contact and affect the cell membranes of bacterial strains that reside in the environment [1-2].

The objective of the study was to assess the impact of biocidal compounds, including antibiotics and natural insecticides, on the cell membrane of bacterial strains isolated from the environment following a brief exposure to the selected stressor. To achieve this, a series of tests were conducted, including toxicity, hydrophobicity, and cell membrane permeability assessments. Additionally, biofilm formation by selected bacterial strains was quantified, and atomic force microscopy was employed to visually examine surface alterations. The combination of these tests enabled the determination of changes on the surface of bacterial cells following contact with the biocidal compound.

References:

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[2] Tang W, Wang D, Wang J, Wu Z, Li L, Huang M, Xu S, Yan D. Pyrethroid pesticide residues in the global environment: An overview. *Chemosphere*. 2018 Jan;191:990-1007. doi: 10.1016/j.chemosphere.2017.10.115.

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