

Antimicrobial	Group	Gene/Codon no.	Primer name	Internal number	Sequence	Temperature (°C)	Reference	
Betalactams	TEM	All	TEM front P1	Primer 757	5'-GCCGAACCCCTATTG-3'	55	Olesen, I., H. Hasman, and F. M. Aarestrup. 2004. Prevalence of beta-lactamases among ampicillin-resistant <i>Escherichia coli</i> and <i>Salmonella</i> isolated from food animals in Denmark. <i>Microb Drug Resist.</i> 10:334-340. Moodley, A. and Guardabassi, L. Transmission of IncN Plasmids Carrying blaCTX-M-1 between Commensal <i>Escherichia coli</i> in Pigs and Farm Workers. <i>Antimicrobial Agents and Chemotherapy.</i> 2009. 53:1709-1711.	
			TEM-C-R-ny	Primer 686	5'-ACC AAT GCT TAA TCA GTG AG-3'			
	CTX	M-All		ctx M U1	Primer 1354	5'-ACC AAT GCT TAA TCA GTG AG-3'	60	Hasman, H., D. Mevius, K. Veldman, I. Olesen and F. M. Aarestrup. 2006. Beta-lactamases among Extended spectrum Beta-lactamase resistant (ESBL) <i>Salmonella</i> from poultry, poultry products and human patients in The Netherlands. <i>J. Antimicrob. Chemother.</i> 56:115-121. Hendriksen R. S., Mikoleit M., Kornschober C., Rickert R.L., Duyne S.V., Kjelsø C., Hasman H., Cormican M., Mevius D., Threlfall J., Angulo F. J., Aarestrup F. M. 2009. Emergence of Multidrug-Resistant <i>Salmonella</i> Concord Infections in Europe and the United States in Children Adopted From Ethiopia, 2003-2007. <i>Pediatr Infect Dis J.</i> 28:814-818.
				CTX-M-U-2new	Primer 1580	5'-TGGGTRAARTARGTSACCAGAAYSAGCGG-3'		
		CTX-M1 group		ctx-M-15 front P1	Primer 1537	5'-CCATGGTTAAAAATCACTGCG-3'	60	Moodley, A. and Guardabassi, L. Transmission of IncN Plasmids Carrying blaCTX-M-1 between Commensal <i>Escherichia coli</i> in Pigs and Farm Workers. <i>Antimicrobial Agents and Chemotherapy.</i> 2009. 53:1709-1711. Hendriksen R. S., Mikoleit M., Kornschober C., Rickert R.L., Duyne S.V., Kjelsø C., Hasman H., Cormican M., Mevius D., Threlfall J., Angulo F. J., Aarestrup F. M. 2009. Emergence of Multidrug-Resistant <i>Salmonella</i> Concord Infections in Europe and the United States in Children Adopted From Ethiopia, 2003-2007. <i>Pediatr Infect Dis J.</i> 28:814-818.
				CTX-M-U-2new	Primer 1580	5'-TGGGTRAARTARGTSACCAGAAYSAGCGG-3'		
		CTX-M2 group		ctx-M2-group-forward	Primer 1000	5'-ATGATGACTCAGAGCATTTCG-3'	60	Park YJ, Lee S, Kim YR, Oh EJ, Woo GJ, Lee K. Occurrence of extended-spectrum (beta)-lactamases and plasmid-mediated AmpC (beta)-lactamases among Korean isolates of <i>Proteus mirabilis</i> . <i>J Antimicrob Chemother.</i> 2006. 57:156-8.
				ctx-M2-group-reverse	Primer 1001	5'-GAAACCGTGGGTACGATT-3'		
		CTX-M9 group		ctx-M-9 P1	Primer 1096	5'-GTGACAAAAGAGATGCAACGG-3'	60	Briñas L, Lantero M, de Diego I, Alvarez M, Zarazaga M, Torres C. Mechanisms of resistance to expanded-spectrum cephalosporins in <i>Escherichia coli</i> isolates recovered in a Spanish hospital. <i>J Antimicrob Chemother.</i> 2005. 56:1107-10.
				ctx-M-9 P2	Primer 1097	5'-ATGATTCTCGCGCTGAAGCC-3'		
	ACC	ACC-1		ACC-1 ESBL P1	Primer 1359	5'-AGCCTCAGCAGCCGGTTC-3'	50	Hasman, H., D. Mevius, K. Veldman, I. Olesen and F. M. Aarestrup. 2006. Beta-lactamases among Extended spectrum Beta-lactamase resistant (ESBL) <i>Salmonella</i> from poultry, poultry products and human patients in The Netherlands. <i>J. Antimicrob. Chemother.</i> 56:115-121.
				ACC-1 ESBL P2	Primer 1360	5'-GAAAGCCGTTAGTTGATCCGG-3'		
	DHA	DHA-1		DHA-1A	Primer 1364	5'-CTGATGAAAAATCGTTATC-3'	46	Yan, J.-J. et al. Emergence of <i>Klebsiella pneumoniae</i> Isolates Producing Inducible DHA-1 β -Lactamase in a University Hospital in Taiwan, 2002. <i>Journal of Clinical Microbiology</i> 40:3121-3126
				DHA-1B	Primer 1365	5'-ATTCCAGTGCACCTAAAATA-3'		
	FOX	FOX group		FOX group P1	Primer 1583	5'-CGAGCAGACSTGTTGAG-3'	50	Unpublished D'Andrea MM, Nucleo E, Luzzaro F, Giani T, Migliavacca R, Vailati F, Kroumova V, Pagani L, Rossolini GM. Antimicrob Agents Chemother. CMY-16, a novel acquired AmpC-type beta-lactamase of the CMY/LAT lineage in multifocal monophyletic isolates of <i>Proteus mirabilis</i> from northern Italy. 2006 50:618-24.
				FOX group P2	Primer 1584	5'-TTGGCCAGCATGACGATG-3'		
	VEB	VEB-1		VEB-1 CME-1 P1	Primer 1426	5'-TTGGACTTGCAACAATACGC-3'	55	5'-...GGACTCTGCAACAATACGC-3' 5'-...CATTCCCGATGC-3' Laurent Poirer, Et al., Biochemical Sequence Analyses of GES-1, a Novel Class A Extended-Spectrum β -Lactamase, and the Class 1 Integron In52 from <i>Klebsiella pneumoniae</i> , <i>Antimicrob Agents Chemother.</i> 2000 March; 44(3): 622-632.
				VEB-1 CME-1 P2	Primer 1427	5'-CGACTTCCATTCCCGATGC-3'		
	SHV	All		SHV OS5	Primer 1545	5'-TTATCTCCCTGTAGCCACC-3'	60	Arlet G, Rouveau M, Philippon A. Substitution of alanine for aspartate at position 179 in the SHV-6 extended-spectrum beta-lactamase. <i>FEMS Microbiol Lett.</i> 1997. 152:163-7.
				SHV OS6	Primer 1546	5'-GATTTGCTGATTTCGCTCGG-3'		
CMY	CMY-1 group		gruppe CMY-2	Primer 1617	5'-ATGCAACAACGACAATCC-3'	55	Pai H, Lyu S, Lee JH, Kim J, Kwon Y, Kim JW, Choe KW. Survey of extended-spectrum beta-lactamases in clinical isolates of <i>Escherichia coli</i> and <i>Klebsiella pneumoniae</i> : prevalence of TEM-52 in Korea. <i>Clin Microbiol.</i> 1999 37:1758-63. D'Andrea MM, Nucleo E, Luzzaro F, Giani T, Migliavacca R, Vailati F, Kroumova V, Pagani L, Rossolini GM. Antimicrob Agents Chemother. CMY-16, a novel acquired AmpC-type beta-lactamase of the CMY/LAT lineage in multifocal monophyletic isolates of <i>Proteus mirabilis</i> from northern Italy. 2006 50:618-24.	
			FOX group P2	Primer 1584	5'-TTGGCCAGCATGACGATG-3'			
	CMY-2 group		Qeprev cmy-2 start	Primer 1079	5'-ATGATGAAAAATCGTTATGCTGC-3'	60	Tersia Kruger, Dora Szabo,2,3 Karen H. Keddy, Tersia Kruger, Dora Szabo,2,3 Karen H. Keddy, Kathleen Deeley, Jane W. Marsh, Andrea M. Hujer, Robert A. Bonomo, and David L. Paterson; Infections with Nontyphoidal <i>Salmonella</i> Species Producing TEM-63 or a Novel TEM Enzyme, TEM-131, in South Africa 2004, <i>American Society for Microbiology</i> Hasman, H., D. Mevius, K. Veldman, I. Olesen and F. M. Aarestrup. 2006. Beta-lactamases among Extended spectrum Beta-lactamase resistant (ESBL) <i>Salmonella</i> from poultry, poultry products and human patients in The Netherlands. <i>J. Antimicrob. Chemother.</i> 56:115-121.	
			cmy-group2-R	Primer 1007	5'-GCTTTTCAAGAATGCCAGG-3'			

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Antimicrobial	IMP	all	IMP-F	Primer 2635	5'-GGAATAGAGTGGCTTAAATCTC-3'	55	L. Poirel, T. R. Walsh, V. Cuvillier, P. Nordmann. Multiplex PCR for detection of acquired carbapenemase genes Diagnostic Microbiology & Infectious Disease Volume 70, Issue 1, Pages 119-123, May 2011
			IMP-R	Primer 2636	5'-GGTTTAAAYAAAACAACACC-3'		
	SMP	all	SPM-F	Primer 2637	5'-AAAATCTGGGTACGCAACG-3'		
			SPM-R	Primer 2638	5'-ACATTATCCGTGGAACAGG-3'		
	VIM	all	VIM-F	Primer 2639	5'-GATGGTGTGGTTCGATA-3'		
			VIM-R	Primer 2640	5'-CGAATGCGCAGCACCAG-3'		
	OXA	OXA-48	OXA-48-F	Primer 2641	5'-CGGTGGTTAAGGATGAACAC-3'		
			OXA-48-R	Primer 2642	5'-CATCAAGTTCAACCAACCCG-3'		
	BIC	all	BIC-F	Primer 2643	5'-TATGCAGCTCCTTTAAGGGC-3'		
			BIC-R	Primer 2644	5'-TCATTGGCGGTGCGTACAC-3'		
	KPC	all	KPC-Fm	Primer 2645	5'-CGTCTAGTCTGCTGCTTG-3'		
			KPC-Rm	Primer 2646	5'-CTTGTCATCCTGTGAGGCG-3'		
	NDM	all	NDM-F	Primer 2647	5'-GGTTGGCGATCTGGTTTC-3'		
NDM-R			Primer 2648	5'-CGGAATGGCTCATCAGATC-3'			
Chloramphenicol	-	cmIA	CmlA 1F, U12338 3860=>3879	Primer 114	5'-TAC TCG GAT CCA TGC TGG CC-3'	65	Rene S. Hendriksen, Aroon Bangtrakulnonth, Chaiwat Pulsrikarn, Srirat Pornreongwong, Henrik Hasman, Si Wook Song, and Frank M. Aarestrup FOODBORNE PATHOGENS AND DISEASE Volume 5, Number 5, 2008 * Mary Ann Liebert, Inc. DOI: 10.1089=fpd.2007.0075 Antimicrobial Resistance and Molecular Epidemiology of Salmonella Rissen from Animals, Food Products and Patients in Thailand and Denmark
			CmlA 2B, U12338 4437=>4418	Primer 115	5'-TCC TCG AAG AGC GCC ATT GG-3'		
	catA1	-	CAT1,X64410a 193-213	Primer 94	5'-CGC CTG ATG AAT GCT CAT CCG-3'	60	Farmer, J. J., III (1999). Enterobacteriaceae: Introduction and Identification. In Manual of Clinical Microbiology, 7th edn (Murray, P. R., Baron, E. J. & Pfaller, M. A. Eds), pp. 442-58. ASM Press, Washington, DC, USA.
			CAT2,X64110a, 649-630	Primer 95	5'-CCT GCC ACT CAT CGC AGT AC-3'		
Colistin	-	mcr-1	mcr-1_320 bp-fwd	Primer 3216	5'-AGTCCGTTTGTCTTGTGGC-3'	52	Rebello Ana Rita, Bortolaia Valeria, Kjeldgaard Jette S, Pedersen Susanne K, Leekitcharoenphon Pimlapas, Hansen Inge M, Guerra Beatriz, Malorny Burkhard, Borowiak Maria, Hammerl Jens Andre, Battisti Antonio, Franco Alessia, Alba Patricia, Perrin-Guyomard Agnes, Granier Sophie A, De Frutos Escobar Cristina, Malhotra-Kumar Surtbii, Villa Laura, Carattoli Alessandra, Hendriksen Rene S. Multiplex PCR for detection of plasmid-mediated colistin resistance determinants, mcr-1, mcr-2, mcr-3, mcr-4 and mcr-5 for surveillance purposes. Euro Surveill. 2018;23(6):pii=17-00672. https://doi.org/10.2807/1560-7917.ES.2018.23.6.17-00672
			mcr-1_320 bp_rev	Primer 3217	5'-AGATCCCTTGGTCTCGGCTTG-3'	54	
		mcr-2	mcr2-700 bp-fwd	Primer 3208	5'-caa gtg tgt tgg tgg cag tt-3'	52	
			mcr2-700 bp-rev	Primer 3209	5'-tct agc cca aca agc ata cc-3'	54	
		mcr-3	MCR3-900 bp-fw	Primer 3210	5'-AAATAAAAATTGTTCCGCTTATG-3'	46	
			MCR3-900 bp-rev	Primer 3211	5'-AATGGAGATCCCGTTTTT-3'	47	
		mcr-4	MCR4-1100 bp-fw	Primer 3212	5'-TCACTTTCATCACTGCGTTG-3'	50	
			MCR4-1100 bp-rev	Primer 3213	5'-TTGGTCCATGACTACCAATG-3'	50	
		mcr-5	mcr-5_fw	Primer 3202	5'-ATG CGG TTG TCT GCA TTT ATC-3'	51	
			mcr-5_rev	Primer 3203	5'-TCA TTG TGG TTG TCC TTT TCT G-3'	51	
Florphenicol	-	floR	Flor-1	Primer 348	5'-ATGGCAGGCGATATTCATTA-3'	55	Maral Rahmani1, Seyed Mostafa Peighambari1, Christina Aaby Svendsen, Lina M Cavaco, Yvonne Agersø and Rene S Hendriksen Molecular clonality and antimicrobial resistance in Salmonella enterica serovars Enteritidis and Infantis from broilers in three Northern regions of IranBMC Veterinary Research 2013, 9:66 doi:10.1186/1746-6148-9-66
			Flor-2	Primer 349	5'-AAACGGGTTGTACAGATCAT-3'		
Gentamicin	-	aac(3)-IV	AME 14ACC(3) IV B	Primer 152	5'-AGTTGACCCAGGCGTGTGCG-3'	63	Bräu B, Pilz U, Piepersberg W. (1984). Genes for gentamicin-(3)-N-acetyltransferases III and IV: I. Nucleotide sequence of the AAC(3)-IV gene and possible involvement of an IS140 element in its expression. Molecular and general genetics 193:179-87
			AME 13ACC(3) IV F	Primer 153	5'-GTG TGC TGC TGG TCC ACA GC-3'		
	ant(2 ^{''})-I	-	AME 3, ANT (2 ^{''})-I-1	Primer 81	5'-GGG CGC GTC ATG GAG GAG TT-3'	67	Cameron, F.H., Groot Obbink, DJ., and Hall, R.M. 1986. Nucleotide sequence of the AAD(2 ^{''}) aminoglycoside adenylyltransferase determined aadB. Evolution relationship of this with those surrounding addA in R538-1 and dhfrII in R388. Nucleic Acids. Res. 14:8625-8635.
				Primer 82	5'-TAT CGC GAC CTG AAA GCG GC-3'		
	aac(3)-II	-	AME7, AAC(3)-II X51534 381->400	Primer 87	5'-TGA AAC GCT GAC GGA GCC TC-3'	54	Vliegthart, J.S., Ketelaar van Gaalen, P.A., and van de Klundert, J.A. 1989 Nucleotide sequence of the aacC2 gene, a gentamicin resistance determinant involved in a hospital epidemic of multiresistant members of the family Enterobacteriaceae. Antimicrob. Agents Chemother. 33:1153-1159.
				Primer 88	5'-GTC GAA CAG GTA GCA CTG AG-3'		
Linezolid	-	optrA	PRIMER A-F	Primer 3189	5'-AGG-TGG-TCA-GCG-AAC-TAA-3'	48	A novel gene, <i>optrA</i> , that confers transferable resistance to oxazolidinones and phenicols and its presence in <i>Enterococcus faecalis</i> and <i>Enterococcus faecium</i> of human and animal origin Yang Wang Yuan Lv Jiachang Cai Stefan Schwarz Lanqing Cui Zhidong Hu Rong Zhang Jun Li Qin Zhao Tao He Dacheng Wang Zheng Wang Yingbo Shen Yun Li Andrea T. Felber Congming Wu Hao Yu Xuming Deng Xi Xia Jianzhong Shen Author Notes Journal of Antimicrobial Chemotherapy, Volume 70, Issue 8, 1 August 2015, Pages 2182-2190, https://doi.org/10.1093/jac/dkv116
			PRIMER A-R	Primer 3190	5'-ATC-AAC-TGT-TCC-CAT-TCA-3'		
Neomycin	-	aph(3 ['])-III	AME 19 APH (3 [']) I-F	Primer 171	5'-AACGCTTGTGCTCGAGCCGCG-3'	52	Oka, A., Sugisaki, II., and Takanami, M. 1981. Nucleotide sequence of the kanamycin resistance transposon Tr905. J. Mol. Biol. 147:217-226.
			AME 20 APH(3 [']) I-B	Primer 172	5'-GGCAAGATCTGGTATCGGCTGCG-3'		
	aph(3 ['])-II	-	AME 21 Aph 3 ['] -II-F	Primer 186	5'-GCT ATT CGG CTA TGA CTG GGC-3'	63	Aarestrup, F.M. et al. J. Antim Chem (2003) 52, 715-718. Antimicrobial susceptibility and occurrence of resistance genes among <i>Salmonella enterica</i> serovar Weltevreden from different countries
				AME 22 APH (3 [']) II-B	Primer 187		

Antimicrobial	Group	Gene/Codon no.	Primer name	Internal number	Sequence	Temperature (°C)	Reference
		aph(3')-I	P2, APH(3')-III	Primer 203	5'-GCCGATGTGGATTGCGAAAA-3'	68	Melano et al. J Antim Chem (2003) 52, 36-42. Multiple antibiotic-resistance mechanisms including a novel combination of extended-spectrum β -lactamases in a <i>Klebsiella pneumoniae</i> clinical strain isolated in Argentina.
			P1-APH(3')-III new	Primer 1428	5'-GCTTGATCCCCAGTAAGTCA-3'		

Antimicrobial	Group	Gene/Codon no.	Primer name	Internal number	Sequence	Temperature (°C)	Reference	
Quinolones	gyrA Salmonella		gyrA, P2 bio	Primer 184	5'-TACCGTCATAGTTATCCACGA-3'	60	Wuiff C, Madsen M, Baggesen DL, Aarestrup FM. Quinolone resistance among Salmonella enterica from cattle, broilers, and swine in Denmark. Microb Drug Resist. 2000 Spring;6(1):11-7.	
			gyrA, P3	Primer 185	5'-GTACTTTACGCCATGAACGT-3'			
	parC Salmonella		ParC STPARC1	Primer 305	5'-CTATGCGATGTCAGAGCTGG-3'	59	Wuiff C, Madsen M, Baggesen DL, Aarestrup FM. Quinolone resistance among Salmonella enterica from cattle, broilers, and swine in Denmark. Microb Drug Resist. 2000 Spring;6(1):11-7.	
			ParC STPARC2	Primer 306	5'-TAACAGCAGCTCGGCGTATT-3'			
	gyrA E. Coli	E.coliGyrAF (166 355)		Primer 1662	5'-ACGTACTAGGCAATGACTGG-3'	55	Everett MJ, Jin YF, Ricci V, Piddock LJ. Contributions of individual mechanisms to fluoroquinolone resistance in 36 Escherichia coli strains isolated from humans and animals. Antimicrob Agents Chemother. 1996 Oct;40(10):2380-6.	
			E.coliGyrAR	Primer 1663	5'-AGAAGTCGCCGTGATAGAAC-3'			
	parC E. Coli	E.coliParCF 2		Primer 1684	5'-TGTATGCGATGTCTGAACTG-3'	57	Cavaco LM, Frimodt-Møller N, Hasman H, Guardabassi L, Nielsen L, Aarestrup FM. Prevalence of quinolone resistance mechanisms and associations to minimum inhibitory concentrations in quinolone-resistant Escherichia coli isolated from humans and swine in Denmark. Microb Drug Resist. 2008 Jun;14(2):163-9.	
			E.coliParCR	Primer 1667	5'-CTCAATAGCAGCTCGGAATA-3'			
	-	qnrA		QnrA fw	Primer 1685	5'-GGATGCCAGTTTCGAGGA-3'	59	Cavaco LM, Frimodt-Møller N, Hasman H, Guardabassi L, Nielsen L, Aarestrup FM. Prevalence of quinolone resistance mechanisms and associations to minimum inhibitory concentrations in quinolone-resistant Escherichia coli isolated from humans and swine in Denmark. Microb Drug Resist. 2008 Jun;14(2):163-9.
				QnrA rw	Primer 1686	5'-TGCCAGGCACAGATCTTG-3'		
		qnrB		qnrB (1-6)F	Primer 1831	5'-GGMATHGAAATTCGCCACTG-3'	57	Cattoir V, Weill FX, Poirel L, Fabre L, Soussy CJ, Nordmann P. Prevalence of qnr genes in Salmonella in France. J Antimicrob Chemother. 2007 Apr;59(4):751-4.
				qnrB (1-6)R	Primer 1832	5'-TTTGCYGYCGCCAGTCGAA-3'		
		qnrC		qnrC fw	Primer 2196	5' GGGTTGTACATTTATTGAATC 3'	55	Wang M, Guo Q, Xu X, Wang X, Ye X, Wu S, Hooper DC, Wang M. New plasmid-mediated quinolone resistance gene, qnrC, found in a clinical isolate of Proteus mirabilis. Antimicrob Agents Chemother. 2009 May;53(5):1892-7.
				qnrC rev	Primer 2197	5' TCCACTTTACGAGGTTCT 3'		
		qnrD		qnr C fw	Primer 2013	5' CGAGTCAATTTACGGGAATA 3'	50	Cavaco LM, Hasman H, Xia S, Aarestrup FM. qnrD, a novel gene conferring transferable quinolone resistance in Salmonella enterica serovar Kentucky and Bovismorbificans strains of human origin. Antimicrob Agents Chemother. 2009 Feb;53(2):603-8.
				qnrC rev	Primer 2014	5' AACCAAGCTGAAGCGCCTG 3'		
		qnrS		qnrS (1-2)F	Primer 1829	5'-TCGACGTGCTAAGTTCGCG-3'	57	Cavaco LM, Frimodt-Møller N, Hasman H, Guardabassi L, Nielsen L, Aarestrup FM. Prevalence of quinolone resistance mechanisms and associations to minimum inhibitory concentrations in quinolone-resistant Escherichia coli isolated from humans and swine in Denmark. Microb Drug Resist. 2008 Jun;14(2):163-9.
				qnrS (1-2)R	Primer 1830	5'-GATCTAAACCGTCGAGTTCGG-3'		
		aac(6') lb-cr		aac(6') lb Fw 1	Primer 1757	5'-TTGCGATGCTCTATGAGTGGCTA-3'	55	Park, C. H., A. Robicsek, G. A. Jacoby, D. Salm, and D. C. Hooper. 2006. Prevalence in the United States of aac(6')-lb-cr encoding a ciprofloxacin-modifying enzyme. Antimicrob. Agents Chemother. 50:3953-3955.
				aac(6') lb Fw 2	Primer 1758	5'-CTCGAATGCCTGGCGTGTTC-3'		
qepA		QEPfor	Primer 1991	5'-TGGTCTACGCCATGGACCTCA- 3'	53	Périchon B, Courvalin P, Galimand M. Transferable resistance to aminoglycosides by methylation of G1405 in 16S rRNA and to hydrophilic fluoroquinolones by QepA-mediated efflux in Escherichia coli. Antimicrob Agents Chemother 2007; 51: 2464-9		
		QEPprev	Primer 1992	5' -TGAATTCGGACACCGTCTCCG-3'				
Streptomycin	strA		Strep-res, strA, plasm-ref1010,787-769, primer-2	Primer 67	5'-CCA ATC GCA GAT AGA AGG C-3'	55	Scholz, P., V. Haring, B. Wittmann-Liebold, K. Ashmann, M. Bagdasarian, and E. Scherzinger. 1989. Complete nucleotide sequence and gene organization of the broad- host-range plasmid RSF1010. Gene 75:271-288.	
			Strep-res, strA, plasm-ref1010,240-259, primer-1	Primer 68	5'-CTT GGT GAT AAC GGC AAT TC-3'			
	strB		Strep-res, strB, plasm-ref1010, 623-604, primer-2	Primer 65	5'-GGA TCG TAG AAC ATA TTG GC-3'	56	Scholz, P., V. Haring, B. Wittmann-Liebold, K. Ashmann, M. Bagdasarian, and E. Scherzinger. 1989. Complete nucleotide sequence and gene organization of the broad- host-range plasmid RSF1010. Gene 75:271-288.	
			Strep-res, strB, plasm-ref1010, 115-134, primer-1	Primer 66	5'-ATC GTC AAG GGA TTG AAA CC-3'			
	aadA2		aadA forward	Primer 521	5'-ATT TGC TGG TTA CGG TGA CC-3'	56	Maral Rahmani, Seyyed Mostafa Peighambari, Christina Aaby Svendsen, Lina M Cavaco, Yvonne Agersø and Rene S Hendriksen Molecular clonality and antimicrobial resistance in Salmonella enterica serovars Enteritidis and Infantis from broilers in three Northern regions of Iran BMC Veterinary Research 2013, 9:66 doi:10.1186/1746-6148-9-66	
			aadA backward	Primer 522	5'-CTT CAA GTA TGA CGG GCT GA-3'			
	aadE		aadE p4	Primer 428	5'-TCA AAA CCC CTA TTA AAG CC-3'	60	Ouoba L., Lei V., Jensen L.B. (2008) Resistance of potential probiotic lactic acid bacteria and bifidobacteria of African and European origin to antimicrobials: determination and transferability of the resistance genes to other bacteria. Int J Food Microbiol 121: 217-224	
			aadE p3	Primer 429	5'ATCCTTCGGCGCATTTTG-3'			

Antimicrobial	Group	Gene/Codon no.	Primer name	Internal number	Sequence	Temperature (°C)	Reference														
Sulfamethoxazole	-	sul1	Sul 1 forward	Primer 519	5'-TGA GAT CAG ACG TAT TGC GC-3'	58	Maral Rahmani1, Seyed Mostafa Peighambari1, Christina Aaby Svendsen, Lina M Cavaco, Yvonne Agersø and Rene S Hendriksen Molecular clonality and antimicrobial resistance in <i>Salmonella enterica</i> serovars Enteritidis and Infantis from broilers in three Northern regions of IranBMC Veterinary Research 2013, 9:66 doi:10.1186/1746-6148-9-66														
			Sul 1 backward	Primer 520	5'-TTG AAG GTT CGA CAG CAC GT-3'																
		sul2	Sul 2-f	Primer 591	5'-GCG CTC AAG GCA GAT GGC ATT-3'	70		Antimicrobial susceptibility and occurrence of resistance genes among <i>Salmonella enterica</i> serovar Weltevreden from different countries Frank M. Aarestrup, Monton Lertworapreecha, Mary C. Evans, Aron Bangtrakulonth, Thongchai Chalermchaikit, Rene Sjøgren Hendriksen1 and Henrik Caspar Wegener. Journal of Antimicrobial Chemotherapy Volume52, Issue4 Pp. 715-718													
			Sul 2-b	Primer 592	5'-GCG TTT GAT ACC GGC ACC CGT-3'																
		sul3	sul3(F)	Primer 1356	5'-GAGCAAGATTTTGGAAATCG-3'	53			Perreten, V. & Boerlin, P. (2003). A new sulphonamide resistance gene (sul3) in <i>Escherichia coli</i> is widespread in the pig population of Switzerland. Antimicrobial Agents and Chemotherapy 47, 1169-72.												
			sul3(B)	Primer 1357	5'-CATCTGCAGCTAACCTAGGGCTTGGGA-3'																
Tetracycline	-	tetA	TetA primer1	Primer 173	5'-GTAATCTGAGCACTGTCCG-3'	57	Waters, S. H. P., P. Rogowsky, and J. Grinstead. 1983. The tetracycline resistance determinants of RP1 and TnJ721: nucleotide sequence analysis. Nucleic Acids Res. 11:6089-6105.														
			TetA primer2	Primer 175	5'-CTGCTGGGACAACATTGCTT-3'																
		tetB	TetB-Tn10-, 39->58	Primer 90	5'-CTC AGT ATT CCA AGC CTT TG-3'	52		Sengeløv, G., Y. Agersø, B. Halling-Sørensen, and Baloda. 2003. Bacterial antibiotic resistance levels in Danish farmland as a result of treatment with pig manure slurry. Environ. Int. 28:587-595													
			TetB-Tn10-, 454->434	Primer 91	5'-ACT CCC CTG AGC TTG AGG GG-3'																
		tetC	TetC,595->576	Primer 92	5'-GGT TGA AGG CTC TCA AGG GC-3'	62			Sengeløv, G., Y. Agersø, B. Halling-Sørensen, and Baloda. 2003. Bacterial antibiotic resistance levels in Danish farmland as a result of treatment with pig manure slurry. Environ. Int. 28:587-595												
			TetC,90->110	Primer 93	5'-CCT CTT GCG GGA TAT CGT CC-3'																
		tetD	Tet D2 (894-874)	Primer 575	5'-CAT CCA TCC GGA AGT GAT AGC-3'	57				Miranda, C. D., C. Kehrenberg, C. Ulep, S. Schwarz, and M. C. Roberts. 2003. Diversity of tetracycline resistance genes in bacteria from Chilean salmon farms. Antimicrob. Agents Chemother. 47:883-888											
			Tet D1 (459-478)	Primer 576	5'-GGA TAT CTC ACC GCA TCT GC-3'																
		tetE	<tet(E)2-1 sekvens	Primer 1318	5'-TGATGATGGCACTGGTCA-3'	57					Agersø, Y & Sandvang, D. Class 1 Integrons and Tetracycline Resistance Genes in Alcaligenes, Arthrobacter, and Pseudomonas spp. Isolated from Pigssties and Manured Soil. Applied and Environmental Microbiology, December 2005, p. 7941-7947, Vol. 71, No. 12										
			<tet(E)2-2 sekvens	Primer 1319	5'-GCTGGCTGTTGCCATTA-3'																
		tetG	TetA(G)-1	Primer 229	5'-GCAGCGAAAGCGTATTTGCG-3'	62						Agersø, Y & Sandvang, D. Class 1 Integrons and Tetracycline Resistance Genes in Alcaligenes, Arthrobacter, and Pseudomonas spp. Isolated from Pigssties and Manured Soil. Applied and Environmental Microbiology, December 2005, p. 7941-7947, Vol. 71, No. 12									
			TetA(G)-2	Primer 230	5'-TCGAAAGCTGCCAAGCAT-3'																
		Tet (H)	tet(H)-1	Primer 1082	5'-ATACTGCTGATACCGTATAGATG-3'	50							Yvonne Agersø and Andreas Petersen. The tetracycline resistance determinant Tet 39 and the sulphonamide resistance gene sulIII are common among resistant Acinetobacter spp. isolated from integrated fish farms in Thailand resistance gene sulIII are common among resistant Acinetobacter spp. Journal of Antimicrobial Chemotherapy (2007) 59, 23-27								
			tet(H)-2	Primer 1083	5'-TCCCAATAAGCGACGC-3'																
		tet(K)	TetK-1	Primer 218	5'-TTAGGTGAAGGGTTAGGTCC-3'	55								Miranda CD, Kehrenberg C, Ulep C et al. Diversity of tetracycline resistance genes in bacteria from Chilean salmon farms. Antimicrob Agents Chemother 2003; 47: 883-8							
			TetK-2	Primer 219	5'-GCAAACCTCATCCAGAAGCA-3'																
		tet(L)	TetL2-2 pos920	Primer 259	5'-ATTACACTCCGATTCCGG-3'	54									Agersø, Y et al. The Identification of a tetracycline resistance gene tet(M), on a Tn916-like transposon, in the Bacillus cereus group. FEMS Microbiology Letters 214 (2002) 251-256						
			TetL2-1 pos432	Primer 260	5'-CATTGGTCTTATTGGTACG-3'																
		tet(M)	TetM-1 pos.966-985	Primer 266	5'-GTAAATAGTGTCTTGGAG-3'	45										Agersø, Y et al. The Identification of a tetracycline resistance gene tet(M), on a Tn916-like transposon, in the Bacillus cereus group. FEMS Microbiology Letters 214 (2002) 251-256					
			TetM-2 pos.1622-1603	Primer 267	5'-CTAAGATATGGCTCTAACAA-3'																
		tet(O)	TetO-1	Primer 232	5'-GATGGCATAACAGGCACAGAC-3'	55											Agersø, Y et al. The Identification of a tetracycline resistance gene tet(M), on a Tn916-like transposon, in the Bacillus cereus group. FEMS Microbiology Letters 214 (2002) 251-256				
			TETO-2	Primer 773	5'-CAA TAT CAC CAG AGC AGG CT-3'																
		tet(S)	TetS-1	Primer 216	5'-TGGAACGCAGAGAGGTATT-3'	55												Agersø, Y et al. The Identification of a tetracycline resistance gene tet(M), on a Tn916-like transposon, in the Bacillus cereus group. FEMS Microbiology Letters 214 (2002) 251-256			
			TetS-2	Primer 217	5'-ACATAGACAAGCCGTTGACC-3'																
		Tet (T)	tetT-2 (1624-1606)	Primer 497	5'-CGA GAA ATG GGT CTT CTT-3'	50													Agersø, Y et al. The Identification of a tetracycline resistance gene tet(M), on a Tn916-like transposon, in the Bacillus cereus group. FEMS Microbiology Letters 214 (2002) 251-256		
			tetT-1 (641-658)	Primer 499	5'-CTA TAC GGG CGT CTA CAG-3'																
		Tet (W)	tetW-2 (1180-1161)	Primer 496	5'-TGG TCC CCT AAT ACA TCG TT-3'	55														de Vries LE, Valle's Y, Agersø Y, Vaishampayan PA, Gareí'a-Montaner A, et al. (2011) The Gut as Reservoir of Antibiotic Resistance: Microbial Diversity of Tetracycline Resistance in Mother and Infant. PLoS ONE 6(6): e21644. doi:10.1371/journal.pone.0021644	
			tetW-1	Primer 500	5'-GCC ATC TTG GTG ATC TCC-3'																
		Tet (Z)		Primer 1387		63															Yvonne Agersø and Dorte Sandvang. Class 1 Integrons and Tetracycline Resistance Genes in Alcaligenes, Arthrobacter, and Pseudomonas spp. Isolated from Pigssties and Manured Soil, Appl. Environ. 10.1128/AEM.71.12.7941-7947.2005. Microbiol. 2005, 71(12):7941.
			<tet(Z)-1		5'-cccactgcactcggactac-3'																
			<tet(Z)-2	Primer 1388	5'-gagggccaagccgatga-3'																

Antimicrobial	Group	Gene/Codon no.	Primer name	Internal number	Sequence	Temperature (°C)	Reference	
Tetracycline		Tet (31)	Tet31-1	Primer 975	5'-GCTCTATCTAGGGAGAATGA-3'	48	Yvonne Agersø and Dorthe Sandvang, Class 1 Integrons and Tetracycline Resistance Genes in Alcaligenes, Arthrobacter, and Pseudomonas spp. Isolated from Pigsties and Manured Soil, Appl. Environ. 10.1128/AEM.71.12.7941-7947.2005. Microbiol. 2005, 71(12):7941. DOI:	
			Tet31-2	Primer 976	5'-GCTAACCATGATACCTTGTGA-3'			
		tet(32)	tet32(2)array_rev	Primer 2267	5'-CTCTTTCATAGCCACGCC-3'	59		Andrea J. Patterson et al, Mosaic Tetracycline Resistance Genes Are Widespread in Human and Animal Fecal Samples, ANTIMICROBIAL AGENTS AND CHEMOTHERAPY, Mar. 2007, p. 1115-1118 Vol. 51, No. 3 0066-4804/07/S08.00 0 doi:10.1128/AAC.00725-06 Karen P. Scott et al, Transfer of Conjugative Elements from Rumen and Human Firmicutes, APPLIED AND ENVIRONMENTAL MICROBIOLOGY, June 2008, p. 3915-3917 Vol. 74, No. 12 0099-2240/08/S08.00 0 doi:10.1128/AEM.02807-07 Bacteria to Roseburia inulinivorans
			tet32(2)array_for	Primer 2268	5'-AACCGAAGCATAACCGCTC-3'			
		tet(33)	<tet(33)-1	Primer 1385	5'-atcggttcctcgtaa-3'	58		
			<tet(33)-2	Primer 1386	5'-gnaaatcgctcagtgacaa-3'			
		Tet (34)	Tet34-1	Primer 977	5'-ATACGGGGATGCAAACTTCA-3'	51		
			Tet34-2	Primer 978	5'-ACGAGTGAGCTCTGATGTCTCTT-3'			
		tet(39)	tet(ny)-1	Primer 1397	5'-CTCCTCTCTATTGGTGA-3'	55		
			tet(ny)-2	Primer 1398	5'-CACTAATACCTCTGGACATCA-3'			
Glycopeptides	VanA	VanA2	Primer 7	5'-AAC AAC TTA CGC GGC ACT-3'	55	5'-AACAACTAACGCGGCACT-3' 5'-AATGTGCGAAAAACCTTGC-3' FRANK MØLLER AARESTRUP, Glycopeptide Susceptibility among Danish Enterococcus faecium and Enterococcus faecalis Isolates of Animal and Human Origin and PCR Identification of Genes within the VanA Cluster, ANTIMICROBIAL AGENTS AND CHEMOTHERAPY, Aug.1996, p. 1938-1940 Vol. 40, No. 8 0066-4804/96/S04.0010		
		VanA1	Primer 8	5'-AAA GTG CGA AAA ACC TTG C-3'				
		VanB	Primer 106	5'-GAT ATT CAA AGC TCC GCA GC-3'				
	VanB	VanB-1	Primer 106	5'-GAT ATT CAA AGC TCC GCA GC-3'	55		Unknown	
		VanB-2	Primer 107	5'-GGT ATC TTC CGC ATC CAT CA-3'				
	Van X	VanX1	Primer 16	5'-TGC GAT TTT GCG CTT CAT TG-3'	55			
		VanX2	Primer 17	5'-ACT TGG GAT AAT TTC ACC GG-3'				
		VanX2	Primer 17	5'-ACT TGG GAT AAT TTC ACC GG-3'				
Macrolides	ErmA	Tn554-1(ermA)	Primer 41	5'-AAG CGG TAA AAC CCC TCT GAG-3'	55	AAG CGG TAA ACC CC_ TCT GAG Lars Bogoe Jensen, Niels Frimodt-Moeller, Frank M. Aarestrup, Presence of erm gene classes in Gram-positive bacteria of animal and human origin in Denmark, FEMS Microbiology Letters 170 (1999) 151-158		
		Tn554-2 (ermA)	Primer 42	5'-TCA AAG CCT GTC GGA ATT GG-3'				
	ErmB	ermU-2(RECOGNIZES ermB)	Primer 26	5'-GGA ACA TCT GTG GTA TGG CG-3'	52			
		ermU-1(RECOGNIZES ermB)	Primer 27	5'-CAT TTA ACG ACG AAA CTG GC-3'				
	ErmC	ermC-2	Primer 28	5'-CAA ACC CGT AIT CCA CGA TT-3'	48			
		ermC-1	Primer 29	5'-ATC TTT GAA ATC GGC TCA GG-3'				
	ErmE	ErmE-F	Primer 366	5'-GAACATCGAAGTCGTCAACG-3'	52		Unknown	
		ErmE-B	Primer 367	5'-GTTCTTCTGATCCAGCCGCT-3'				
	ErmF	ermF-1	Primer 119	5'-TGT TCA AGT TGT CGGTTG TG-3'	52			
		ermF-2	Primer 120	5'-CAG GAC CTA CCT CAT AGA CA-3'				

Antimicrobial	Group	Gene/Codon no.	Primer name	Internal number	Sequence	Temperature (°C)	Reference			
Streptogramins		vat	VAT-1	Primer 48	5'-TGG AGT GTG ACA AGA TAG GC-3'	55	Anette Marie Hammerum, Lars Bogoe Jensen and Frank Moeller Aarestrup, Detection of the satA gene and transferability of virginiamycin resistance in Enterococcus faecium from food-animals, FEMS Microbiology Letters 168 (1998) 145-151			
			VAT-2	Primer 50	5'-GTG ACA ACA GCT TCT GCA GC-3'					
		vatB	VATB-1	Primer 142	5'-GGCCCTGATCCAAATAGCAT-3'	60		Anette Marie Hammerum, Lars Bogoe Jensen and Frank Moeller Aarestrup, Detection of the satA gene and transferability of virginiamycin resistance in Enterococcus faecium from food-animals, FEMS Microbiology Letters 168 (1998) 145-151		
			VATB-2	Primer 143	5'-GTGCTGACCAATCCACCAT-3'					
		vatD	Sat A-1 virg.primr pos 200-219	Primer 51	5'-GCT CAA TAG GAC CAG GTG TA-3'	55		Anette Marie Hammerum, Lars Bogoe Jensen and Frank Moeller Aarestrup, Detection of the satA gene and transferability of virginiamycin resistance in Enterococcus faecium from food-animals, FEMS Microbiology Letters 168 (1998) 145-151		
			Sat A-2-B pos 471-452	Primer 57	5'-TCC AGC TAA CAT GTA TGG CG-3'					
		vatE	SatG1	Primer 280	5'-ACTATACCTGACGCAATGC-3'	52		Kenneth M. BischoV, Kelly A. Skinner-Nemec, Timothy D. Leathers, Antimicrobial susceptibility of Lactobacillus species isolated from commercial ethanol plants, J Ind Microbiol Biotechnol (2007) 34:739-744		
			SatG2B	Primer 282	5'-GGTCAAATCTTGGTCCG-3'					
		vgaA	VGA-1	Primer 47	5'-AGT GGT GGT GAA GTA ACA CG-3'	52		Anette Marie Hammerum, Lars Bogoe Jensen and Frank Moeller Aarestrup, Detection of the satA gene and transferability of virginiamycin resistance in Enterococcus faecium from food-animals, FEMS Microbiology Letters 168 (1998) 145-151		
			VGA-2	Primer 49	5'-CTT GTC TCC TCC GCG AAT AC-3'					
		vgaB	VGAB-2	Primer 154	5'-GCGACCATGAAAATTGCTCTC-3'	52		Anette Marie Hammerum, Lars Bogoe Jensen and Frank Moeller Aarestrup, Detection of the satA gene and transferability of virginiamycin resistance in Enterococcus faecium from food-animals, FEMS Microbiology Letters 168 (1998) 145-151		
			VGAB-1	Primer 155	5'-TGACAATATGAGTGGTGGTG-3'					
		vgbA	VGB-1	Primer 137	5'-TACAGAGTACCCACTACCGA-3'	55		Anette Marie Hammerum, Lars Bogoe Jensen and Frank Moeller Aarestrup, Detection of the satA gene and transferability of virginiamycin resistance in Enterococcus faecium from food-animals, FEMS Microbiology Letters 168 (1998) 145-151		
			VGB-2	Primer 138	5'-TCAATTCCTGCTCCAGCAGT-3'					
		vgbB	Vgbb-Q	Primer 227	5'-CAGCAGTCTAGATCAGAGTGG-3'	55		Allignet, J., N. Liassine, and N. El Solh. 1998. Characterization of a staphylococcal plasmid related to pUB110 and carrying two novel genes, vatC and vgbB, encoding resistance to streptogramins A and B and similar antibiotics. Antimicrob. Agents Chemother. 42:1794-1798		
			VgBB-R	Primer 228	5'-CATACGGATCCATCTTTTCC-3'					
		MRSA		SPA		Primer 2819		5'-TAAAGACGATCCTTCGGTGAGC-3'	59	Rapid detection, differentiation and typing of methicillin-resistant Staphylococcus aureus harbouring either mecA or the new mecA homologue mecA(LGA251) Clin Microbiol Infect. 2012 Apr;18(4):395-400. doi: 10.1111/j.1469-0691.2011.03715.x http://www.ncbi.nlm.nih.gov/pubmed/22429460
						Primer 2820		5'-CAGCAGTAGTGCCGTTTGCTT-3'		
mecA				Primer 2821	5'-TCCAGATTACAACCTCACCAGG-3'	59				
				Primer 2822	5'-CCACTTCATATCTTGTAAACG-3'					
mecC				Primer 2825	5'-GAAAAAAGGCTTAGAACGCTC-3'	59				
				Primer 2826	5'-GAAAGATCTTTCCGTTTCAGC-3'					
PVL				Primer 2823	5'-GCTGGACAAAACCTTGTGGAATAT -3'	59				
				Primer 2824	5'-GATAGGACACCAATAAATCTGGATTG-3'					

*DTU Food: Technical University of Denmark, National Food Institute (EU Reference Laboratory for Antimicrobial Resistance)