

Supporting Information for

Boosting Antimicrobial Activity of Imipenem in Combination with Silver Nanoparticles towards *S. fonticola* and *Pantoea sp.*

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Table S1 PCR primers and their sequence with Gen Bank codes

Primer		Sequence 5'-3'	Size of PCR amplicon (bp)	Bacterium
EsaI gene	F	TTTTGCCACCGCGTCAAAAC	127	Pantoea sp.
	R	TGGCGTATCGTTGCTGAATC		
SmaI gene	F	TCACGTCATTTGCAGCTTGC	73	Serratia sp.
	R	ATTGTTGAACACGCCATCGC		

Table S2 PCR master mix by instructions of the company for each gene

PCR master mix	Volume (μL)
DNA template	5
Forward primer (10 pmol)	1.5
Reverse primer (10 pmol)	1.5
PCR water	12
Total volume	20
PCR master mix	Volume (μL)

Table S3 Parameters of PCR thermocycler

PCR step	Temperature (°C)	Time (min)	Repeat cycle
Initial denaturation	95	3	1
Denaturation	95	0.5	
Annealing	58	0.5	30
Extension	72	0.5	
Final extension	72	5	1
Melting	4		Hold

Appendix 1 Statistical analysis of gene expression of *S. fonticola* 1, 2 isolates after treatment with chemical and biological SNPs and imipenem

Sample	Mean ± SE	P-value
T1	3.6787 ± 0.22704	0.009
T2	1.6407 ± 0.36673	
T3	2.0047 ± 0.02598	
T4	6.9533 ± 1.65687	

Appendix 2 Statistical analysis of gene expression of *S. fonticola* 3 isolates after treatment with chemical and biological SNPs and imipenem

Sample	Mean ± SE	P-value
T1	1.8003 ± 0.47420	0.001
T2	.9387 ± 0.20402	
T3	3.0150 ± 0.31802	
T4	5.3103 ± 0.71751	

Appendix 3 Statistical analysis of gene expression of *Pantoea* sp.1,2 isolates after treatment chemical and biological SNPs and imipenem

Sample	Mean ± SE	P-value
T1	3.7857 ± 0.93741	0.006
T2	2.6660 ± 0.08166	
T3	4.4687 ± 0.35743	
T4	6.7347 ± 0.52331	

Appendix 4 Statistical analysis of gene expression of *Pantoea* sp.1, 2 isolates after treatment chemical and biological SNPs and imipenem

Sample	Mean ± SE	P-value
T1	3.7857 ± 0.93741	0.006
T2	2.6660 ± 0.08166	
T3	4.4687 ± 0.35743	
T4	6.7347 ± 0.52331	

Appendix 5 Statistical analysis of gene expression of *Pantoea* sp.2, 3 isolates after treatment chemical and biological SNPs and imipenem

Sample	Mean ± SE	P-value
T1	1.7827 ± 0.04541	0.007
T2	1.0897 ± 0.09381	
T3	3.0890 ± 1.13238	
T4	5.5933 ± 0.73031	

Appendix 6 Statistical analysis of gene expression of *S. fonticola* 1,2 isolates after treatment with combination of chemical SNPs and imipenem

Sample	Mean ± SE	P-value
T1	0.4547 ± 0.08673	0.002
T2	1.6673 ± 0.76251	
T3	2.2427 ± 0.13626	
T4	6.6463 ± 0.84380	
T5	6.8287 ± 1.87678	
T6	7.2350 ± 1.42994	
T7	7.4167 ± 0.94686	
Control	8.6147 ± 2.51172	

Appendix 7 Statistical analysis of gene expression of *S. fonticola* 1, 2 isolates after treatment with combination of biological SNPs and imipenem

Sample	Mean ± SE	P-value
T1	1.0293 ± 0.03656	0.244
T2	2.0493 ± 0.69233	
T3	2.7200 ± 0.87973	
T4	4.5873 ± 0.25321	
T5	6.2080 ± 4.62522	
Control	7.5070 ± 1.30800	

Appendix 8 Statistical analysis of gene expression of *S. fonticola* 3 after treatment with combination of chemical SNPs and imipenem

Sample	Mean \pm SE	P-value
T1	0.1600 \pm 0.12879	0.000
T2	0.6437 \pm 0.05795	
T3	1.4707 \pm 0.15057	
T4	6.0410 \pm 0.75446	
T5	7.0890 \pm 2.56477	
T6	7.4423 \pm 2.24652	
T7	9.9467 \pm 1.76125	
Control	13.6263 \pm 1.22144	

Appendix 9 Statistical analysis of gene expression of *S. fonticola* 3 after treatment with combination of biological SNPs and imipenem

Sample	Mean \pm SE	P-value
T1	0.2340 \pm 0.05186	0.000
T2	0.4177 \pm 0.14389	
T3	1.2767 \pm 0.13135	
T4	3.2110 \pm 0.64451	
T5	6.6567 \pm 1.84217	
Control	10.6527 \pm 2.37459	

Appendix 10 Statistical analysis of gene expression of *Pantoea* sp.1, 2 after treatment with combination of chemical SNPs and imipenem

Sample	Mean \pm SE	P-value
T1	1.6430 \pm 0.76022	0.062
T2	2.0737 \pm 0.07872	
T3	2.1220 \pm 0.70909	
T4	2.2130 \pm 0.47422	
T5	3.7700 \pm 0.99895	
T6	4.0500 \pm 0.22398	
T7	4.4667 \pm 1.88540	
Control	5.8997 \pm 1.13478	

Appendix 11 Statistical analysis of gene expression of *Pantoea* sp.1, 2 after treatment with combination of biological SNPs and imipenem

Sample	Mean \pm SE	P-value
T1	0.2540 \pm 0.04013	0.000
T2	0.5867 \pm 0.15975	
T3	1.1097 \pm 0.08950	
T4	1.7313 \pm 0.23242	
T5	2.6893 \pm 0.73479	
Control	6.0473 \pm 0.89507	

Appendix 12 Statistical analysis of gene expression of *Pantoea* sp.3, 4 after treatment with combination of chemical SNPs and imipenem

Sample	Mean \pm SE	P-value
T1	0.5827 \pm 0.07670	0.006
T2	1.5870 \pm 0.71255	
T3	2.2740 \pm 0.61451	
T4	2.9060 \pm 1.18727	
T5	4.3330 \pm 1.44956	
T6	4.7773 \pm 1.07099	

T7	5.1233 ± 0.96446
Control	6.5550 ± 0.79581

Appendix 13 Statistical analysis of gene expression of *Pantoea* sp.3, 4 after treatment with combination of biological SNPs and imipenem

Sample	Mean ± SE	P-value
T1	1.8947 ± 0.11299	0.020
T2	2.0613 ± 0.72306	
T3	2.2170 ± 0.36003	
T4	2.7003 ± 0.90174	
T5	5.1297 ± 0.31823	
Control	8.5473 ± 2.89352	

Appendix 14 T-test analysis in comparison between combination of chemical and biological SNPs with antibiotics in *S. fonticola* 1, 2 isolates

Sample	Mean ± SE	P-value
Chemical	5.1383 ± 0.72740	0.363
Biological	4.0168 ± 0.88910	

Appendix 15 T-test analysis in comparison between combination of chemical and biological SNPs with antibiotics in *S. fonticola* 3 isolate

Sample	Mean ± SE	P-value
Chemical	5.1383 ± 0.72740	0.363
Biological	4.0168 ± 0.88910	

Appendix 16 T-test analysis in comparison between combination of chemical and biological SNPs with antibiotics in *Pantoea* sp. 1, 2 isolates

Sample	Mean ± SE	P-value
Chemical	3.2798 ± 0.40461	0.69
biological	2.0697 ± 0.50096	

Appendix 17 T-test analysis in comparison between combination of chemical and biological SNPs with antibiotics in *Pantoea* sp. 3, 4 isolates.

Sample	Mean ± SE	P-value
Chemical	3.5173 ± 0.48084	0.785
biological	3.7584 ± 0.73142	