



Advanced Laboratory for Analysis Research and Nanotechnology

TEST RESULTS ACCORDING ISO 22196 ON BALLPOINT PENS WITH ZINC IONS' ADDITIVE

List of tested bacteria

- *Escherichia coli* ATCC 25922
- *Staphylococcus aureus* ATCC 6538P
- *Meticillin-resistant Staphylococcus aureus (MRSA)* ATCC 33591
- *Acinetobacter Baumannii* ATCC 19606
- *Streptococco pyogene*
- *Klebsiella pneumoniae*
- *Proteus vulgaris*
- *Salmonella*
- *Pseudomonas aeruginosa* ATCC 10145
- *Enterobacter cloacae* NCTC 10005
- *Clostridium difficile* ATCC 9689
- *Candida albicans* ATCC 10231



Results

MICROBIC FAMILIES	Initial Inoculum	Inoculum control	ABS PEN	Log reduction	Reduction %
<i>Escheriachia coli</i>	$3,0 \times 10^6$	$3,5 \times 10^7$	$3,95 \times 10^5$	1,95	99,8
<i>Staphylococcus aureus</i>	$5,2 \times 10^6$	$2,83 \times 10^7$	$1,71 \times 10^5$	2,22	99,7
<i>MRSA</i>	$2,4 \times 10^5$	$2,16 \times 10^7$	$3,95 \times 10^4$	2,73	97,2
<i>Acinetobacter baum.</i>	$2,5 \times 10^6$	$4,00 \times 10^7$	$3,15 \times 10^6$	1,10	98,1
<i>Ps. aeruginosa</i>	$1,5 \times 10^6$	$1,59 \times 10^7$	$1,75 \times 10^4$	2,95	99,2
<i>Ent. cloacae</i>	$4,72 \times 10^6$	$2,08 \times 10^7$	$1,75 \times 10^5$	2,07	99,5
<i>C. albicans</i>	1×10^7	$1,53 \times 10^7$	$8,70 \times 10^5$	1,24	98,5
<i>Clostridium diff.</i>	1×10^6	$1,2 \times 10^6$	$1,4 \times 10^4$	1,93	98,1
<i>Streptococcus pyogene</i>	$2,5 \times 10^6$	$4,01 \times 10^7$	$3,15 \times 10^6$	1,10	98,1
<i>Klebsiella pn.</i>	1×10^7	$1,53 \times 10^7$	$8,70 \times 10^5$	1,24	98,8
<i>Proteus Vulgaris</i>	$3,0 \times 10^6$	$3,5 \times 10^7$	$3,94 \times 10^5$	1,95	98,9
<i>Salmonella</i>	$4,71 \times 10^6$	$2,08 \times 10^7$	$1,75 \times 10^5$	2,07	99,2