Identification of a newly isolated lytic bacteriophage against K24 capsular type, carbapenem resistant *Klebsiella pneumoniae* isolates

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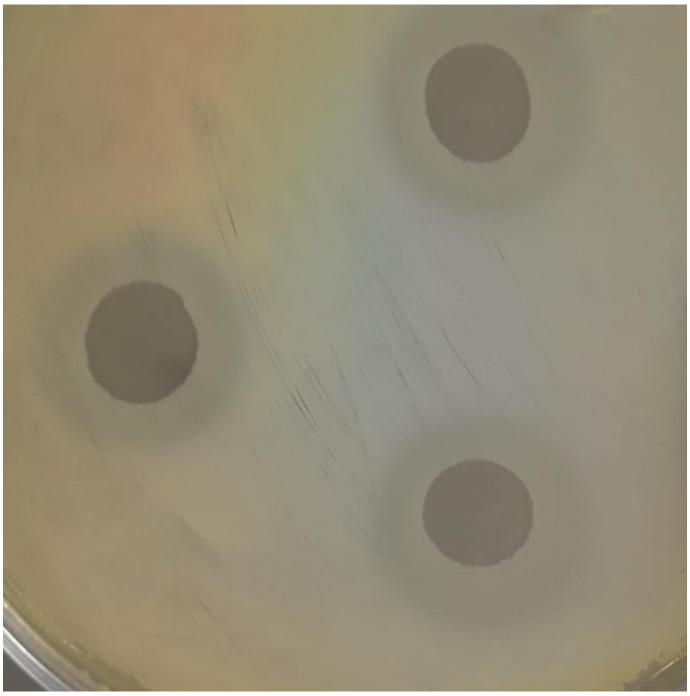
Supplementary Figure 1.



Supplementary Figure 1. Plaque morphology of phage vB_KpnS_Kp13. Clear plaques (~10 mm) surrounded by a wide halo zone (~4 mm) formed by vB_KpnS_Kp13 with *K. pneumoniae* 533 lawn on double layer agar plate.

Supplementary Table 1. Efficiency of plating (EOP) for phage vB_KpnS_Kp13 on *K. pneumoniae* isolates to the phage infection. For each isolate, the strain name, the sequence type, EOP value and EOP classification are reported. The type of phage production is ranked according to Mirzaei and Nilsson (Mirzaei & Nilsson, 2015). Each EOP value is the mean of three observations ±SD.

Strain	Sequence type	EOP value	Production
101	ST15	0.5±0.2	High
104	ST15	0.5±0.3	High
106	ST15	0.6±0.2	High
111	ST15	0.8±0.2	High
113	ST15	0.5±0.3	High
531	ST15	0.5±0.3	High
532	ST15	0.5±0.3	High
533	ST15	1±0.2	High
534	ST15	0.8±0.7	High
535	ST15	0.7±0.4	High
536	ST15	0.6±0.2	High
538	ST15	0.5±0.3	High
539	ST15	0.5±0.2	High
5310	ST15	0.4±0.2	Medium
5311	ST15	0.6±0.2	High
5313	ST15	0.5±0.3	High
501	ST15	0.5±0.2	High
502	ST15	0.7±0.2	High
503	ST15	0.6±0.3	High
I1	ST15	0.5±0.2	High
491	ST15	0.6±0.3	High
492	ST15	0.6±0.2	High
493	ST15	0.7±0.4	High
C614	-	0.6±0.3	High
C715	ST15	0.5±0.2	High
C815	ST15	0.5±0.2	High
C1015	ST15	0.4±0.3	Medium
C1115	ST15	0.6±0.2	High
C1215	ST15	0.7±0.4	High

Strain	Sequence type	EOP value	Production
C1315	ST15	0.6±0.3	High
C1415	ST15	0.5±0.2	High
C1515	ST15	0.6±0.2	High
C1615	ST15	0.6±0.4	High
C1715	ST15	0.5±0.3	High
C1815	-	0.5±0.2	Medium
C116	ST15	0.7±0.2	High
C217	-	0.6±0.4	High
C317	-	0.5±0.3	High
C517	-	0.5±0.2	High
CIP 52.229	ST59	0.6±0.2	High

Supplementary Table 2. The COMSTAT analysis of the surface plots. The thickness (µm) of the biofilms and the biovolume (μm^3) of bacteria per μm^2 of the surface were recorded.

Parameters	**Control *K. pneumoniae* 533 (µm)**			**Average (µm)**	**vB_KpnS_Kp13 treated (µm)**			**Average (µm)**
Biomass ($\mu m^3/\mu m^2$)	13.02	12.96	13.39	**13.12**	5.02	4.56	4.70	**4.76**
Average thickness (µm)	18.13	19.20	18.41	**18.58**	9.03	9.90	8.80	**9.24**
Maximum thickness (µm)	23.01	22.60	23.66	**23.09**	16.06	15.09	16.03	**15.73**

Supplementary Table 3. Characteristics of the bacterial strains used for determination of phage vB_KpnS_Kp13 bacterial host range.

Strain	Bacteria	Isolated from	Sequence type	K-serotype	Lysis	Reference/Source
NTUH-K2044	*K. pneumoniae*	blood	ST23	K1	−	NTUH-K2044
CIP 52.145	*K. pneumoniae*	-	ST66	K2	−	Institut Pasteur*
CIP 80.51	*K. pneumoniae subsp. rhinoscleromatis*	-	-	K3	−	Institut Pasteur*
ATCC 700603	*K. quasipneumoniae*	urine	ST489	K6	−	ATCC 700603
CIP 52.207	*K. pneumoniae*	-	-	K9	−	Institut Pasteur*
CIP 52.215	*K. pneumoniae*	-	-	K11	−	Institut Pasteur*
CIP 52.216	*K. pneumoniae*	-	-	K12	−	Institut Pasteur*
CIP 52.217	*K. pneumoniae*	-	-	K13	−	Institut Pasteur*
CIP 52.221	*K. pneumoniae*	-	-	K17	−	Institut Pasteur*
CIP 52.223	*K. pneumoniae*	-	-	K19	−	Institut Pasteur*
CIP 52.224	*K. pneumoniae*	-	-	K20	−	Institut Pasteur*
CIP 52.225	*K. pneumoniae*	-	-	K21	−	Institut Pasteur*
CIP 52.229	*K. pneumoniae*	-	ST59	K24	+	Institut Pasteur*
101	*K. pneumoniae*	urine	ST15	K24	+	Clinical isolate, CCH**
104	*K. pneumoniae*	urine	ST15	K24	+	Clinical isolate, CCH**
106	*K. pneumoniae*	urine	ST15	K24	+	Clinical isolate, CCH**
111	*K. pneumoniae*	urine	ST15	K24	+	Clinical isolate, CCH**
113	*K. pneumoniae*	urine	ST15	K24	+	Clinical isolate, CCH**
531	*K. pneumoniae*	faeces, urine, sputum	ST15	K24	+	Clinical isolate, CCH**
532	*K. pneumoniae*	faeces, urine	ST15	K24	+	Clinical isolate, CCH**
533	*K. pneumoniae*	urine	ST15	K24	+	Clinical isolate, CCH**
534	*K. pneumoniae*	faeces, sputum	ST15	K24	+	Clinical isolate, CCH**
535	*K. pneumoniae*	faeces, sputum, blood	ST15	K24	+	Clinical isolate, CCH*
536	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
538	*K. pneumoniae*	urine	ST15	K24	+	Clinical isolate, CCH**
539	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
5310	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**

Strain	Bacteria	Isolated from	Sequence type	K-serotype	Lysis	Reference/Source
5311	*K. pneumoniae*	faeces, urine	ST15	K24	+	Clinical isolate, CCH**
5313	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
501	*K. pneumoniae*	feces, blood	ST15	K24	+	Clinical isolate, CCH**
502	*K. pneumoniae*	sputum	ST15	K24	+	Clinical isolate, CCH**
503	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
I1	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
491	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
492	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
493	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
C614	*K. pneumoniae*	faeces	-	K24	+	Clinical isolate, CCH**
C715	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
C815	*K. pneumoniae*	faeces, urine	ST15	K24	+	Clinical isolate, CCH**
C1015	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
C1115	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
C1215	*K. pneumoniae*	urine	ST15	K24	+	Clinical isolate, CCH**
C1315	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
C1415	*K. pneumoniae*	faeces, urine	ST15	K24	+	Clinical isolate, CCH**
C1515	*K. pneumoniae*	urine	ST15	K24	+	Clinical isolate, CCH**
C1615	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
C1715	*K. pneumoniae*	faeces	ST15	K24	+	Clinical isolate, CCH**
C1815	*K. pneumoniae*	urine	-	K24	+	Clinical isolate, CCH**
C116	*K. pneumoniae*	faeces, urine	ST15	K24	+	Clinical isolate, CCH**
C217	*K. pneumoniae*	faeces, urine	-	K24	+	Clinical isolate, CCH**
C317	*K. pneumoniae*	faeces	-	K24	+	Clinical isolate, CCH**
C517	*K. pneumoniae*	faeces, blood	-	K24	+	Clinical isolate, CCH**
NPHMOS_9	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own collection
NPHMOS_25	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own collection
NPHMOS_44	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own collection
NPHMOS_69	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own c.

Strain	Bacteria	Isolated from	Sequence type	K-serotype	Lysis	Reference/Source
NPHMOS_88	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own collection
Sew_4	*K. pneumoniae*	sewage	-	not K24	−	Sewage isolate, own coll
Sew_19	*K. pneumoniae*	sewage	-	not K24	−	Sewage isolate, own collection (Pellérd)
Sew_33	*K. pneumoniae*	sewage	-	not K24	−	Sewage isolate, own collection (Pellérd)
Sew_55	*K. pneumoniae*	sewage	-	not K24	−	Sewage isolate, own collection (Pellérd)
Sew_72	*K. pneumoniae*	sewage	-	not K24	−	Sewage isolate, own collection (Pellérd)
KP2201	*K. pneumoniae*	faeces	-	not K 24	−	Clinical isolate, own collection
KP2244	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own collection
KP2254	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own collection
KP2266	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own collection
KP2294	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own collection
HC11	*K. pneumoniae*	blood	-	not K24	−	Clinical isolate, own collection
HC372	*K. pneumoniae*	blood	-	not K24	−	Clinical isolate, own collection
HC494	*K. pneumoniae*	blood	-	not K24	−	Clinical isolates, own collection
HC899	*K. pneumoniae*	blood	-	not K24	−	Clinical isolate, own collection
HC998	*K. pneumoniae*	blood	-	not K24	−	Clinical isolate, own collection
U43	*K. pneumoniae*	urine	-	not K24	−	Clinical isolate, own
U210	*K. pneumoniae*	urine	-	not K24	−	Clinical isolate, own collection

Strain	Bacteria	Isolated from	Sequence type	K-serotype	Lysis	Reference/Source
U490	*K. pneumoniae*	urine	-	not K24	−	Clinical isolate, own collection
U655	*K. pneumoniae*	urine	-	not K24	−	Clinical isolate, own collection
U820	*K. pneumoniae*	urine	-	not K24	−	Clinical isolate, own collection
E1191	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own collection
E1496	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own collection
E1531	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own collection
E1540	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own collection
E1779	*K. pneumoniae*	faeces	-	not K24	−	Clinical isolate, own collection
CIP 52.232	*K. pneumoniae*	-	-	K27	−	Institut Pasteur*
CIP 52.235	*K. pneumoniae*	-	-	K30	−	Institut Pasteur*
CIP 53.8	*K. pneumoniae*	-	-	K33	−	Institut Pasteur*
CIP 53.23	*K. pneumoniae*	-	-	K47	−	Institut Pasteur*
MGH 78578	*K. pneumoniae*	sputum	ST38	K52	−	MGH 78578
CIP 80.47	*K. pneumoniae*	-	-	K64	−	Institut Pasteur*

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