Metal compounds based on palladium and platinum with potential application in the control and treatment of Campylobacter jejuni

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Campylobacter sp. is the main cause of foodborne gastroenteritis in humans, and there are increasing reports of multiple resistance of this bacterium to the antimicrobial agents of first choice, ciprofloxacin and erythromycin. New molecules have been investigated for their efficacy in the treatment of human campylobacteriosis and in environmental control, especially metal compounds whose minimum doses demonstrate high effectiveness. The aim was to evaluate the efficacy of palladium (PdDMSOBTA) and platinum (PtDMSOBTA) complexes on strains of *C. jejuni*, in planktonic and sessile forms, and the cytotoxicity of these compounds in Caco-2 cells. Five strains of *C. jejuni*, isolated from chicken carcasses between 2017 and 2018, were analyzed. All had known resistance to erythromycin and ciprofloxacin. Susceptibility to palladium and platinum compounds was assessed by determining the minimum bactericidal concentration (MBC) using the adjusted Mueller Hinton microdilution method, with concentrations ranging from 0.78 to 100 µg/ml. To test antibiofilm activity, the strains were grown in a medium containing 5% chicken juice, and the compounds were tested at concentrations of 3.12 to 400 µg/ml for 2 hours, compared to treatment with peracetic acid (300 to 4000 µg/ml). The cytotoxicity test was carried out after stabilizing the Caco-2 cells, exposing them to concentrations of 0.78 to 100 µg/ml of the compounds for 24 and 48 hours, using the resazurin dye. All tests were carried out in triplicate and the data was statistically analyzed using GraphPad Prism. Both compounds showed efficacy in planktonic forms of *C. jejuni*, with CBMs ranging from 3.12, 12.5 and 25 µg/ml for palladium, and 1.56, 12.5 and 25 µg/ml for platinum. In the sessile form, all the strains showed the same inhibition behavior to the compounds, but the platinum-based complex proved to be more effective (200 µg/ml) than the palladium one (400 µg/ml) in eliminating the sessile cells, while peracetic acid promoted inhibition from 500 µg/ml. After 24 h, around 25.89% of the cells remained viable when treated with platinum at 25 µg/ml, 65% at 12.5 µg/ml, and at the lowest concentration, viability was 100%. After 48 h, 18.91% remained viable at 25 µg/ml, 71.76% at 6.25 µg/ml, and at the lowest concentration, 92.36%. Palladium was more effective in preserving cell integrity, and promoted high viability even at higher concentrations, with 100% of cells viable at 25 µg/ml, 99.66% viable at 12.5 µg/ml and 100% viable at the lowest concentration after 24 h, maintaining this viability even after 48 h of treatment. Cell viability did not differ from the control for the two complexes. Our results indicate that both compounds have potential for controlling the pathogen in food facilities and treating the disease due to their low effect on Caco-2.

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