

Supplementary Material

The Impact of Bacterial Intra-species Variability on Biological Effects Exerted by Rotating Magnetic Field

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Table S1. Phenotypic patterns of *S. aureus* strains.

Phenotypic pattern	Strain number							ATCC 6538
	1	2	3	4	5	6	7	
AMY	-	-	-	-	-	-	-	-
APPA	-	-	-	-	-	-	-	-
LeuA	-	-	-	-	-	-	-	-
AlaA	-	-	-	-	-	-	-	-
dRIB	-	-	-	-	-	-	+	-
NOVO	-	+	-	-	-	-	+	-
dRAF	-	-	-	-	-	-	-	-
OPTO	+	+	+	+	+	+	+	+
PIPLC	-	-	-	-	-	-	-	-
CDEX	-	-	-	-	-	-	-	-
ProA	-	-	-	-	-	-	-	-
TyrA	-	-	-	-	-	-	-	-
ILATk	+	-	+	-	-	+	+	+
NC6.5	+	+	+	+	+	+	+	+
O129R	+	+	+	+	+	+	+	-
dXYL	-	-	-	-	-	-	-	-
AspA	-	-	-	-	-	-	-	-
BGURr	-	-	-	-	-	-	-	-
dSOR	-	-	-	-	-	-	-	-
LAC	-	-	+	-	-	-	-	-
dMAN	+	+	+	+	+	+	+	+
SAL	-	-	-	-	-	-	-	-
ADH1	+	+	+	+	+	+	+	+
BGAR	-	-	-	-	-	-	-	-
AGAL	-	-	-	-	-	-	-	-
URE	-	-	-	-	-	-	-	-
NAG	+	+	+	-	+	+	+	+

dMNE	+	+	+	+	+	+	+	+
SAC	+	+	+	+	+	+	+	+
BGAL	+	-	+	-	+	-	-	-
AMAN	-	+	-	-	-	-	-	-
PyrA	+	+	+	+	+	+	+	+
POLYB	+	+	+	+	+	+	+	+
dMAL	+	+	+	+	+	+	+	+
MBdG	+	-	-	+	+	+	+	-
dTRE	+	+	+	+	+	+	+	+
AGLU	+	+	-	+	+	+	+	-
PHOS	+	+	+	+	+	+	+	+
BGUR	-	-	-	-	-	-	-	-
dGAL	+	+	+	-	+	-	-	+
BACI	+	+	+	+	+	+	+	+
PUL	-	-	-	-	-	-	-	-
ADH2s	+	-	-	-	-	-	-	+

AMY - D-Amygdalin; APPA - Ala Phe Pro arylamidase; LeuA - Leucine arylamidase; AlaA - Alanine arylamidase; dRIB - D-Ribose; NOVO - Novobiocin resistance ; dRAF - D-Raffinose; OPTO - Optochin resistance; PIPLC - Phosphatidylinositol phospholipase C; CDEX - Cyclodextrin; ProA - L-Proline arylamidase; TyrA - Tyrosine arylamidase; ILATk - L-Lactate alkalinization; NC6.5 - Growth in 6.5% NaCl; O129R - O/129 Resistance (comp. vibrio.); dXYL - D-Xylose; AspA - L-Aspartate arylamidase; BGURr - β -Glucaronidase; dSOR - D-Sorbitol; LAC - Lactose; dMAN - D-Mannitol; SAL - Salicin; ADH1 - Arginine dihydrolase 1; BGAR - β -Galactopyranosidase; AGAL - α -Galactosidase; URE - Urease; NAG - N-Acetyl-D-glucosamine; dMNE - D-Mannose; SAC - Saccharose/sucrose; BGAL - β -Galactosidase; AMAN - α -Mannosidase; PyrA - L-Pyrrolidonyl-arylamidase; POLYB - Polymixin B resistance; dMAL - D-Maltose; MBdG - Methyl- β -D-glucopyranoside; dTRE - D-Trehalose; AGLU - α -Glucosidase; PHOS - Phosphatase; BGUR - β -Glucaronidase; dGAL - D-Galactose; BACI - Bacitracin resistance; PUL - Pullulan; ADH2s - Arginine dihydrolase 2;

The study of growth dynamics and cellular metabolic activity – statistical analyses

Table S2. Statistical differences in growth dynamics between *S. aureus* strains representing different clonal types exposed for 3 h to rotating magnetic field of 5 Hz.

	ATCC 6538	1	2	3	4	5	6	7	control
ATCC 6538	x	-	-	-	-	-	-	-	-
1	-	x	-	-	-	-	***	-	-
2	-	-	x	-	-	-	-	-	-
3	-	-	-	x	-	-	*	-	-
4	-	-	-	-	x	-	**	-	-
5	-	-	-	-		x	-	-	-
6	-	***	-	*	**	-	x	**	****
7	-	-	-	-	-	-	**	x	-
control	-	-	-	-	-	-	****	-	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S3. Statistical differences in growth dynamics between *S. aureus* strains representing different clonal types exposed for 6 h to rotating magnetic field of 5 Hz.

	ATCC 6538	1	2	3	4	5	6	7	control
ATCC 6538	x	**	****	-	-	-	*	-	*
1	**	x	-	-	-	-	-	-	-
2	****	-	x		*	*	-	*	-
3	-	-		x	-	-	-	-	-
4	-	-	*	-	x		-	-	-
5	-	-	*	-	-	x	-	-	-
6	*	-		-	-	-	x	-	-
7	-	-	*	-	-	-	-	x	-
control	*	-	-	-	-	-	-	-	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S4. Statistical differences in growth dynamics between *S. aureus* strains representing different clonal types exposed for 9 h to rotating magnetic field of 5 Hz.

	ATCC 6538	1	2	3	4	5	6	7	control
ATCC 6538	x	-	****	****	*	-	****	***	****
1	-	x	****	**	-	-	****	*	***
2	****	****	x	-	****	****	-	**	**
3	****	**	-	x	-	**	-	-	-
4	*	-	****	-	x	-	-	-	-
5	-	-	****	**	-	x	***	-	**
6	****	****	-	-	-	***	x	-	-
7	***	*	**	-	-	-	-	x	-
control	****	***	**	-	-	**	-	-	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S5. Statistical differences in growth dynamics of *S. aureus* strains representing different clonal types depending on the duration (3, 6 and 9 h) of rotating magnetic field (5 Hz) exposure.

<i>S.aureus</i> strain			
	ATCC 6538		
	3 h	6 h	9 h
3 h	x	****	****
6 h	****	x	-
9 h	****	-	x
1			
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	***
9 h	-	***	x
2			
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	-
9 h	-	-	x

3			
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	-
9 h	-	-	x
4			
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	-
9 h	-	-	x
5			
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	-
9 h	-	-	x
6			
	3 h	6 h	9 h
3 h	x	**	-
6 h	**	x	-
9 h	-	-	x
7			
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	-
9 h	-	-	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S6. Statistical differences in growth dynamics between *S. aureus* strains representing different clonal types exposed for 3 h to rotating magnetic field of 50 Hz.

	ATCC 6538	1	2	3	4	5	6	7	control
ATCC 6538	x	-	-	-	-	-	-	-	-
1	-	x	-	-	**	-	-	-	-
2	-	-	x	-	***	-	-	-	*
3	-	-	-	x	-	-	***	-	-
4	-	**	***	-	x	***	****	-	-
5	-	-	-	-	***	x	-	-	*
6	-	-	-	***	****	-	x	-	****
7	-	-	-	-	-	-	-	x	-
control	-	-	*	-	-	*	****	-	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S7. Statistical differences in growth dynamics between *S. aureus* strains representing different clonal types exposed for 6 h to rotating magnetic field of 50 Hz.

	ATCC 6538	1	2	3	4	5	6	7	control
ATCC 6538	x	****	***	*	-	-	-	-	-
1	****	x	-	-	-	-	-	***	*
2	***	-	x	-	-	-	-	*	-
3	*	-	-	x	-	-	-	-	-
4	-	-	-	-	x	-	-	-	-
5	-	-	-	-	-	x	-	-	-
6	-	-	-	-	-	-	x	-	-
7	-	***	*	-	-	-	-	x	-
control	-	*	-	-	-	-	-	-	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S8. Statistical differences in growth dynamics between *S. aureus* strains representing different clonal types exposed for 9 h to rotating magnetic field of 50 Hz.

	ATCC 6538	1	2	3	4	5	6	7	control
ATCC 6538	x	-	****	***	-	-	****	**	***
1	-	x	****	***	-	-	****	**	***
2	****	****	x	-	****	**	-	-	*
3	***	***	-	x	-	-	-	-	-
4	-	-	****	-	x	-	*	-	-
5	-	-	**	-	-	x	-	-	-
6	****	****	-	-	*	-	x	-	-
7	**	**	-	-	-	-	-	x	-
control	***	***	*	-	-	-	-	-	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S9. Statistical differences in growth dynamics of *S. aureus* strains representing different clonal types depending on the duration (3, 6 and 9 h) of rotating magnetic field (50 Hz) exposure.

<i>S.aureus</i> strain			
	ATCC 6538		
	3 h	6 h	9 h
3 h	x	**	****
6 h	**	x	-
9 h	****	-	x
	1		
	3 h	6 h	9 h
3 h	x	-	****
6 h	-	x	****
9 h	****	****	x
	2		
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	-
9 h	-	-	x

3			
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	-
9 h	-	-	x
4			
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	-
9 h	-	-	x
5			
	3 h	6 h	9 h
3 h	x	-	**
6 h	-	x	-
9 h	**	-	x
6			
	3 h	6 h	9 h
3 h	x	***	-
6 h	***	x	-
9 h	-	-	x
7			
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	-
9 h	-	-	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S10. Statistical differences in growth dynamics of *S. aureus* strains representing different clonal types exposed to rotating magnetic field (5 Hz v. 50 Hz).

<i>S.aureus</i> strain/Time of exposition	5 Hz v. 50 Hz	<i>S.aureus</i> strain/Time of exposition	5 Hz v. 50 Hz
ATCC 6538/3h	-	4/3h	-
ATCC 6538/6h	-	4/6h	-
ATCC 6538/9 h	-	4/9h	-
1/3h	-	5/3h	-
1/6h	-	5/6h	-
1/9h	-	5/9h	-
2/3h	-	6/3h	-
2/6h	-	6/6h	-
2/9h	-	6/9h	-
3/3h	-	7/3h	-
3/6h	-	7/6h	-
3/9h	-	7/9h	-

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S11. Statistical differences in cellular metabolic activity between *S. aureus* strains representing different clonal types exposed for 3 h to rotating magnetic field of 5 Hz.

	ATCC 6538	1	2	3	4	5	6	7	control
ATCC 6538	x	-	**	****	****	****	-	*	-
1	-	x	-	*	****	****	-	****	-
2	**	-	x		****	****	**	****	-
3	****	*	-	x	****	****	****	****	**
4	****	****	****	****	x	-	****	-	****
5	****	****	****	****		x	****	-	****
6	-	-	**	****	****	****	x	-	-
7	*	****	****	****	-	-	-	x	****
control	-	-	-	**	****	****	-	****	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S12. Statistical differences in cellular metabolic activity between *S. aureus* strains representing different clonal types exposed for 6 h to rotating magnetic field of 5 Hz.

	ATCC 6538	1	2	3	4	5	6	7	control
ATCC 6538	x	-	-	-	**	****	****	****	-
1	-	x	-	-	**	****	***	****	-
2	-	-	x	-	**	****	***	****	-
3	-	-	-	x	***	****	****	****	-
4	**	**	**	***	x	****	-	-	-
5	****	****	****	****	****	x	****	****	****
6	****	***	***	****	-	****	x	-	-
7	****	****	****	****	-	****	-	x	**
control	-	-	-	-	-	****	-	**	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S13. Statistical differences in cellular metabolic activity between *S. aureus* strains representing different clonal types exposed for 9 h to rotating magnetic field of 5 Hz.

	ATCC 6538	1	2	3	4	5	6	7	control
ATCC 6538	x	**	-	-	*	*	****	****	-
1	**	x	-	-	-	****	****	****	***
2	-	-	x	-	-	****	****	****	-
3	-	-	-	x	-	****	****	****	-
4	*	-	-		x	****	****	****	**
5	*	****	****	****	****	x	****	****	***
6	****	****	****	****	****	****	x	-	****
7	****	****	****	****	****	****	-	x	****
control	-	***	-	-	**	***	****	****	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S14. Statistical differences in cellular metabolic activity of *S. aureus* strains representing different clonal types depending on the duration (3, 6 and 9 h) of rotating magnetic field (5 Hz) exposure.

<i>S.aureus</i> strain			
ATCC 6538			
	3 h	6 h	9 h
3 h	x	**	-
6 h	**	x	-
9 h	-	-	x
1			
	3 h	6 h	9 h
3 h	x	-	*
6 h	-	x	-
9 h	*	-	x
2			
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	-
9 h	-	-	x
3			
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	-
9 h	-	-	x
4			
	3 h	6 h	9 h
3 h	x	****	****
6 h	****	x	****
9 h	****	****	x
5			
	3 h	6 h	9 h
3 h	x	-	*
6 h	-	x	****
9 h	*	****	x
6			
	3 h	6 h	9 h

3 h	x	-	****
6 h	-	x	****
9 h	****	****	x
7			
	3 h	6 h	9 h
3 h	x	-	****
6 h	-	x	****
9 h	****	****	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S15. Statistical differences in cellular metabolic activity between *S. aureus* strains representing different clonal types exposed for 3 h to rotating magnetic field of 50 Hz.

	ATCC 6538	1	2	3	4	5	6	7	control
ATCC 6538	x	-	****	****	**	-	-	**	****
1	-	x	****	****	**	-	-	**	****
2	****	****	x	-	****	****	*	****	-
3	****	****	-	x	****	****	**	****	-
4	**	**	****	****	x	***	****	-	****
5	-	-	****	****	***	x	-	***	***
6	-	-	*	**	****	-	x	****	-
7	**	**	****	****	-	***	****	x	****
control	****	****	-	-	****	***	-	****	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S16. Statistical differences in cellular metabolic activity between *S. aureus* strains representing different clonal types exposed for 6 h to rotating magnetic field of 50 Hz.

	ATCC 6538	1	2	3	4	5	6	7	control
ATCC 6538	x	-	-	-	-	****	*	***	-
1	-	x	-	-	-	****	-	**	-
2	-	-	x	-	-	****	-	*	-
3	-	-	-	x	-	****	-	***	-
4	-	-	-	-	x	****	-	-	-
5	****	****	****	****	****	x	****	**	****
6	*	-	-	-	-	****	x	-	-
7	***	**	*	***	-	**	-	x	-
control	-	-	-	-	-	****	-	-	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S17. Statistical differences in cellular metabolic activity between *S. aureus* strains representing different clonal types exposed for 9 h to rotating magnetic field of 50 Hz.

	ATCC 6538	1	2	3	4	5	6	7	control
ATCC 6538	x	***	-	-	****	***	-	-	-
1	***	x	-	**	-	-	****	**	-
2	-	-	x	-	****	-	****	-	-
3	-	**	-	x	****	*	-	-	-
4	****	-	****	****	x	**	****	****	****
5	****	-	-	*	**	x	****	**	-
6	-	****	****	-	****	****	x	-	****
7	-	**	-	-	****	**	-	x	-
control	-	-	-	-	****	-	****	-	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table S18. Statistical differences in cellular metabolic activity of *S. aureus* strains representing different clonal types depending on the duration (3, 6 and 9 h) of rotating magnetic field (50 Hz) exposure.

<i>S.aureus</i> strain			
ATCC 6538			
	3 h	6 h	9 h
3 h	x	****	-
6 h	****	x	***
9 h	-	***	x
1			
	3 h	6 h	9 h
3 h	x	****	****
6 h	****	x	-
9 h	****	-	x
2			
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	-
9 h	-	-	x
3			
	3 h	6 h	9 h
3 h	x	-	*
6 h	-	x	*
9 h	*	*	x
4			
	3 h	6 h	9 h
3 h	x	****	****
6 h	****	x	****
9 h	****	****	x
5			
	3 h	6 h	9 h
3 h	x	-	****
6 h	-	x	****
9 h	****	****	x

6			
	3 h	6 h	9 h
3 h	x	-	-
6 h	-	x	*
9 h	-	*	x
7			
	3 h	6 h	9 h
3 h	x	****	****
6 h	****	x	-
9 h	****	-	x

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

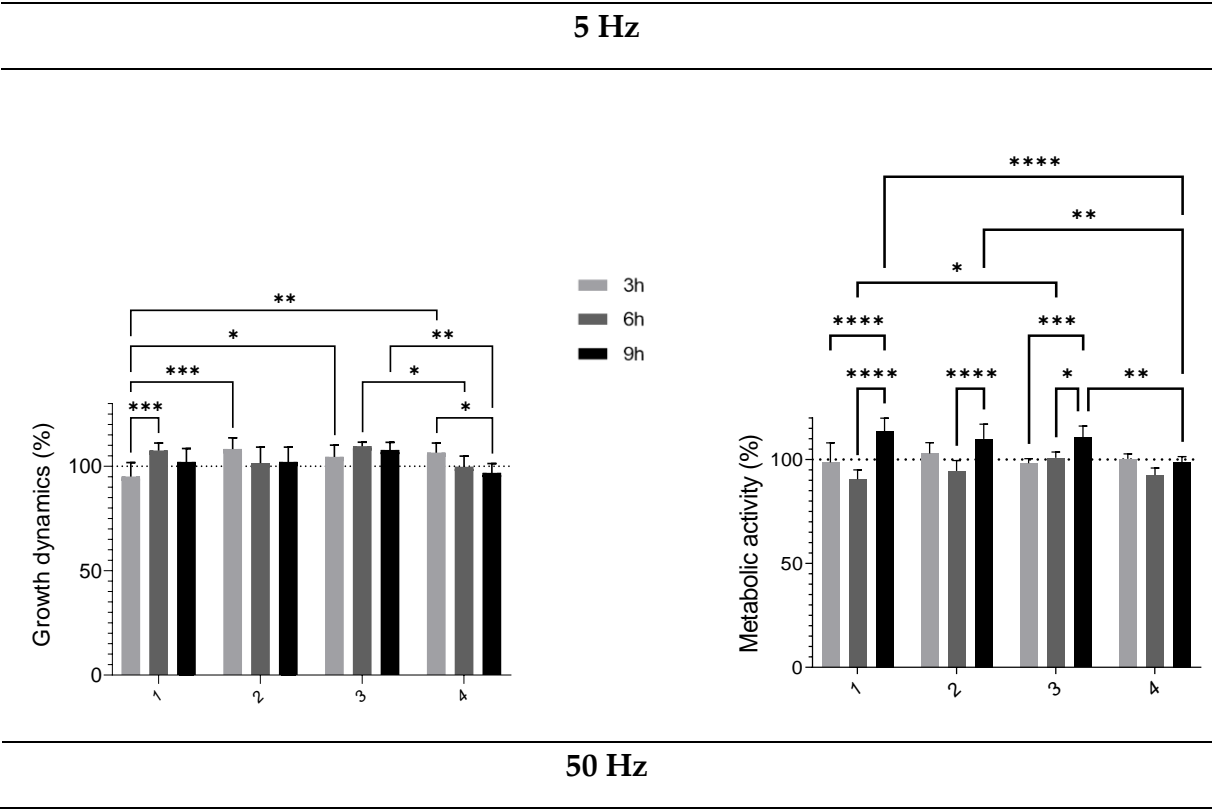
Table S19. Statistical differences in cellular metabolic activity of *S. aureus* strains representing different clonal types exposed to rotating magnetic field (5 Hz v. 50 Hz).

<i>S. aureus</i> strain/Time of exposition	5 Hz v. 50 Hz	<i>S. aureus</i> strain/Time of exposition	5 Hz v. 50 Hz
ATCC 6538/3h	-	4/3h	-
ATCC 6538/6h	-	4/6h	-
ATCC 6538/9 h	-	4/9h	-
1/3h	**	5/3h	*
1/6h	-	5/6h	-
1/9h	-	5/9h	****
2/3h	-	6/3h	-
2/6h	-	6/6h	-
2/9h	-	6/9h	*
3/3h	-	7/3h	-
3/6h	-	7/6h	-
3/9h	-	7/9h	****

* p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001

Table 20. The values of magnetic induction inside the RMF generator, at the location of the Petri dishes, depending on the applied AC frequency.

Magnetic induction [mT]	5 Hz	50 Hz
MIN	17.23	17.95
MAX	21.88	22.77
Average	19.20	19.99



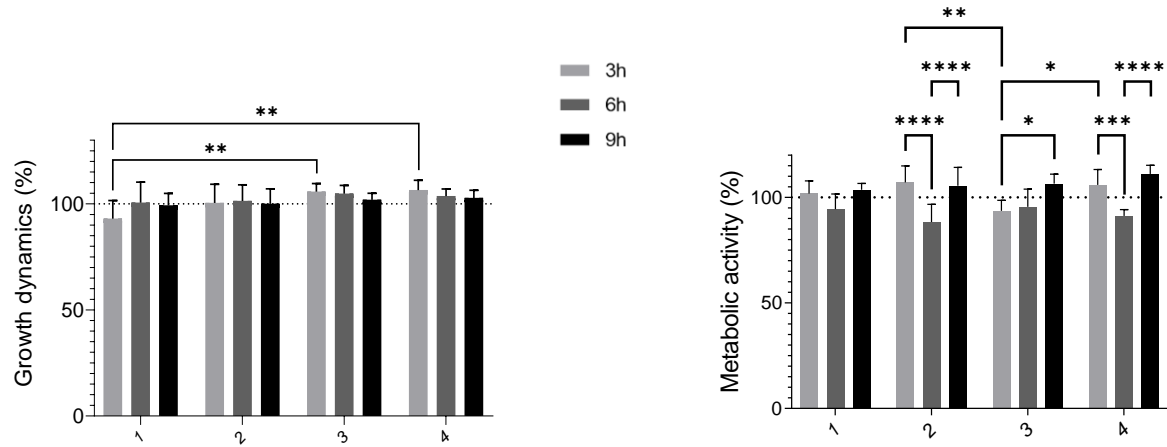
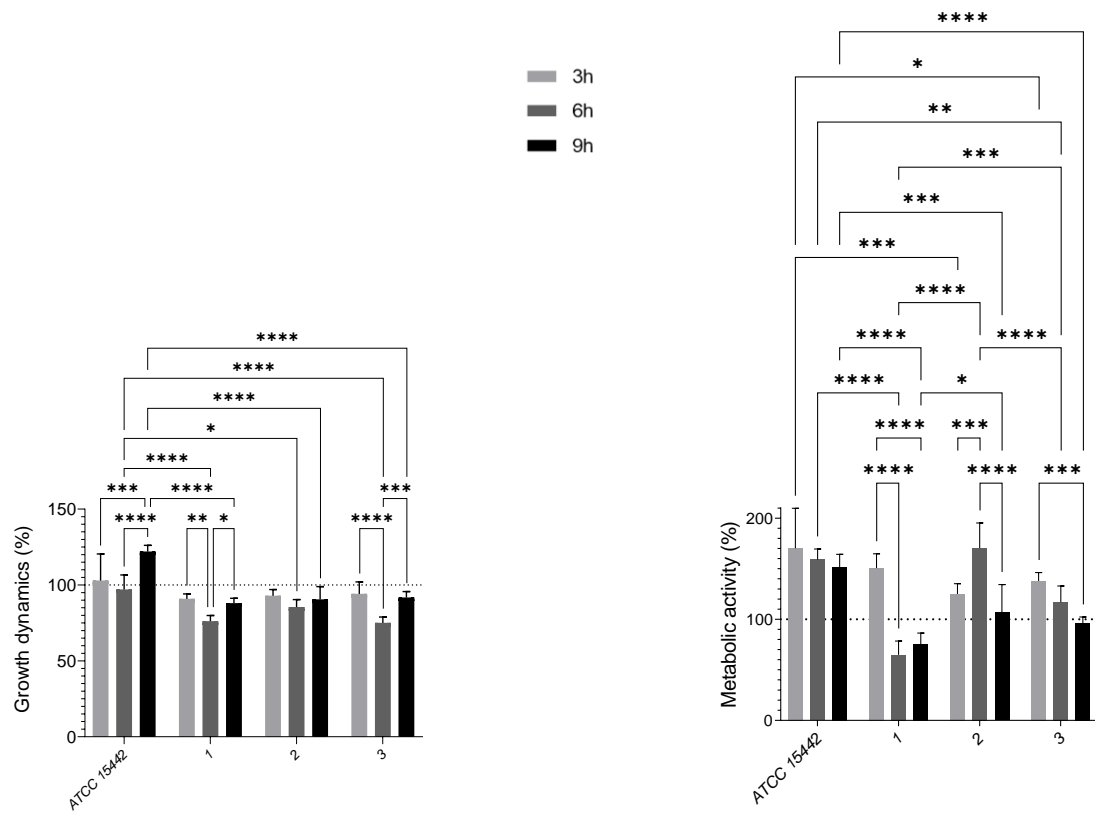


Figure S1. Statistical differences in growth dynamics and cellular metabolic activity between *S.aureus* strains representing one clonal type exposed to rotating magnetic field (5 Hz and 50 Hz) for 3, 6 and 9 h.

Data are expressed as % of control. The results are presented as a mean \pm SEM calculated using six values (three from each biological replicate); * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, **** $p < 0.0001$.

5 Hz



50 Hz

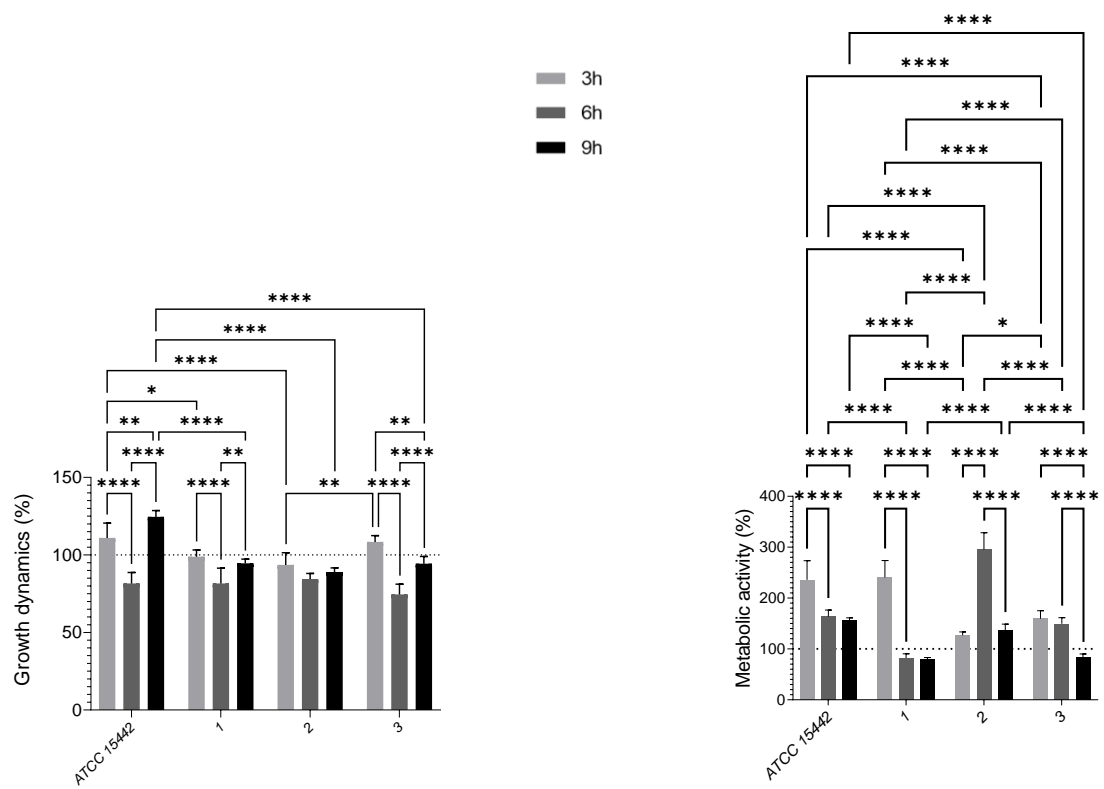
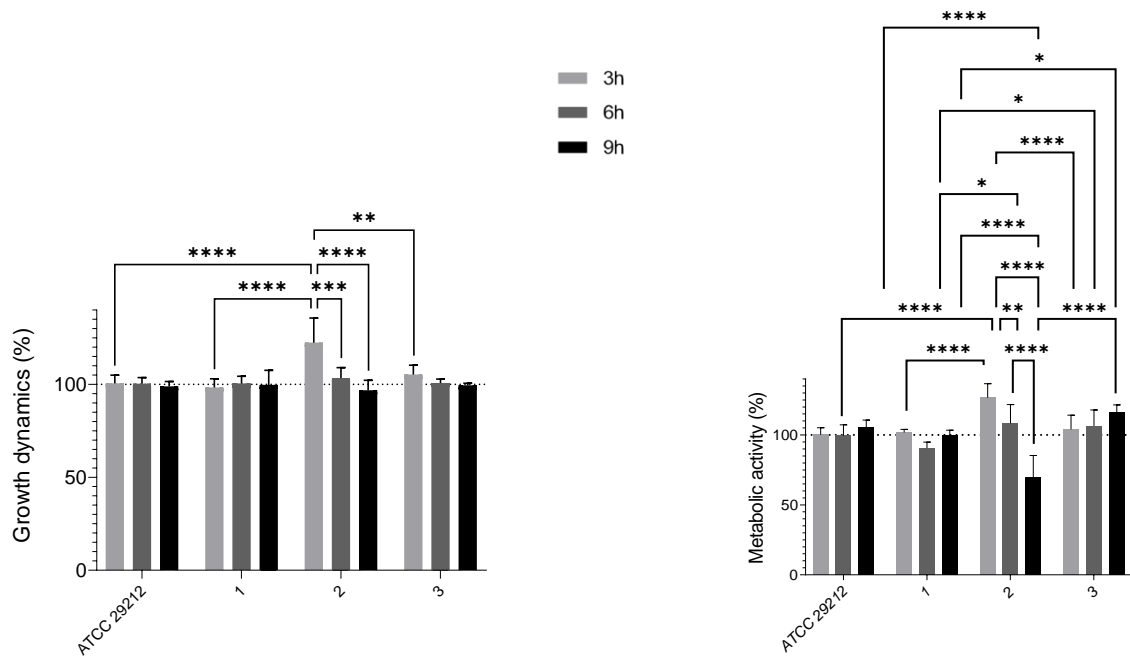


Figure S2. Statistical differences in growth dynamics and cellular metabolic activity between *P.aeruginosa* strains exposed to rotating magnetic field (5 Hz and 50 Hz) for 3, 6 and 9 h.

Data are expressed as % of control. The results are presented as a mean \pm SEM calculated using six values (three from each biological replicate); * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, **** $p < 0.0001$.

5 Hz



50 Hz

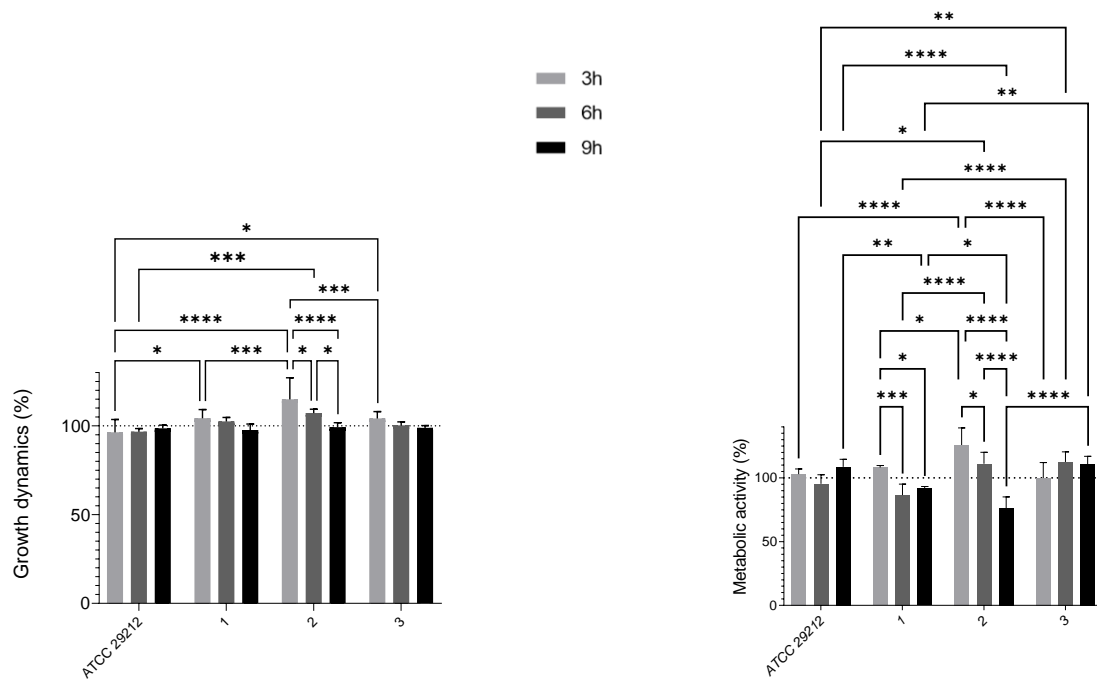
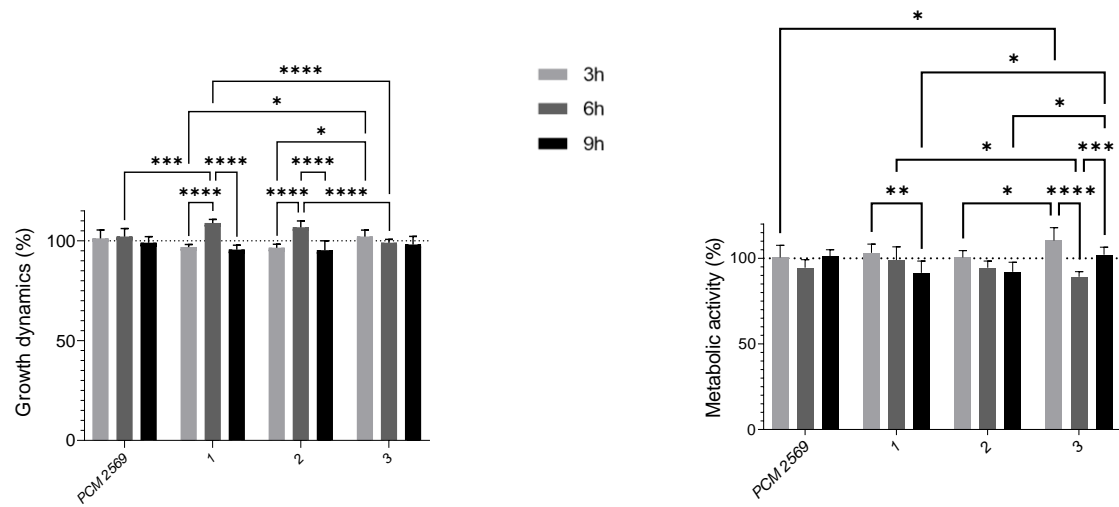


Figure S3. Statistical differences in growth dynamics and cellular metabolic activity between *E. faecalis* strains exposed to rotating magnetic field (5 Hz and 50 Hz) for 3, 6 and 9 h.

Data are expressed as % of control. The results are presented as a mean \pm SEM calculated using six values (three from each biological replicate); * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, **** $p < 0.0001$.

5 Hz



50 Hz

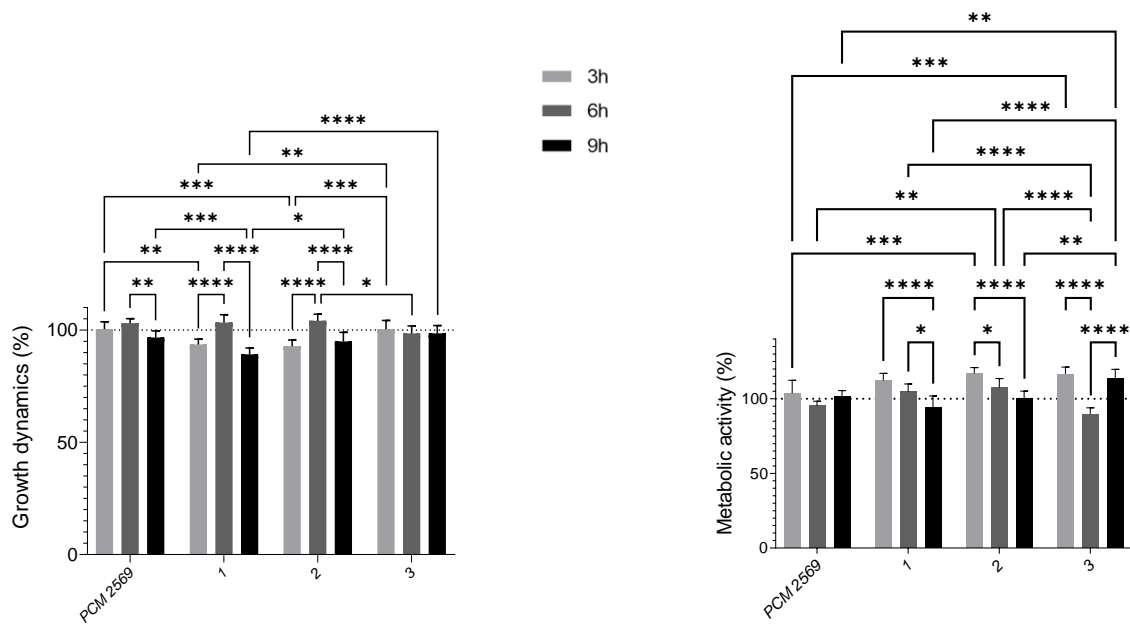


Figure S4. Statistical differences in growth dynamics and cellular metabolic activity between *E. cloacae* strains exposed to rotating magnetic field (5 Hz and 50 Hz) for 3, 6 and 9 h.

Data are expressed as % of control. The results are presented as a mean \pm SEM calculated using six values (three from each biological replicate); * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, **** $p < 0.0001$.

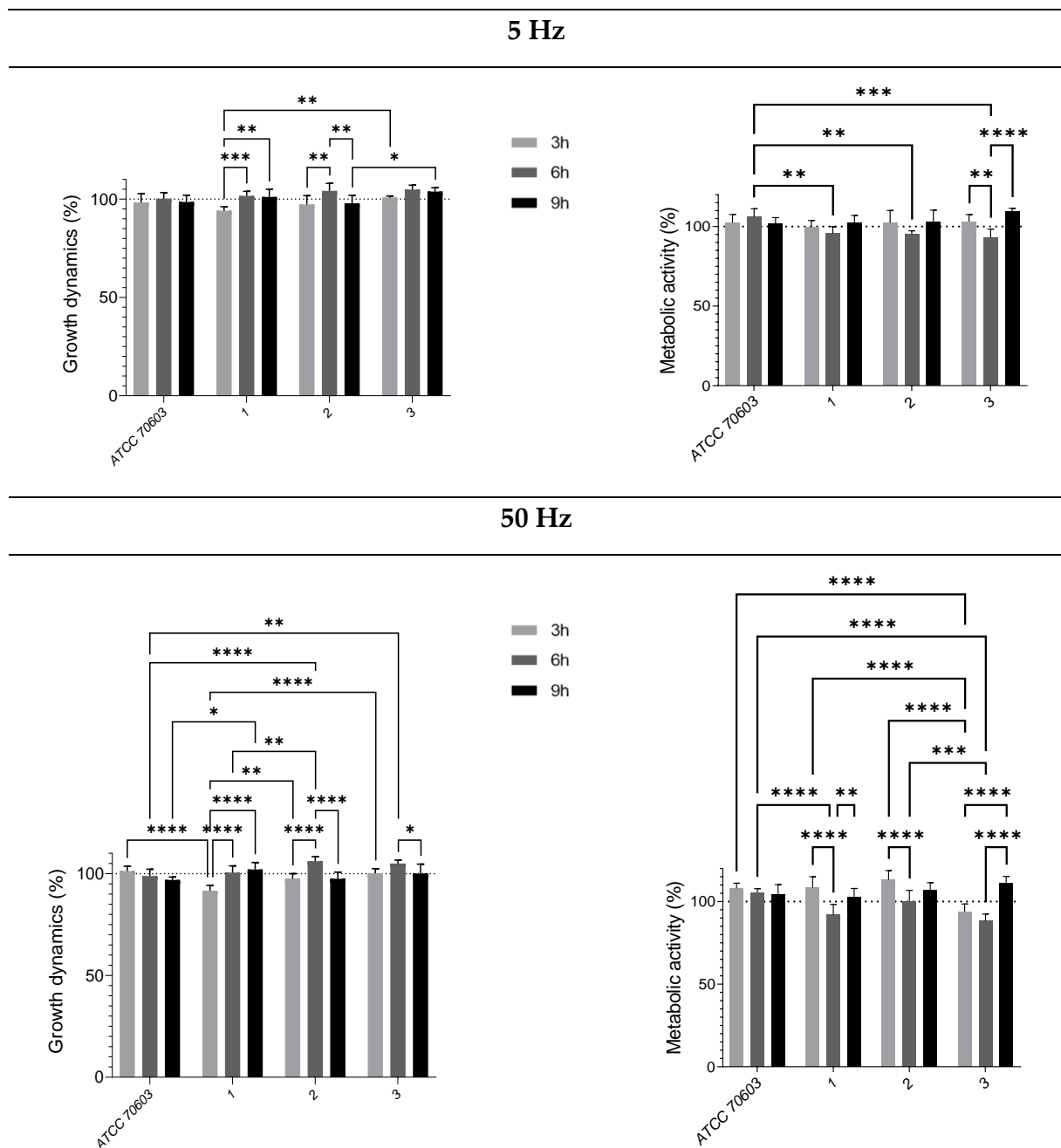
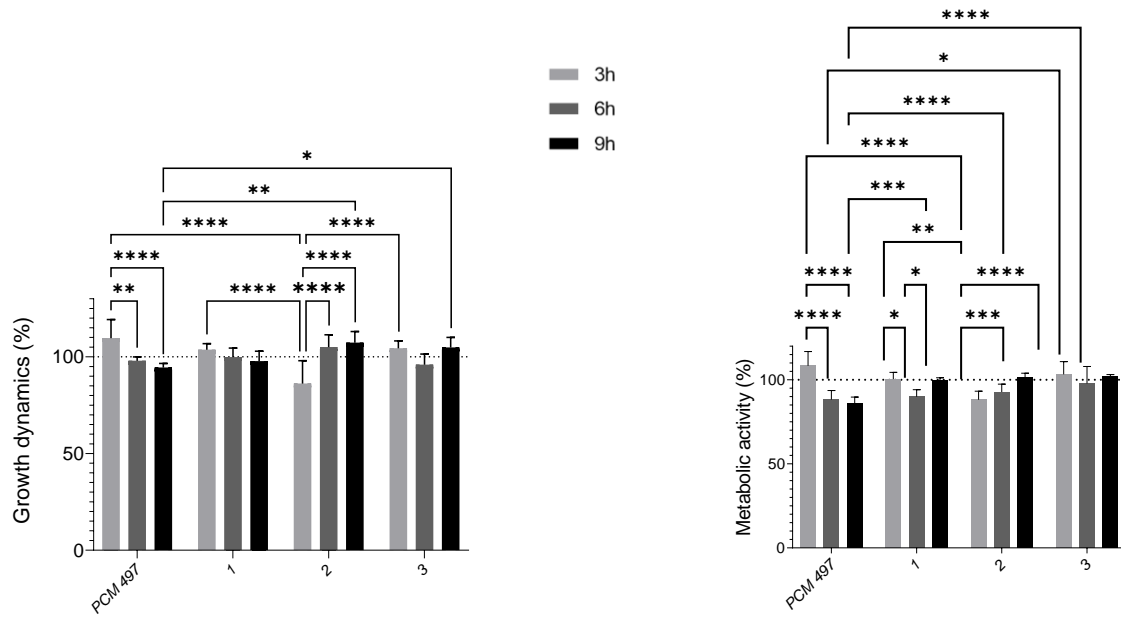


Figure S5. Statistical differences in growth dynamics and cellular metabolic activity between *K. pneumoniae* strains exposed to rotating magnetic field (5 Hz and 50 Hz) for 3, 6 and 9 h.

Data are expressed as % of control. The results are presented as a mean \pm SEM calculated using six values (three from each biological replicate); * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, **** $p < 0.0001$.

5 Hz



50 Hz

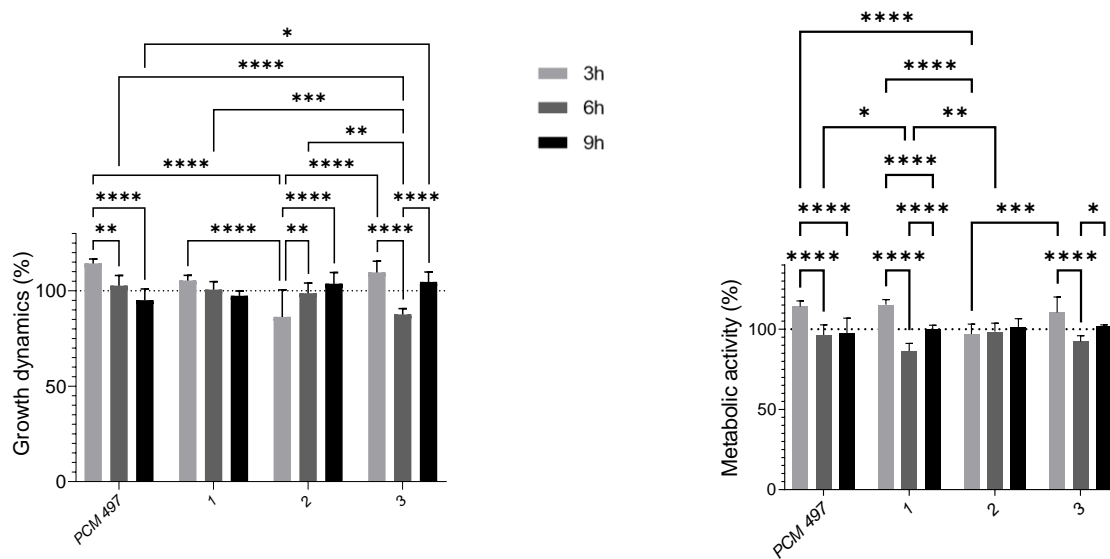
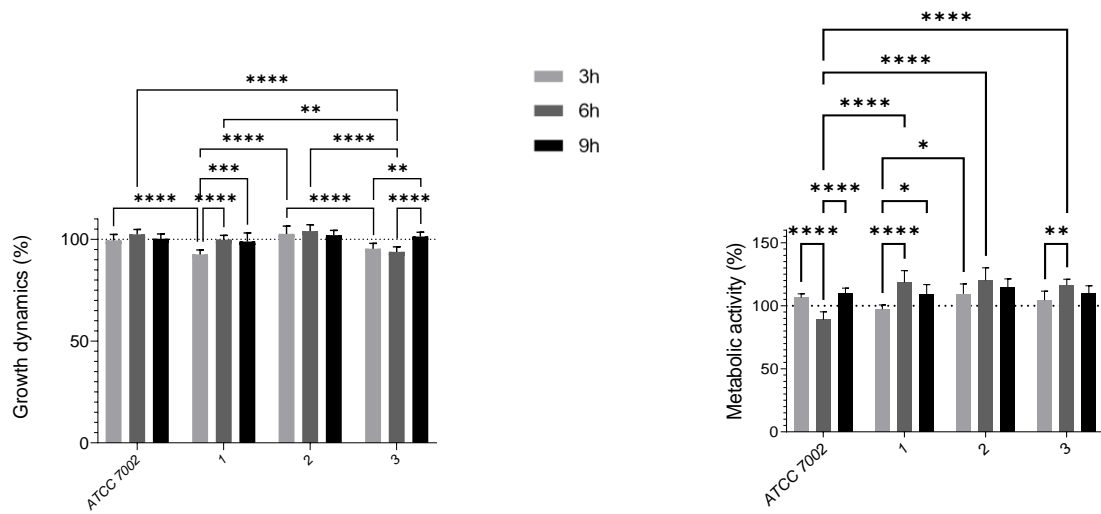


Figure S6. Statistical differences in growth dynamics and cellular metabolic activity between *B. cereus* strains exposed to rotating magnetic field (5 Hz and 50 Hz) for 3, 6 and 9 h.

Data are expressed as % of control. The results are presented as a mean \pm SEM calculated using six values (three from each biological replicate); * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, **** $p < 0.0001$.

5 Hz



50 Hz

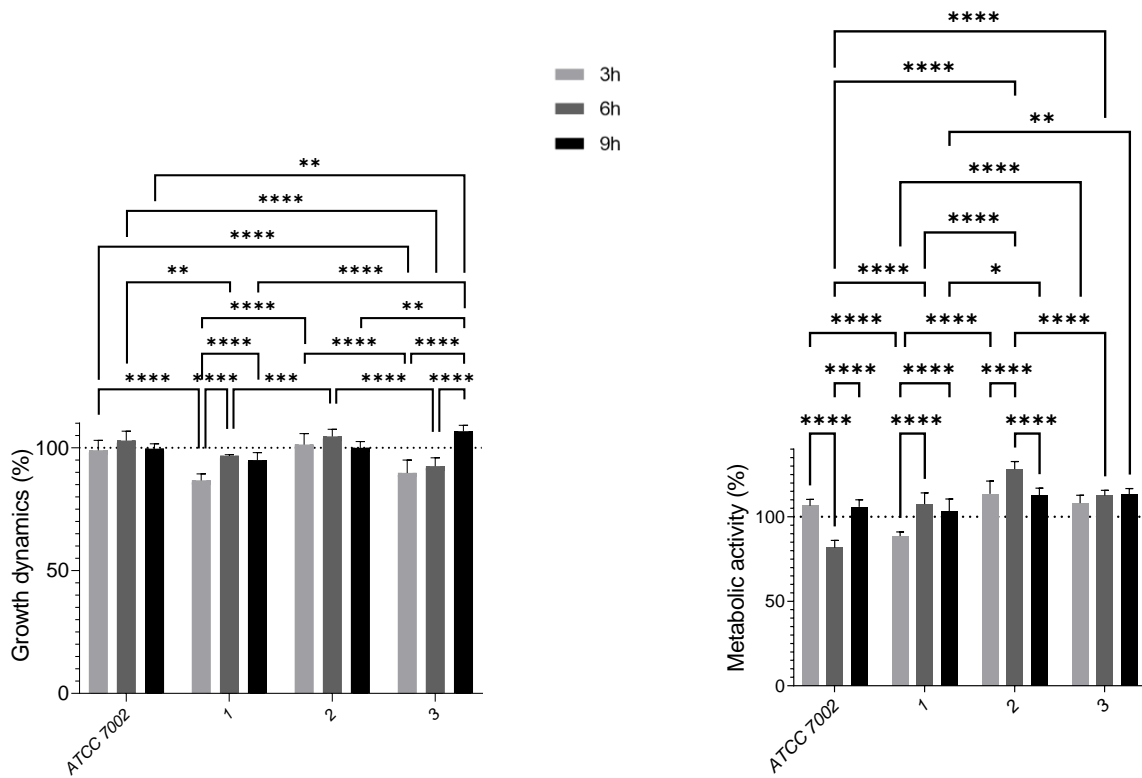
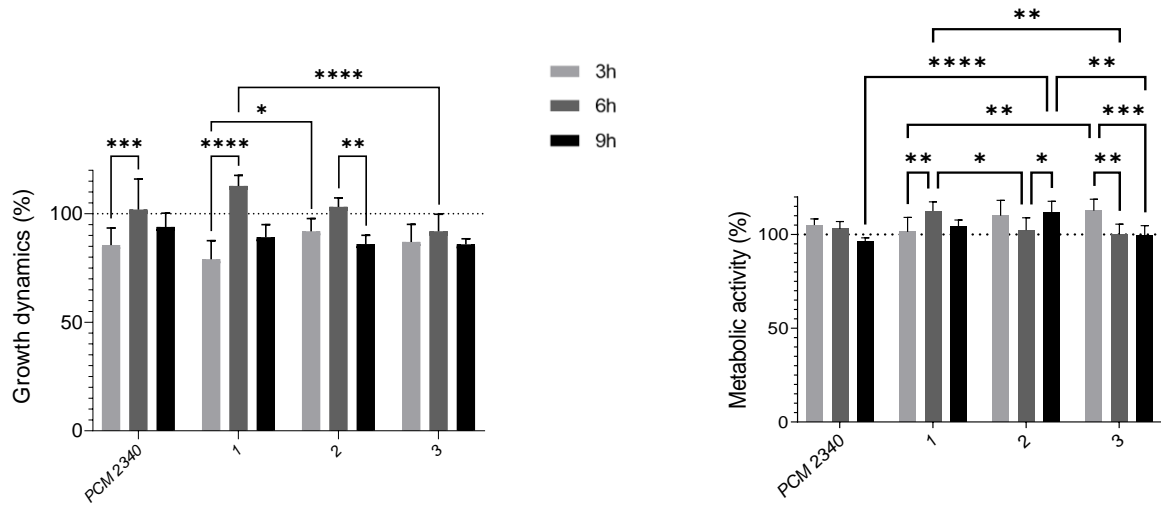


Figure S7. Statistical differences in growth dynamics and cellular metabolic activity between *P. mirabilis* strains exposed to rotating magnetic field (5 Hz and 50 Hz) for 3, 6 and 9 h.

Data are expressed as % of control. The results are presented as a mean \pm SEM calculated using six values (three from each biological replicate); * p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001.

5 Hz



50 Hz

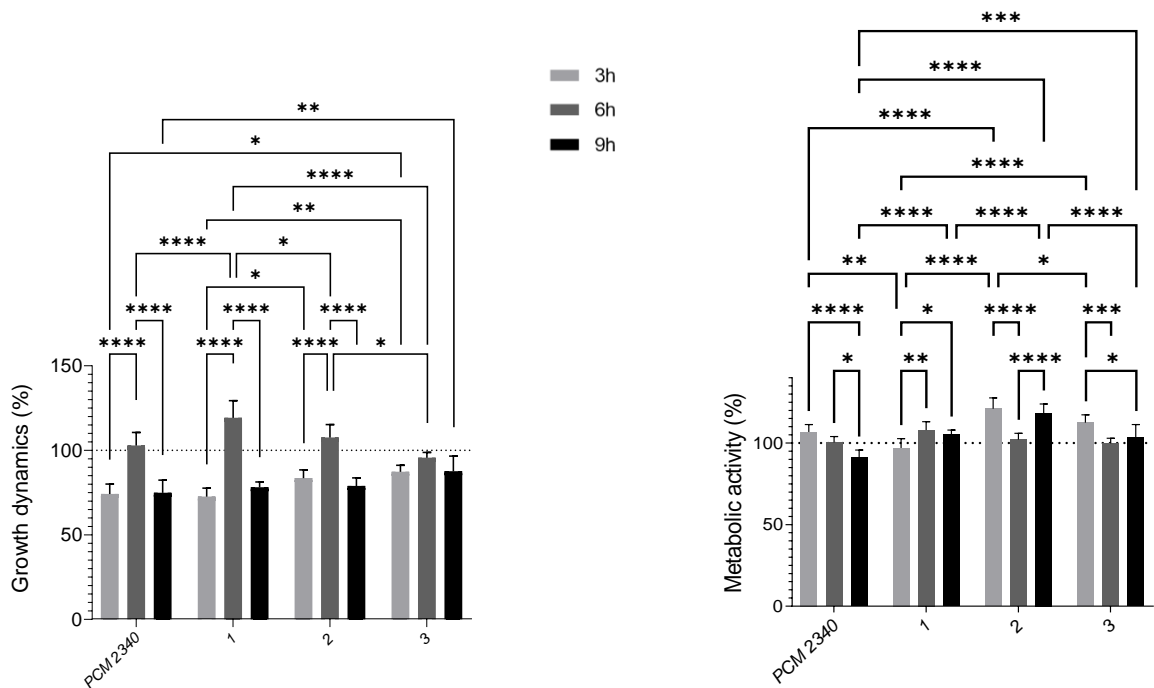


Figure S8. Statistical differences in growth dynamics and cellular metabolic activity between *M. catarrhalis* strains exposed to rotating magnetic field (5 Hz and 50 Hz) for 3, 6 and 9 h.

Data are expressed as % of control. The results are presented as a mean \pm SEM calculated using six values (three from each biological replicate); * p<0.05, ** p<0.01, *** p<0.001, **** p<0.0001.