

Figure S1|Schematic maps of IncHI5 plasmids carried by *Klebsiella michiganensis*.

Figure S2|Linear comparison of IncHI5 plasmids.

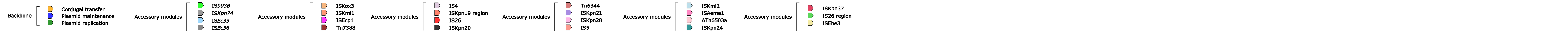
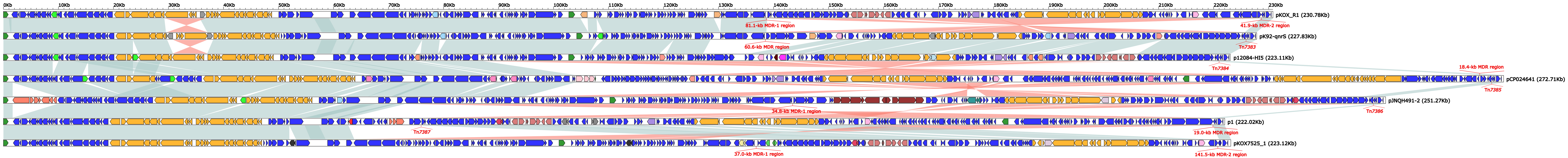


Table S1|Background of *Klebsiella michiganensis* isolates

Accession number	Organism	Assembly name	Assembly accession	Source	Origin	IncHI5 plasmid carried	Assembly level	Length of chromosome (bp)	Submission date
CP089315	<i>Klebsiella michiganensis</i>	-	-	New sequencing	Taizhou, Zhejiang China	pK92-qnrS	Complete Genome	6108919	2021/12/19
CP003683	<i>Klebsiella michiganensis</i>	ASM27670v2	GCA_000276705.2	NCBI-Gen Bank	Miaoli, Taiwan China	pKOX_R1	Complete Genome	6561678	2012/7/10
CP072119	<i>Klebsiella michiganensis</i>	ASM1763989v1	GCA_017639895.1	NCBI-Gen Bank	Zhejiang, China	p12084-HI5	Complete Genome	6248475	2021/3/30
CP024643	<i>Klebsiella michiganensis</i>	ASM993085v1	GCA_009930855.1	NCBI-Gen Bank	Fuzhou, Fujian China	pCP024641	Complete Genome	6152545	2020/1/27
CP075881	<i>Klebsiella michiganensis</i>	ASM1860410v1	GCA_018604105.1	NCBI-Gen Bank	Xiamen, Fujian China	pJNQH491-2	Complete Genome	6552775	2021/6/1
CP067093	<i>Klebsiella michiganensis</i>	ASM1661664v1	GCA_016616645.1	NCBI-Gen Bank	Guangzhou, Guangdong China	p1	Complete Genome	6466118	2021/1/12
CP065474	<i>Klebsiella michiganensis</i>	ASM1599938v1	GCA_015999385.1	NCBI-Gen Bank	Hangzhou, Zhejiang China	pKOX7525_1	Complete Genome	6244801	2020/12/13
AP022547	<i>Klebsiella michiganensis</i>	ASM1513957v1	GCA_015139575.1	NCBI-Gen Bank	Tokyo, Japan	-	Complete Genome	6041841	2020/10/8
CP003218	<i>Klebsiella michiganensis</i>	ASM24032v1	GCA_000240325.1	NCBI-Gen Bank	Daejun, South Korea	-	Complete Genome	5974109	2011/12/29
CP004887	<i>Klebsiella michiganensis</i>	ASM63241v1	GCA_000632415.1	NCBI-Gen Bank	HongKong, China	-	Complete Genome	5914407	2014/4/15
CP008841	<i>Klebsiella michiganensis</i>	ASM72452v1	GCA_000724525.1	NCBI-Gen Bank	Manripo area, South Korea	-	Complete Genome	6311385	2014/7/9
CP022348	<i>Klebsiella michiganensis</i>	ASM221683v1	GCA_002216835.1	NCBI-Gen Bank	Zhejiang, China	-	Complete Genome	6418740	2017/7/12
CP023185	<i>Klebsiella michiganensis</i>	ASM229028v1	GCA_002290285.1	NCBI-Gen Bank	Zhejiang, China	-	Complete Genome	6418567	2017/9/12

CP029141	<i>Klebsiella michiganensis</i>	ASM3074 07v1	GCA_003074 075.1	NCBI-Gen Bank	USA	-	Complete Genome	6525490	2018/4/30
CP035214	<i>Klebsiella michiganensis</i>	ASM4102 62v1	GCA_004102 625.1	NCBI-Gen Bank	Queensland, Australia	-	Complete Genome	6604517	2019/1/22
CP041515	<i>Klebsiella michiganensis</i>	ASM7106 88v1	GCA_007106 885.1	NCBI-Gen Bank	South Korea	-	Complete Genome	6270897	2019/7/18
CP044109	<i>Klebsiella michiganensis</i>	ASM8693 56v1	GCA_008693 565.1	NCBI-Gen Bank	Washington D.C., USA	-	Complete Genome	6656590	2019/9/25
CP042545	<i>Klebsiella michiganensis</i>	ASM8931 60v1	GCA_008931 605.1	NCBI-Gen Bank	Sydney, Australia	-	Complete Genome	6312326	2019/10/9
CP048108	<i>Klebsiella michiganensis</i>	ASM1009 300v1	GCA_010093 005.1	NCBI-Gen Bank	Wuhan, Hubei China	-	Complete Genome	6812698	2020/2/3
CP055325	<i>Klebsiella michiganensis</i>	ASM1361 065v1	GCA_013610 655.1	NCBI-Gen Bank	UK	-	Complete Genome	6603523	2020/7/24
CP058118	<i>Klebsiella michiganensis</i>	ASM1362 437v1	GCA_013624 375.1	NCBI-Gen Bank	UK	-	Complete Genome	6544295	2020/7/24
CP058212	<i>Klebsiella michiganensis</i>	ASM1363 641v1	GCA_013636 415.1	NCBI-Gen Bank	UK	-	Complete Genome	6236062	2020/7/24
CP056136	<i>Klebsiella michiganensis</i>	ASM1373 265v1	GCA_013732 655.1	NCBI-Gen Bank	UK	-	Complete Genome	6609426	2020/7/27
CP060111	<i>Klebsiella michiganensis</i>	ASM1421 727v1	GCA_014217 275.1	NCBI-Gen Bank	Liuzhou, Guangxi China	-	Complete Genome	6149586	2020/8/17
CP061930	<i>Klebsiella michiganensis</i>	ASM1661 821v1	GCA_016618 215.1	NCBI-Gen Bank	3097 Liebefeld, Switzerland	-	Complete Genome	6865058	2021/1/12
CP071393	<i>Klebsiella michiganensis</i>	ASM1734 885v1	GCA_017348 855.1	NCBI-Gen Bank	Hengyang, Hunan China	-	Complete Genome	6398286	2021/3/13
CP065338	<i>Klebsiella michiganensis</i>	ASM1779 828v1	GCA_017798 285.1	NCBI-Gen Bank	Shanxi, China	-	Complete Genome	5791694	2021/4/6
CP051427	<i>Klebsiella michiganensis</i>	ASM1781 577v1	GCA_017815 775.1	NCBI-Gen Bank	Jilin, China	-	Complete Genome	5845628	2021/4/7

CP073236	<i>Klebsiella michiganensis</i>	ASM1813 904v1	GCA_018139 045.1	NCBI-Gen Bank	Hunan, China	-	Complete Genome	5910952	2021/4/25
CP073305	<i>Klebsiella michiganensis</i>	ASM1814 094v1	GCA_018140 945.1	NCBI-Gen Bank	Pilsen, Czech Republic	-	Complete Genome	6494581	2021/4/27
CP081351	<i>Klebsiella michiganensis</i>	ASM1980 306v1	GCA_019803 065.1	NCBI-Gen Bank	Quebec City, Canada	-	Complete Genome	6128315	2021/8/30
CP085764	<i>Klebsiella michiganensis</i>	ASM2069 562v1	GCA_020695 625.1	NCBI-Gen Bank	Prague, Czech Republic	-	Complete Genome	6455282	2021/11/1
CP011077	<i>Klebsiella michiganensis</i>	ASM9635 7v1	GCA_000963 575.1	NCBI-Gen Bank	Zhejiang, China	-	Complete Genome	5107633	2015/3/26

Table S2|Pairwise comparison of the seven IncHI5 plasmids backbone sequences using BLASTN

(coverage+identity)	pK92-qnrS	pKOX_R1	p12084-HI5	pCP024641	pJNQH491-2	p1	pKOX7525_1
pK92-qnrS		(100%+99.40%)	(91%+99.92%)	(85%+99.10%)	(95%+99.57%)	(89%+99.43%)	(91%+99.30%)
pKOX_R1	(100%+99.40%)		(90%+99.91%)	(94%+99.40%)	(95%+99.32%)	(89%+99.42%)	(91%+99.62%)
p12084-HI5	(96%+99.92%)	(96%+99.91%)		(93%+99.96%)	(93%+99.75%)	(93%+99.54%)	(95%+99.82%)
pCP024641	(76%+99.10%)	(76%+99.40%)	(78%+99.96%)		(73%+99.40%)	(75%+99.43%)	(73%+99.42%)
pJNQH491-2	(97%+99.57%)	(97%+99.32%)	(89%+99.75%)	(84%+99.40%)		(87%+99.91%)	(96%+99.54%)
p1	(94%+99.43%)	(94%+99.42%)	(95%+99.82%)	(88%+99.43%)	(90%+99.91%)		(90%+99.91%)
pKOX7525_1	(97%+99.30%)	(97%+99.62%)	(92%+99.54%)	(85%+99.42%)	(99%+99.54%)	(90%+99.63%)	

Table S3|Drug resistance genes in IncHI5 plasmids

Plasmid	Resistance marker	Resistance phenotype	Nucleotide position	Region located		
pKOX_R1	<i>fosA3</i>	Fosfomycin resistance	147479..147895	81.1-kb MDR-1 region		
	<i>bla_{SHV-12}</i>	Beta-lactam resistance	152565..153425			
	<i>sul2</i>	Sulphonamide resistance	157855..158670			
	<i>strA</i>	Aminoglycoside resistance	158775..159533			
	<i>strB</i>	Aminoglycoside resistance	159533..160369			
	<i>qnrS1</i>	Quinolone resistance	164610..165266			
	<i>dfrA1</i>	Trimethoprim resistance	171652..172125			
	<i>aadA5</i>	Aminoglycoside resistance	172642..173430			
	<i>qacED1</i>	Quaternary ammonium compound resistance	173598..173945			
	<i>sul1</i>	Sulphonamide resistance	173939..174778			
	<i>armA</i>	Aminoglycoside resistance	178123..178896			
	<i>msr(E)</i>	Macrolide, Lincosamide and Streptogramin B resistance	181195..182670			
	<i>mph(E)</i>	Macrolide resistance	182726..183610			
	The <i>ars</i> locus	Arsenic resistance	196047..199194			
	<i>catA2</i>	Phenicol resistance	200680..201297			
	<i>tmrB</i>	Tunicamycin resistance	211633..212175			
	<i>aacC2</i>	Aminoglycoside resistance	212188..213048			
	The <i>mer</i> locus	Mercuric resistance	215952..219928			
	The <i>ter</i> locus	Tellurium resistance	220965..233902	Plasmid backbone		
	pK92-qnrS	<i>mph(E)</i>	Macrolide resistance	323372..324256	41.9-kb MDR-2 region	
<i>msr(E)</i>		Macrolide, Lincosamide and Streptogramin B resistance	324312..325787			
<i>armA</i>		Aminoglycoside resistance	328086..328859			
<i>sul1</i>		Sulphonamide resistance	332204..333043			
<i>qacED1</i>		Quaternary ammonium compound resistance	333037..333384			
<i>aadA2</i>		Aminoglycoside resistance	333548..334339			
<i>dfrA12</i>		Trimethoprim resistance	334747..335244			
<i>bla_{CTX-M-3}</i>		Beta-lactam resistance	337375..338250			
<i>bla_{TEM-1B}</i>		Beta-lactam resistance	339032..339891			
<i>arr3</i>		Rifampicin resistance	344106..344558			
<i>aacA4cr</i>		Fluoroquinolone and aminoglycoside resistance	344655..345254			
pK92-qnrS		<i>sul2</i>	Sulphonamide resistance	149109..149924		60.6-kb MDR region
		<i>strA</i>	Aminoglycoside resistance	149985..150788		
	<i>strB</i>	Aminoglycoside resistance	150788..151624			
	<i>qnrS1</i>	Quinolone resistance	155865..156521			
	<i>aacA4cr</i>	Fluoroquinolone and aminoglycoside resistance	303406..304005			
	<i>arr3</i>	Rifampicin resistance	163354..163806			

	<i>dfrA12</i>	Trimethoprim resistance	172469..172966	Plasmid backbone
	<i>aadA2</i>	Aminoglycoside resistance	173386..174165	
	<i>qacED1</i>	Quaternary ammonium compound resistance	174329..174676	
	<i>sul1</i>	Sulphonamide resistance	174670..175509	
	<i>armA</i>	Aminoglycoside resistance	178854..179627	
	<i>msr(E)</i>	Macrolide, Lincosamide and Streptogramin B resistance	181926..183401	
	<i>mph(E)</i>	Macrolide resistance	183457..184341	
	The <i>ter</i> locus	Tellurium resistance	272549..285487	
	The <i>mer</i> locus	Mercuric resistance	286524..290500	Tn7383
	<i>aacC2</i>	Aminoglycoside resistance	294742 295602	
	<i>tmrB</i>	Tunicamycin resistance	295615 296157	
	<i>arr3</i>	Rifampicin resistance	302857 303309	
	<i>aacA4cr</i>	Fluoroquinolone and aminoglycoside resistance	303406 304005	
p12084-HI5	The <i>ter</i> locus	Tellurium resistance	207068..220006	Plasmid backbone
	The <i>mer</i> locus	Mercuric resistance	221043.. 225019	Tn7384
	<i>fosA3</i>	Fosfomycin resistance	227235..227651	
	<i>mph(E)</i>	Macrolide resistance	251162..252046	
	<i>msr(E)</i>	Macrolide, Lincosamide and Streptogramin B resistance	252102..253577	
	<i>armA</i>	Aminoglycoside resistance	255876..256623	
	<i>sul1</i>	Sulphonamide resistance	261084..261923	
	<i>qacED1</i>	Quaternary ammonium compound resistance	261917..262264	
	<i>aadA17</i>	Aminoglycoside resistance	262428..263219	
	<i>catB3</i>	Phenicol resistance	263277..263909	
	<i>arr3</i>	Rifampicin resistance	264058..264510	
	<i>bla_{SIM-1}</i>	Beta-lactam resistance	264662..265402	
pCP024641	<i>bla_{CTX-M-14}</i>	Beta-lactam resistance	105614..106489	Δ Tn6503a
	<i>sul2</i>	Sulphonamide resistance	268523..269338	18.4-kb MDR region
	<i>strA</i>	Aminoglycoside resistance	269399..270202	
	<i>strB</i>	Aminoglycoside resistance	270208..271038	
	<i>bla_{TEM-1}</i>	Beta-lactam resistance	271453..272313	
	<i>tmrB</i>	Tunicamycin resistance	276730..277272	
	<i>aacC2</i>	Aminoglycoside resistance	277285..278145	
	<i>terW</i>	Tellurium resistance	287488..287961	Plasmid backbone
	The <i>mer</i> locus	Mercuric resistance	288998..292974	Tn7385
	<i>sul1</i>	Sulphonamide resistance	295710..296549	
	<i>qacED1</i>	Quaternary ammonium compound resistance	296543..296890	
	<i>arr3</i>	Rifampicin resistance	297113..297565	
	<i>catB3</i>	Phenicol resistance	297650..298282	
	<i>bla_{OXA-1}</i>	Beta-lactam resistance	298420..299295	

	<i>aacA4cr</i>	Fluoroquinolone and aminoglycoside resistance	299381..299980	
pJNQH491-2	<i>qacED1</i>	Quaternary ammonium compound resistance	153648..153995	34.8-kb MDR-1 region
	<i>sulI</i>	Sulphonamide resistance	153989..154828	
	<i>chrA</i>	Chromate resistance	156642..157847	
	<i>mph(A)</i>	Macrolide resistance	161466..162371	
	<i>aacC2</i>	Aminoglycoside resistance	163430..164290	
	<i>tmrB</i>	Tunicamycin resistance	164303..164845	
	<i>bla_{TEM-1}</i>	Beta-lactam resistance	169262..170122	
	The <i>mer</i> locus	Mercuric resistance	171731..175693	Plasmid backbone
	The <i>ter</i> locus	Tellurium resistance	268768..282962	
	<i>qnrS1</i>	Quinolone resistance	287106..287762	21.3-kb MDR-2 region
	<i>ble_{MBL}</i>	Bleomycin resistance	293627..293992	
	<i>bla_{NDM-1}</i>	Beta-lactam resistance	293996..294808	
	<i>sulI</i>	Sulphonamide resistance	297263..298102	
	<i>qacED1</i>	Quaternary ammonium compound resistance	298096..298443	
<i>dfrB4</i>	Trimethoprim resistance	298656..298892		
p1	<i>qacED1</i>	Quaternary ammonium compound resistance	85621..85968	43.1-kb <i>mph(E)-msr(E)-tetA(D)</i> region
	<i>sulI</i>	Sulphonamide resistance	85962..86801	
	<i>msr(E)</i>	Macrolide, Lincosamide and Streptogramin B resistance	89099..90574	
	<i>mph(E)</i>	Macrolide resistance	90630..91514	
	<i>tetA(D)</i>	Tetracycline resistance	114171..115355	
	The <i>ter</i> locus	Tellurium resistance	120113..134307	Plasmid backbone
	<i>fosA3</i>	Fosfomycin resistance	265596..266012	19.0-kb MDR region
	<i>mph(A)</i>	Macrolide resistance	267224..268129	
	<i>sulI</i>	Sulphonamide resistance	272340..273179	
	<i>qacED1</i>	Quaternary ammonium compound resistance	273173..273520	
	<i>aadA16</i>	Fluoroquinolone and aminoglycoside resistance	273637..274482	
	<i>dfrA27</i>	Trimethoprim resistance	274663..275136	
	<i>arr3</i>	Rifampicin resistance	275269..275895	
pKOX7525_1	<i>strA</i>	Aminoglycoside resistance	141009..141799	37.0-kb MDR-1 region
	<i>strB</i>	Aminoglycoside resistance	141799..142635	
	<i>chrA</i>	Chromate resistance	165322..166527	
	<i>mph(A)</i>	Macrolide resistance	170146..171051	
	<i>msrA</i>	Erythromycin and streptogramin B resistance	150603..151142	
	<i>msrB</i>	Erythromycin and streptogramin B resistance	151144..151587	
	The <i>ter</i> locus	Tellurium resistance	178713..192907	Plasmid backbone

	The <i>ars</i> locus	Arsenic resistance	258036..269626	141.5-kb MDR-2 region
	<i>sulI</i>	Sulphonamide resistance	285807..286646 293204..294043	
	<i>qacED1</i>	Quaternary ammonium	286640..286987 294037..294384	
	<i>aadA1</i>	Aminoglycoside resistance	287111..287926	
	<i>bla_{OXA-16}</i>	Beta-lactam resistance	287919..288686	
	<i>bla_{NDM-1}</i>	Beta-lactam resistance	288836..289648	
	<i>ble_{MBL}</i>	Bleomycin resistance	289652..290017	
	<i>aadA16</i>	Aminoglycoside resistance	294501..295346	
	<i>dfrA27</i>	Trimethoprim resistance	295527..296000	
	<i>arr3</i>	Rifampicin resistance	296133..296585	
	<i>aacA4cr</i>	Fluoroquinolone and aminoglycoside resistance	296682..297281	
	<i>qnrS1</i>	Quinolone resistance	356331..356987	
	<i>bla_{SFO-1}</i>	Beta-lactam resistance	364393..365280	
	The <i>mer</i> locus	Mercuric resistance	374933..378586	
	<i>aacA4</i>	Aminoglycoside resistance	384997..385515	
	<i>qacG2</i>	Quaternary ammonium compound resistance	385678..386010	
	<i>bla_{IMP-4}</i>	Beta-lactam resistance	388189..388929	