

## **Cu-Zn and Cu-Zn-Co nanosized mixed oxides for biocide action against *Escherichia coli***

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Single oxides nanoparticles, especially CuO, ZnO and Co<sub>3</sub>O<sub>4</sub> [1-2] proved to be an efficient tool against *E. coli*. On the other hand, mixed oxides are quite often employed in a large number of processes, as more performing than the single oxides [3].

Here we present the enhanced effects of nanosized mixed Cu/Zn and Cu/Zn/Co oxides against *E. coli*. The mixed oxides were synthesized from hydroxycarbonates precursors and fully characterized by XRD, IR and SEM, hence their structure and size were determined. The metal oxide nanoparticles were dispersed thoroughly in a culture medium, and *E. coli* bacteria were cultivated on Tryptic Soy Agar plates containing different concentrations of metal oxide nanoparticles (50-100-200-400 µg/mL). Bacteria were counted in terms of colony forming units (CFU). *E. coli* counts decreased in the culture medium containing metal oxide nanoparticles, and the dose-response relationship was calculated [4].

The nanosized mixed oxide nanoparticles exhibit a higher biocidal power against *E. coli* compared to the corresponding single oxides. Furthermore, tests were performed also in comparison with single oxides mechanically mixed in the same proportion of the solid solution mixed oxides. The increase in concentration of nanoparticles, also increases the bacterial inhibition rate. The highest viability reduction values (> 99%) were obtained at the highest doses with the longest expositions.

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