Nanopatterned Polystyrene Polymer with Bactericidal and Bacteriostatic Properties against Salmonella enterica ATCC 43975 and Bacillus cereus ATCC 14579

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The current methods used to kill and inhibit microbes though rapid and accurate, these methods involve the use of chemicals and antimicrobial drugs which are harmful and can lead to the development of antibiotic resistant micro-organisms. In medicine for sterilizing and cleaning instruments, a huge amount of money is spent. There is a necessity of developing a new method which can mechanically eliminate bacteria without developing any resistance. In our research, we explored the development of a new method, Nano-patterned polymer surface with bactericidal and bacteriostatic properties. The Nano-imprinted polystyrene polymer wafers were tested against Salmonella enterica ATCC 43975 (gram negative) and Bacillus cereus ATCC 14579 (gram positive) strains using live dead cell assay and agar dilution method. The results obtained showed significant decrease in number of bacterial cells and spectrophotometric examination, in dilution method, confirmed the bacteriostatic ability. From the results, it was also confirmed that Salmonella enterica ATCC 43975 (gram negative) was killed faster than Bacillus cereus ATCC 14579 (gram negative). In conclusion, this new method has an ability to eliminate bacteria mechanically that can be used for covering the surfaces of surgical instruments, counters of supermarkets, water purifiers, seats and arm rests in the hospitals to combat the resistant bacteria and expenditure on chemicals for cleaning.

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