

Supplementary Materials:

Table S1. Sequences of PCR primers.

Target	Primer Sequence (5'→3')	Amplicon Size (bp)	References
<i>tetA</i>	F:GCTACATCCTGCCTTC R:GCATAGATCGGAAGAG	211	Alves et al., 2014
<i>tetB</i>	F:TCATTGCCGACCTCAG R:CCAACCATCACCATCC	391	Alves et al., 2014
<i>bla_{TEM}</i>	F:AAAGATGCTGAAGATCA R:TTTGGTATGGCTTCATTC	425	Alves et al., 2014
<i>sul1</i>	F:CTGAACGATATCCAAGGATTYCC R:AAAAATCCCACGGRTC	239	Alves et al., 2014
<i>qnrA</i>	F:TTCTCACGCCAGGATTTG R:CCATCCAGATCGGCAAA	521	Veldman et al., 2011
<i>qnrB</i>	F:GGMATHGAAATTCGCCACTG R:TTYGCBGYCGCCAGTCG	261	Veldman et al., 2011
<i>qnrC</i>	F:TGAATTATT CCCATAAAACG R:TGTCTGGAATAACAATCACC	447	Veldman et al., 2011
<i>qnrD</i>	F:CGGGG AATAGAGTTAAAAAT R:TATCGGTGAACAATAACACC	592	Veldman et al., 2011
<i>qnrS</i>	F:GCAAGTTCATTGAACAGGGT R:TCTAAACCGTCGAGTTCGGCG	428	Veldman et al., 2011
<i>int11</i>	F: ACGAGCGCAAGGTTTCGGT R: GAAAGGTCTGGTCATACATG	565	Wang, 2015
<i>int12</i>	F: GTGCAACGCATTTTGCAGG R: CAACGGAGTCATGCAGATG	403	Wang, 2015
<i>Int1</i>	F:GGCATAACAAGCAGCAAGC R:AAGCAGACTTGACCTGAT	variable	Wang, 2015

Table S2. Antibigram of multidrug-resistant *E. coli* in seawater.

Antibiotics No.	No. of Isolates	Antibiogram (No. of Isolates)
3	7	TMP-TCY-CIP (1); TMP-SXT-TCY (3); TMP-SXT-CIP (2); TMP-SXT-CEP (1)
4	5	TMP-SXT-TCY-CIP (1); TMP-SXT-TCY-CEP (1); TMP-SXT-TCY-GEN (1); TMP-SXT-GEN-STR (2)
5	1	TMP-SXT-TCY-GEN-STR (1)
8	2	TMP-SXT-TCY-GEN-STR-CIP-CHL-LVX (2)

Table S3. Correlation analysis between antibiotic resistance phenotypes of *E. coli* isolates from bathing beach.

		Tetracycline s	Sulfonamides	Aminoglycoside s		β -Lactams	Quinolones		Phenicol	
		TCY	TMP	SXT	STR	GEN	CEP	CIP	LVX	CHL
Tetracyclines	TCY	1								
Sulfonamides	TMP	-0.056	1							
	SXT	0.159	0.688**	1						
Aminoglycosides	STR	0.045	0.349	0.425*	1					
	GEN	0.180	0.271	0.369*	0.812**	1				
β -lactams	CEP	-0.131	-0.192	-0.102	-0.192	-0.237	1			
Quinolones	CIP	-0.134	0.071	0.050	0.106	-0.005	-0.280	1		
	LVX	0.238	0.209	0.254	0.599 **	0.486 **	-0.115	0.411 *	1	
Phenicol	CHL	0.297	0.036	0.099	0.450 *	0.345	-0.144	0.271	0.802 **	1

Note: ** $p < 0.01$; * $p < 0.05$.

Table S4. Prevalence of resistance genes detected in the *E. coli* strains from seawater and beach sand, and Fisher's exact tests correlation analysis of phenotypic resistance profile and relative genotypic resistance profile.

AR Phenotype (No. Resistant)	Associated ARGs Tested	Genome DNA Positive PCR Results		Asymptotic Significance (p Value)
		Seawater (%)	Sand (%)	
Tetracyclines (17)	<i>tetA</i>	11 (65%)	-	0
	<i>tetB</i>	7 (41%)	-	0.009
Cephalosporins (5)	<i>bla_{TEM}</i>	4 (80%)	-	0
Sulfonamide (16)	<i>sul 1</i>	9 (56%)	-	0.012
Quinolones (9)	<i>qnrA</i>	-	-	-
	<i>qnrB</i>	-	-	-
	<i>qnrC</i>	-	-	-
	<i>qnrD</i>	-	-	-
	<i>qnrS</i>	-	-	-