



D.JRP7-3.2

Workpackage 3

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Contributing partners: NVI, INRAe



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ADAPTATION TO BIOCIDES AND CROSS-RESISTANCE DEVELOPMENT TO ANTIBIOTICS OF RELEVANT *LISTERIA MONOCYTOGENES* STRAINS

From results obtained in sub-task 3.2.1, we have selected **28 *Lm* strains among these 206 *Lm* strains received (Table 4):**

- with various antimicrobial profiles (MIC values) and *Lm* strains which are the most susceptible to biocides and/or antibiotics in order to have a higher probability to see an adaptation.

and

- with different ecological niches (different type of food product, soil and animals)

These strains have been selected to test their ability to adapt to four different biocides molecules at a sub-lethal concentration:

- DDAC : 0.3 µg/ml
- BC : 0.6125 µg/ml
- HS : 312.5 µg/ml
- Pac : 156.5 µg/ml and 78 µg/ml for the strains selected in second time as these strains had difficulty to growth with Pac concentration at 156.5 µg/ml



Table 4. Selection of 28 *Lm* strains with their antimicrobial MIC values (A: antibiotic MIC values; B: biocide MIC values) for adaptation at 4 biocides (red)

A

Ecological niches		Anses ID	CC profil	AB2R ID	AMP	FOT	AXO	CHL	CIP	ERY	GEN	MERO	NIT	STR	TET	TIA	SXT	VAN	
FOOD	Food - RTE Dairy	05CEB711LM	CC1	16LX-008	1	>32	>32	8	2	0,25	0,5	0,25	>32	4	>8	64	0,03	1	
		11CEB260LM	CC21	16LX-042	0,5	>32	>32	8	1	0,25	0,06	0,12	>32	4	1	32	0,015	1	
		14SEL1687LM	CC37	16LX-074	0,5	>32	>32	8	2	0,25	0,25	0,12	>32	8	1	64	0,03	1	
		14SEL1687LM	CC1	16LX-096	0,5	16	32	8	2	0,25	0,25	0,25	>32	4	1	32	0,03	1	
	Food - RTE Meat and meat products	10CEB335LM	CC8	16LX-032	0,5	>32	>32	8	2	0,25	0,25	0,12	>32	4	1	64	0,03	1	
		12CEB366LM	CC2	16LX-058	1	>32	>32	8	2	0,25	0,25	0,12	>32	4	1	64	0,03	1	
		15SEL676LM	CC1	16LX-082	0,5	>32	>32	8	2	0,25	0,25	0,25	>32	4	1	64	0,03	1	
	Food - RTE Fish	06CEB188LM	CC6	16LX-011	1	>32	>32	8	2	0,25	0,25	0,5	>32	4	0,5	64	0,03	1	
		10CEB68LM	CC2	16LX-031	1	>32	>32	8	2	0,25	0,25	0,25	>32	4	1	64	0,03	1	
		10CEB588LM	CC121	16LX-036	0,5	>32	>32	8	2	0,25	0,25	0,12	>32	4	1	32	0,03	1	
		15SEL53LM	CC8	16LX-079	0,5	>32	>32	8	1	0,25	0,25	0,12	>32	4	1	64	0,03	1	
	Food - Vegetables	06CEB656LM	CC1	16LX-015	0,5	>32	>32	8	1	0,25	1	0,25	>32	8	0,05	64	0,06	1	
12CEB1182LM		CC121	16LX-067	0,25	>32	>32	8	0,5	0,25	0,5	0,12	>32	4	1	32	0,03	1		
12CEB1426LM		CC37	16LX-068	0,5	>32	>32	8	1	0,25	0,5	0,12	>32	4	2	32	0,015	1		
ENVIRONMENT	Sweden	18SEL615LM	CC2	16LX-206	1	>32	>32	8	1	0,25	1	0,25	>32	8	1	32	0,03	1	
	Soil	19SEL83LM	CC1	16LX-099	1	>32	>32	8	2	0,5	0,5	0,12	>32	16	1	64	0,03	1	
		19SEL87LM	CC451	16LX-139	0,5	>32	>32	16	2	0,25	1	0,25	>32	4	2	>64	0,03	1	
		19SEL88LM	CC20	16LX-151	0,5	>32	>32	8	2	0,25	0,12	0,25	>32	4	1	32	0,03	1	
		18SEL317LM	CC18	16LX-136	0,5	>32	>32	8	4	0,25	0,25	0,12	>32	8	1	64	0,03	1	
	Animals	France	18SEL771LM	CC26	16LX-172	0,5	>32	>32	8	2	0,25	0,5	0,12	>32	4	1	64	0,03	1
		Slovenia - Cattle	17SEL382LM	CC22	16LX-112	0,5	>32	>32	8	2	0,12	0,5	0,12	>32	8	0,25	32	0,03	1
		Norway - slugs (<i>A. vulgaris</i>)	18SEL211LM	CC8	16LX-121	0,5	>32	>32	8	4	0,25	0,5	0,12	>32	8	1	64	0,03	1
		Norway - deer	18SEL222LM	CC451	16LX-128	0,5	>32	>32	16	1	0,25	0,5	0,12	>32	16	1	64	0,06	1
		Czech republic - gerbil spleen	18SEL308LM	CC7	16LX-144	0,5	16	32	4	2	0,12	0,25	0,12	>32	8	1	64	0,015	1
		Germany - goat	NA	CC8	16LX-169	0,5	>32	>32	8	2	0,25	1	0,12	>32	16	1	≤8	0,03	1
		Italy - fox	NA	CC1	16LX-176	1	>32	>32	8	4	0,25	1	0,25	>32	16	1	32	0,03	2
		Italy - Dolphin	NA	CC121	16LX-179	0,5	>32	>32	8	2	0,25	0,25	0,12	>32	4	0,5	32	0,03	1
The Netherlands - goat		NA	CC26	16LX-183	0,25	>32	>32	8	2	0,25	0,25	0,12	>32	8	2	32	0,03	1	
				Scott A	1	>32	>32	8	1	0,25	0,25	0,25	>32	4	1	64	0,03	1	

B

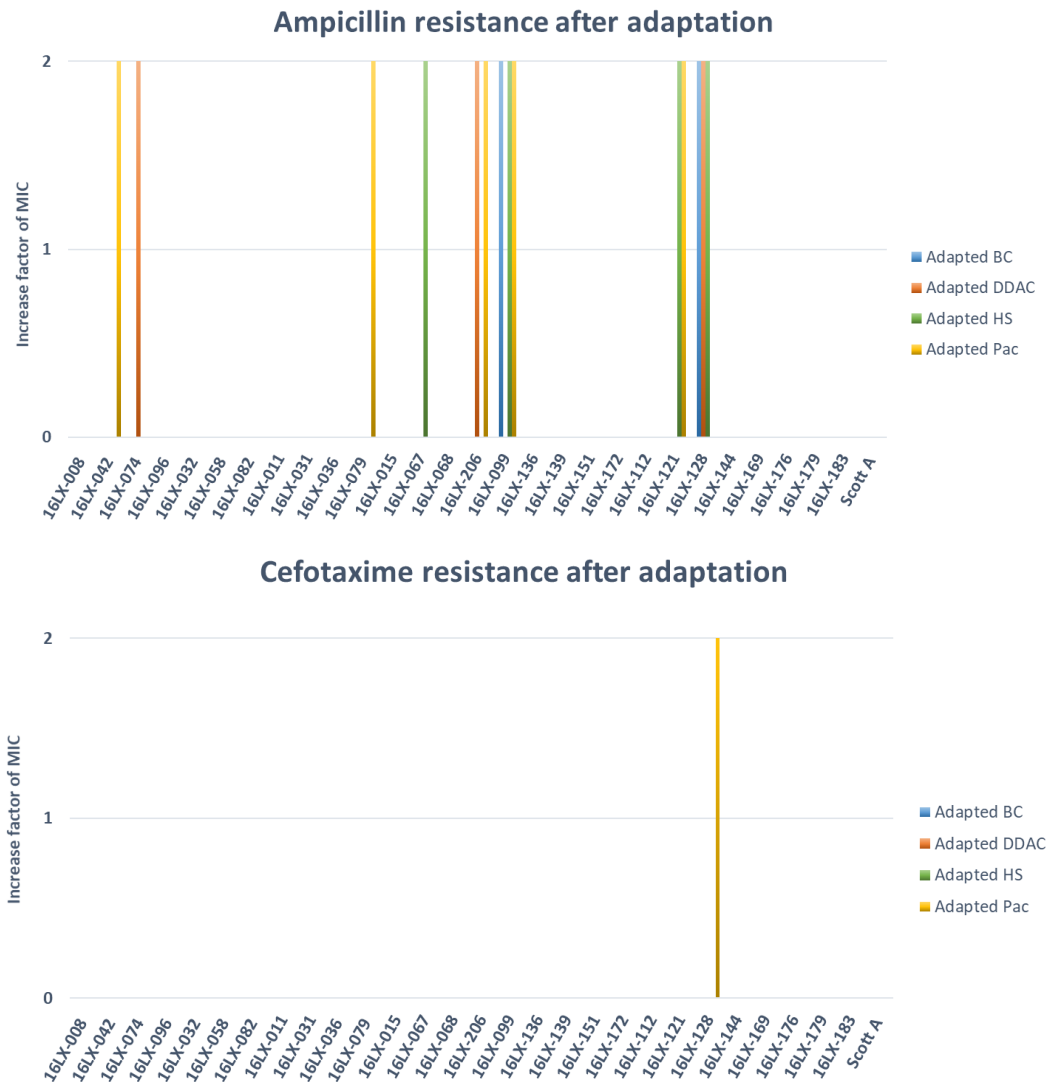


Ecological niches		Anses ID	CC profil	AB2R ID	AMPD	DDAC	BC	PHMB	HPer	HS	PAC	EtOH (%)	
FOOD	Food - RTE Dairy	05CEB711LM	CC1	16LX-008	8	0,6	2,5	6,25	250	1250	625	> 50	
		11CEB260LM	CC21	16LX-042	6	1,25	2,5	1,6	250	625	625	25	
		14SEL1687LM	CC37	16LX-074	6	0,6	2,5	1,6	125	625	313	25	
		IN15	CC1	16LX-096	6	0,6	1,25	3,1	125	625	313	12,5	
	Food - RTE Meat and meat products	10CEB335LM	CC8	16LX-032	6	1,25	1,25	1,6	125	625	625	25	
		12CEB366LM	CC2	16LX-058	6	0,6	1,25	3,1	125	1250	625	25	
		15SEL676LM	CC1	16LX-082	6	0,6	1,25	3,1	125	625	313	25	
	Food - RTE Fish	06CEB188LM	CC6	16LX-011	6	0,6	1,25	1,6	62,5	625	625	12,5	
		10CEB68LM	CC2	16LX-031	6	0,6	1,25	1,6	250	625	625	25	
		10CEB588LM	CC121	16LX-036	6	1,25	5	1,6	125	625	625	25	
		15SEL53LM	CC8	16LX-079	6	2,5	5	1,6	125	1250	625	>50	
	Food - Vegetables	06CEB656LM	CC1	16LX-015	6	0,6	1,25	1,6	125	625	625	25	
		12CEB1182LM	CC121	16LX-067	6	1,25	5	1,6	62,5	1250	625	25	
		12CEB1426LM	CC37	16LX-068	4	0,6	1,25	1,6	62,5	625	625	25	
	ENVIRONMENT	Sweden	18SEL615LM	CC2	16LX-206	8	1,25	1,25	6,25	125	1250	313	50
Soil		19SEL83LM	CC1	16LX-099	8	0,6	0,6	12,5	125	1250	313	25	
		19SEL87LM	CC451	16LX-139	4	0,6	1,25	3,1	125	625	313	6,25	
		19SEL88LM	CC20	16LX-151	4	0,6	1,25	3,1	125	1250	313	25	
France		18SEL317LM	CC18	16LX-136	2	0,6	0,6	0,8	62,5	625	156	12,5	
		18SEL771LM	CC26	16LX-172	4	0,6	1,25	1,6	62,5	625	156	12,5	
Animals		Slovenia - Cattle	17SEL382LM	CC22	16LX-112	4	0,6	0,6	1,6	62,5	625	313	25
		Norway - slugs (<i>A. vulgaris</i>)	18SEL211LM	CC8	16LX-121	4	0,6	1,25	3,1	125	1250	313	25
		Norway - deer	18SEL222LM	CC451	16LX-128	4	0,6	0,6	3,1	62,5	625	313	25
		Czech republic - gerbil spleen	18SEL308LM	CC7	16LX-144	4	0,6	0,6	3,1	62,5	1250	313	50
	Germany - goat	NA	CC8	16LX-169	4	0,6	1,25	1,6	125	1250	313	25	
	Italy - fox	NA	CC1	16LX-176	8	0,6	1,25	3,1	125	1250	313	50	
	Italy - Dolphin	NA	CC121	16LX-179	4	1,25	5	1,6	62,5	1250	313	50	
The Netherlands - goat	NA	CC26	16LX-183	16	0,6	1,25	1,6	125	312,5	313	50		
	Scott A			8	0,6	1,25	3,1	62,5	625	313	25		



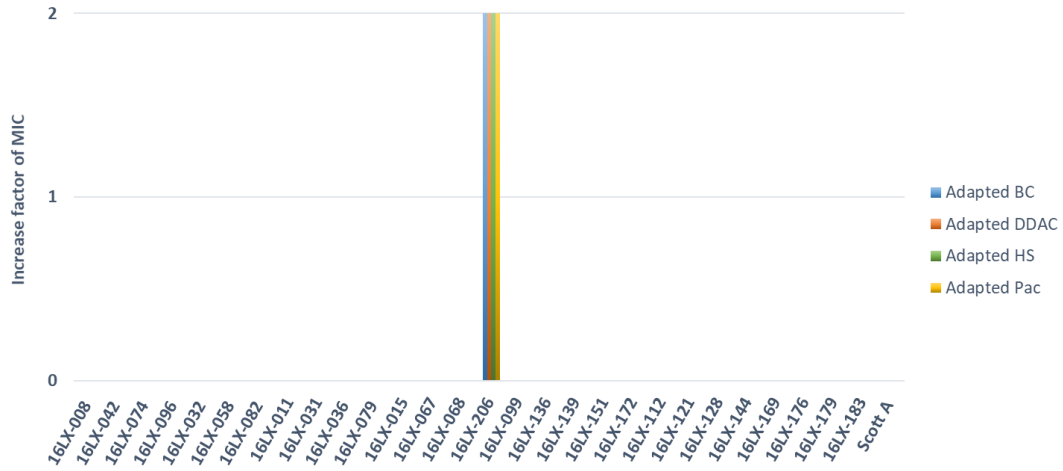
This adaptation involved an exposure of these strains to 4 different biocidal solutions during 10 consecutive days with a renewal of the broth containing biocides. After that, these adapted strains were kept at -80 °C and MICs of antibiotics (14) and biocides (8) were performed. One control for each strain was carried out with 100 µl of bacterial suspension diluted (1/10) and added to 10 ml of broth without biocide during 10 days as done for the other strains exposed to biocides. This control allows to take into account the MIC variation due to broth medium. We added also a reference strain *Lm ScottA*. Results of variation factor of MIC values determined after adaptation of 28 strains selected are presented by these different graphs (Fig 1 and 2). MIC values are indicated in table in supplementary data.

Figure 1. Increase factor of antibiotic MIC values after biocide exposures

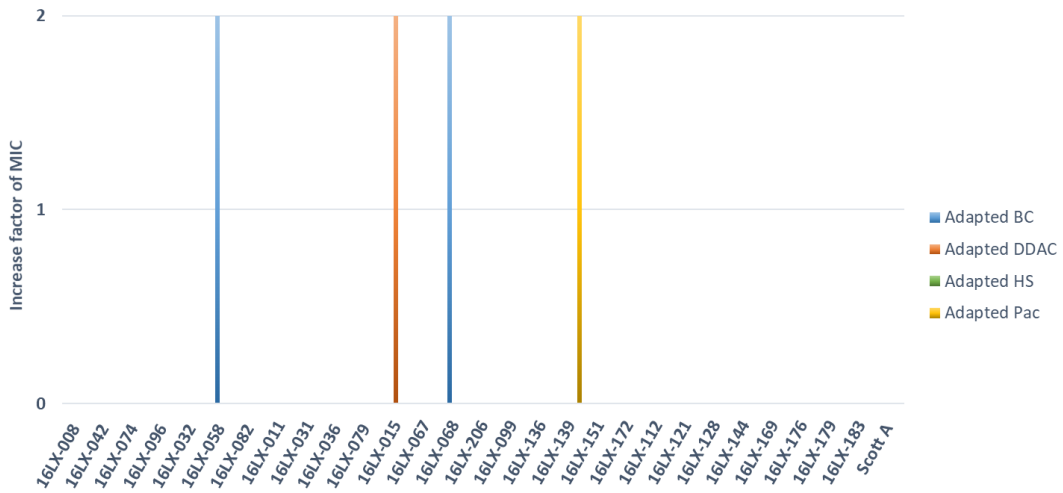




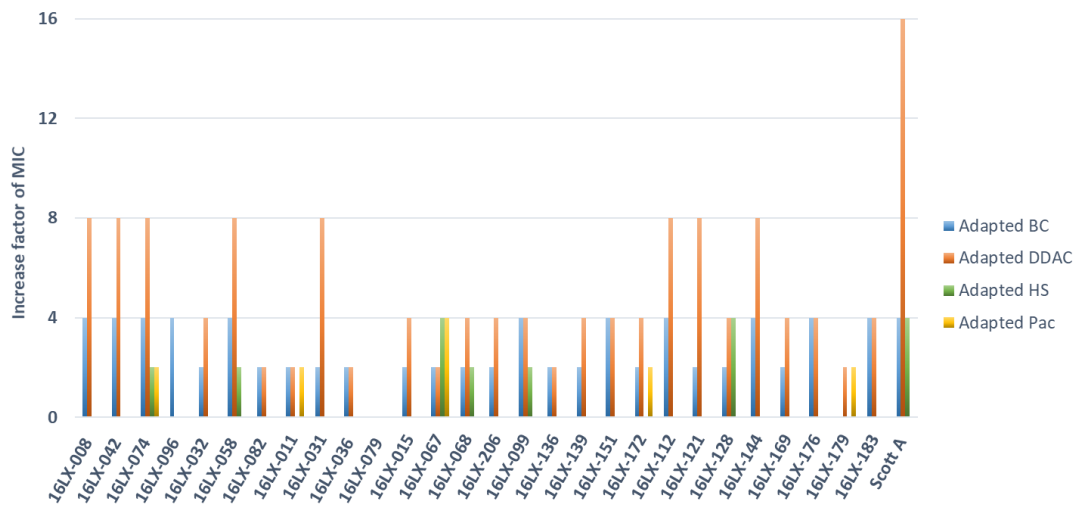
Ceftriaxone resistance after adaptation



Chloramphenicol resistance after adaptation

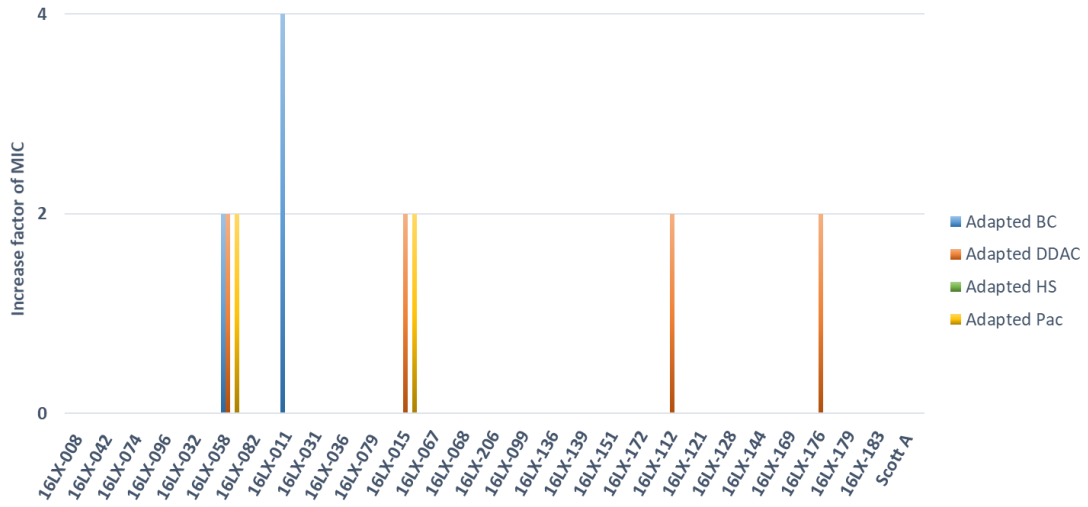


Ciprofloxacin resistance after adaptation

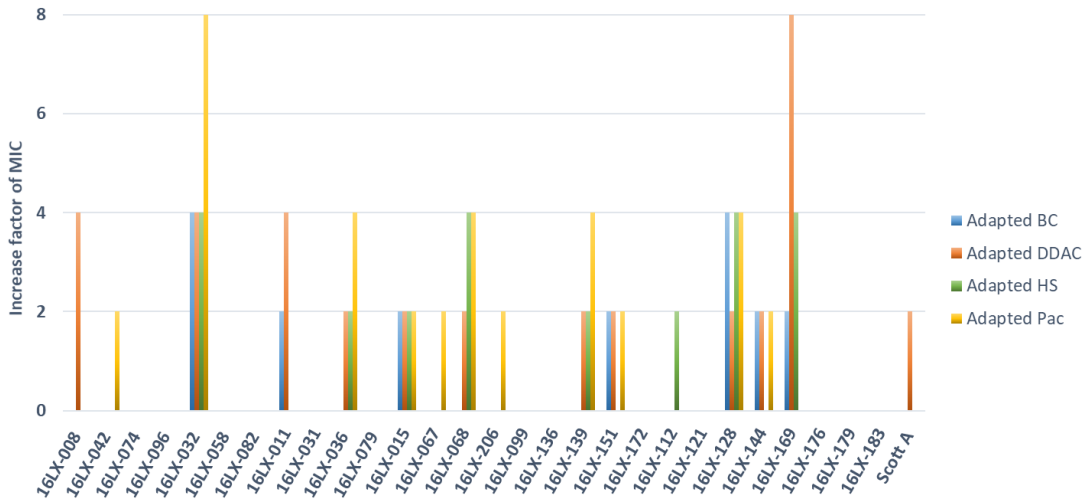




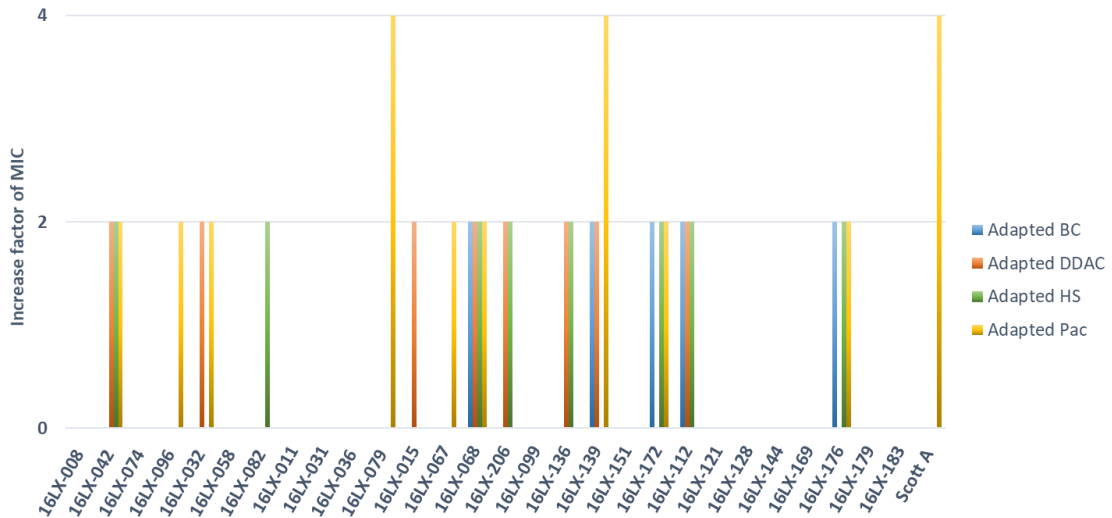
Erythromycin resistance after adaptation



Gentamicin resistance after adaptation

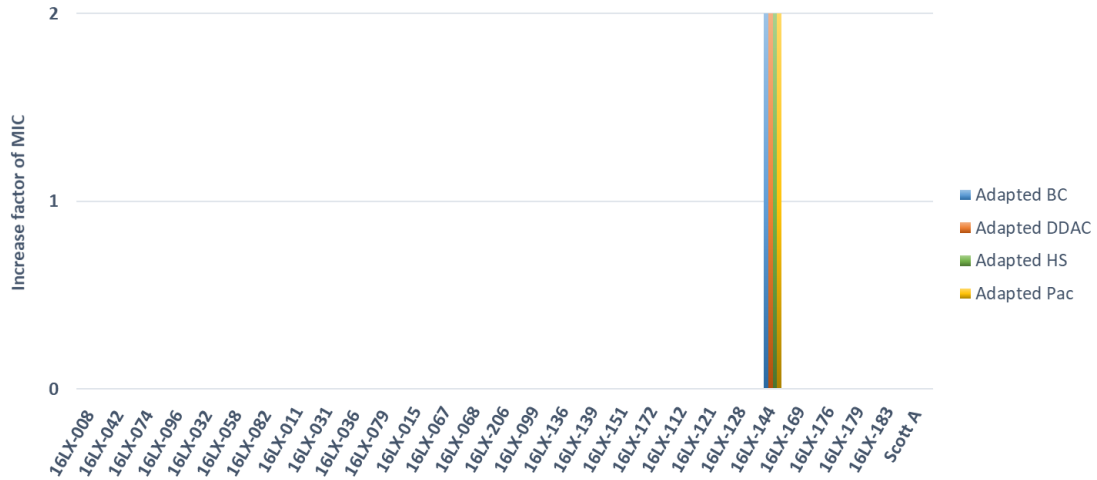


Meropenem resistance after adaptation

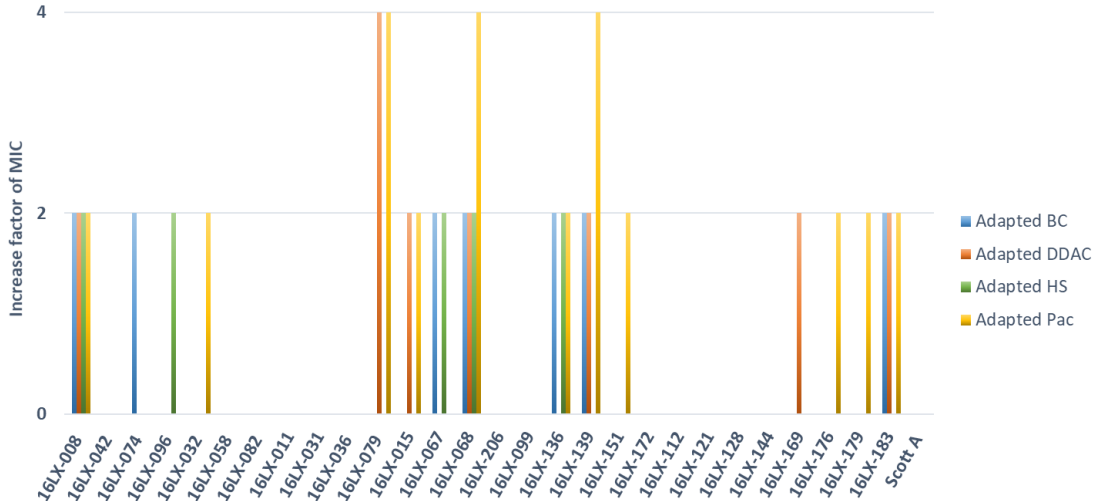




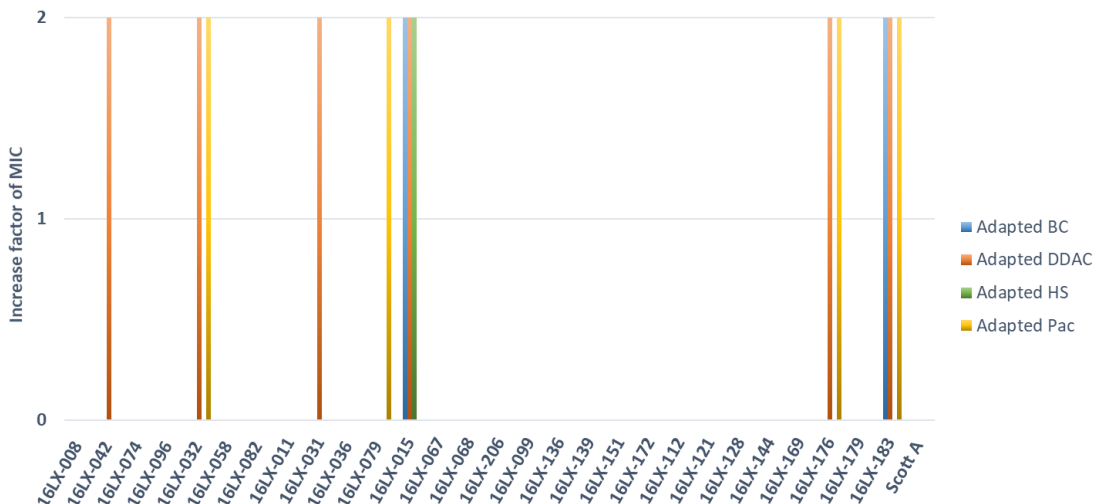
Nitrofurantoin resistance after adaptation



Streptomycin resistance after adaptation

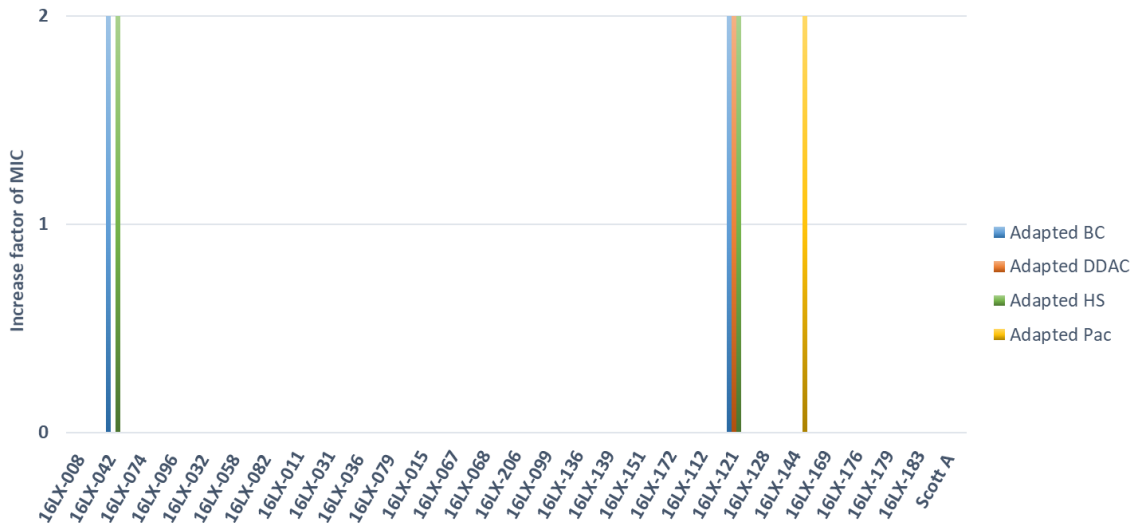


Tetracycline resistance after adaptation

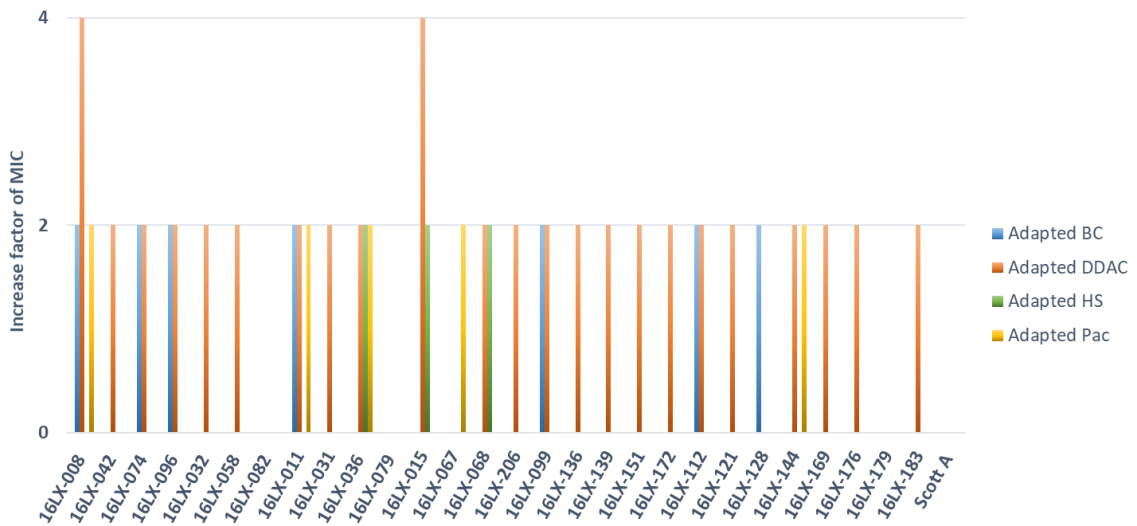




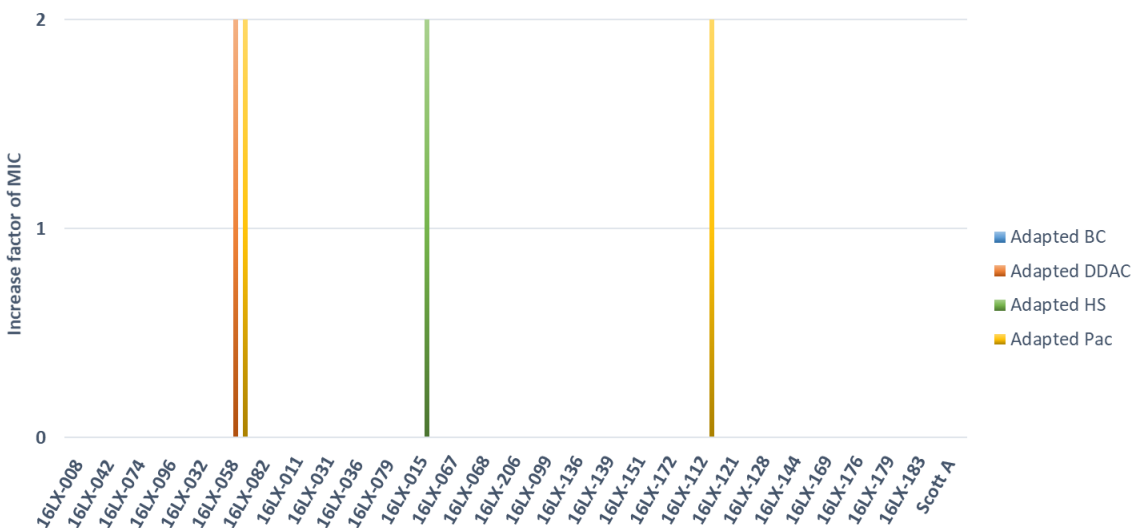
Tiamulin resistance after adaptation



Trimethoprim-Sulfamethoxazole resistance after adaptation



Vancomycin resistance after adaptation





We did not observe any significant variation in the MIC values for some antibiotics (AMP, CTA, CTR, CHL, NIT, TET, TIA and VAN) between bacteria exposed or not exposed to biocides.

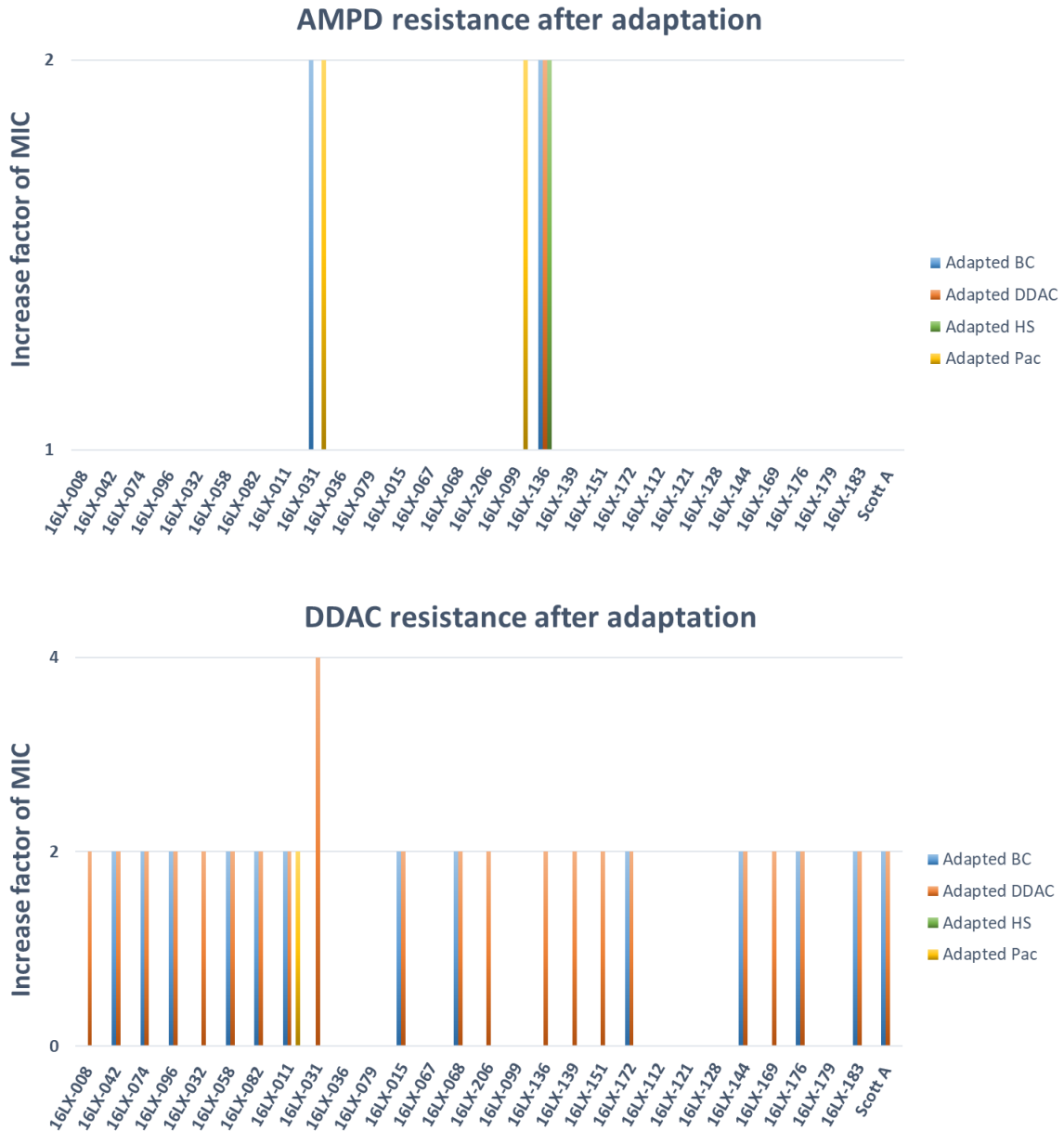
However, we observed significant variation of antibiotic resistance for several strains after exposure to biocides (*Fig 1. and Table 4 for strains details*):

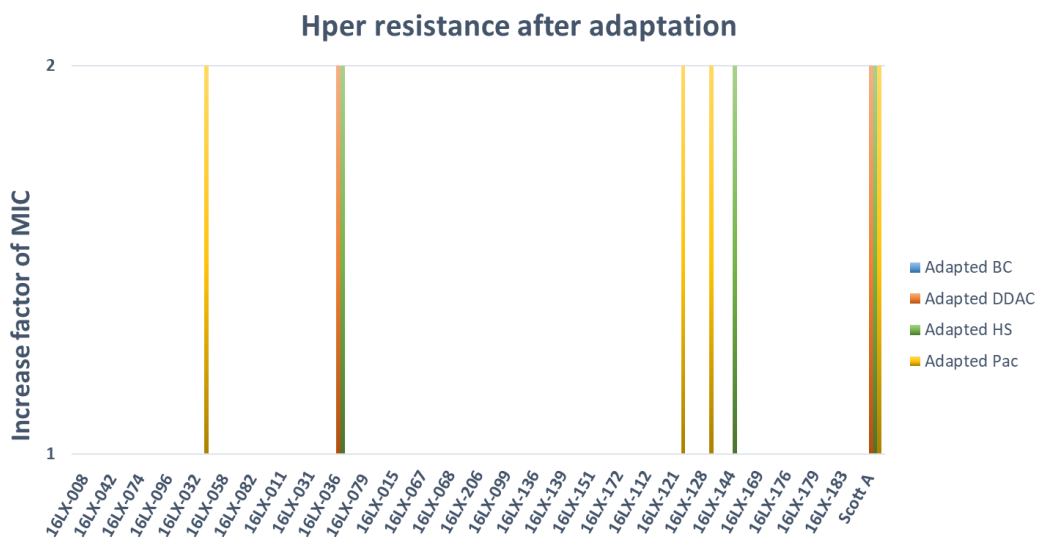
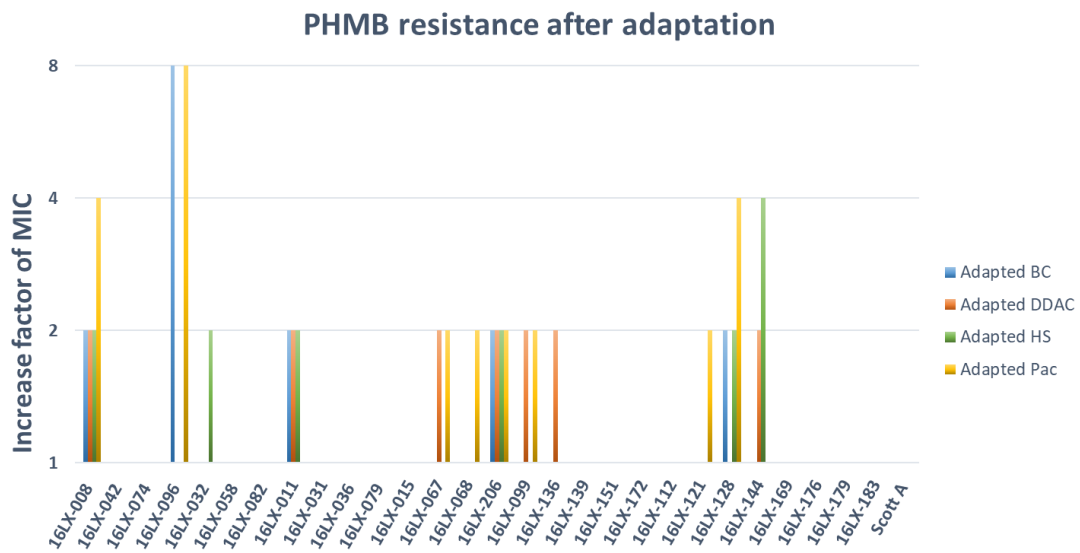
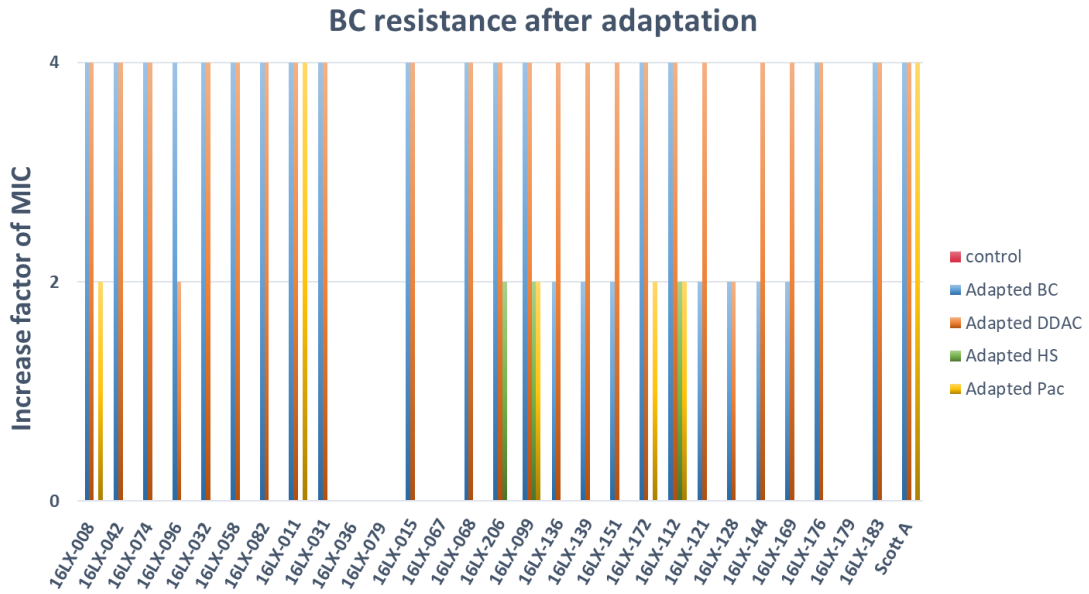
- Exposure to DDAC increases significantly ciprofloxacin resistance (≥ 8 -fold) for several strains: 16LX-008; 16LX-031; 16LX-042; 16LX-058; 16LX-074, 16LX-112; 16LX-121; 16LX-144 and ScottA
- For the strain 16LX-011, the exposure to BC increases erythromycin resistance with an 89% probability that this variation in MIC is significant
- It is the same case for the increase in gentamicin resistance following exposure to different biocides. Exposure to DDAC increases MIC value of gentamicin by 8-fold for strain 16LX-169 and for 16LX-008 and by 4-fold for 16LX-011, Pac exposure increases gentamicin resistance for strain 16LX-032 (8-fold) and 16LX-036, 16LX-068, 16LX-139 and 16LX-128 (4-fold). HS exposure have also an impact on gentamicin resistance for strain 16LX-068, 16LX-032, 16LX-128 and 16LX-169. BC exposure increases gentamicin resistance for 16LX-032 and 16LX-128.
- For the other antibiotic we does not observed increase of MIC values strictly more than 4-fold

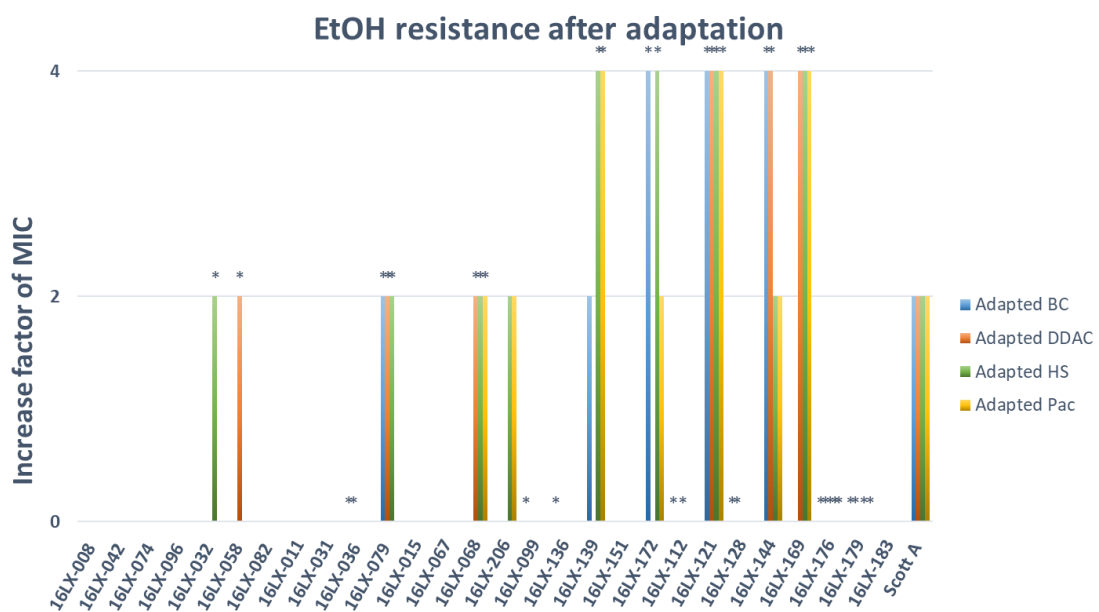
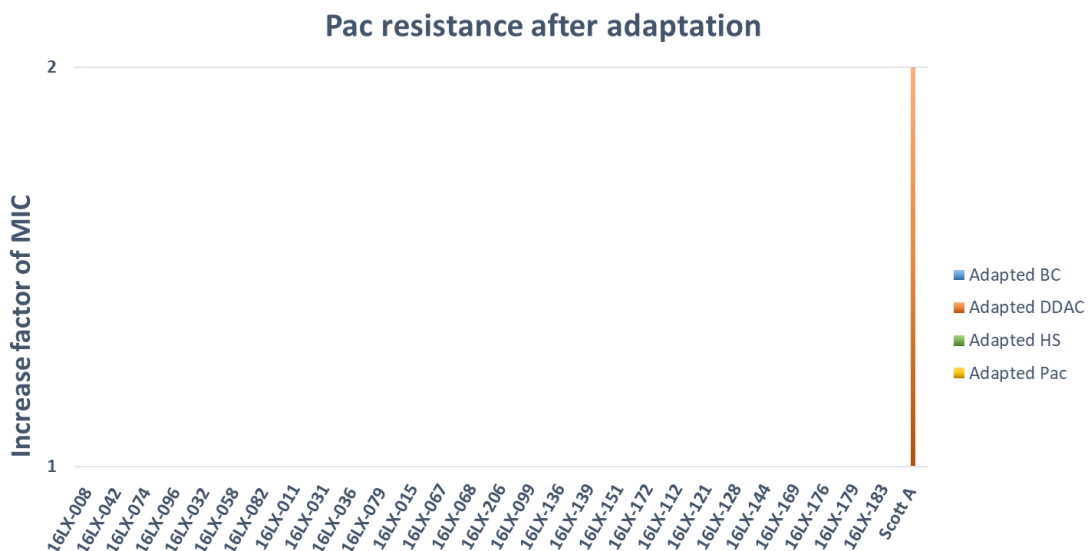
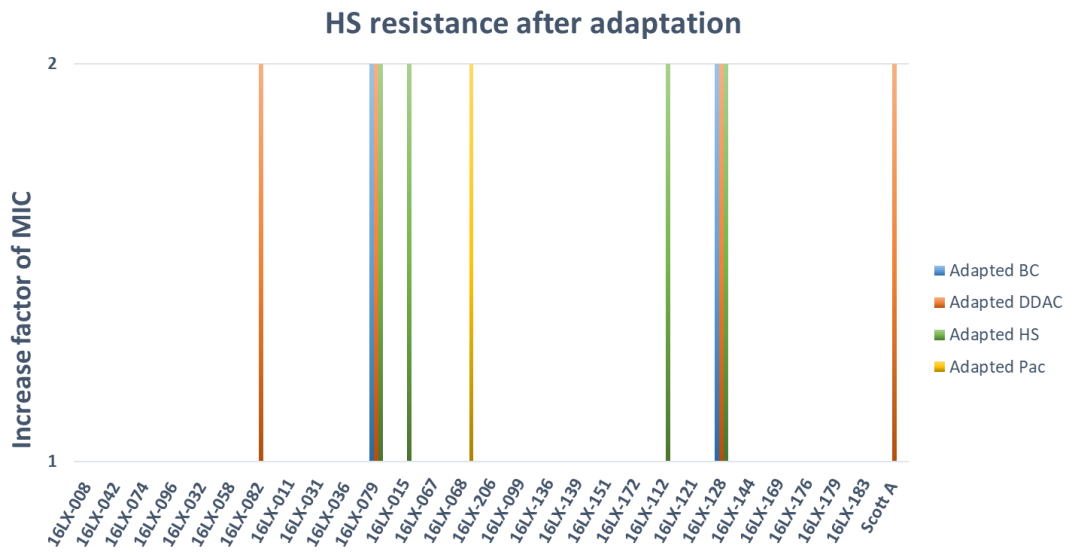
The main information is that the quaternary ammonium compounds exposure influences the resistance of *Lm* strains to certain antibiotics and mainly exposure to DDAC. The greatest variations in MIC values were found for ciprofloxacin resistance after exposure of strains to DDAC. However, we observed difference between *Lm* strains but the various ecological niches do not appear to be the cause of the behavior variation of *Lm* strains in relation to antibiotics.



Figure 2. Increase factor of biocides MIC values after biocide exposures (*: increase factor may be higher because CMI value determined is higher than the last biocide concentration tested)







We did not observe any significant variation in the MIC values for five biocides (Hper, AMPD, HS, Pac, EtOH) between bacteria exposed or not exposed to these four biocides (BC, DDAC, HS or Pac).



However, we found significant variation of biocide resistance for several strains after exposure to these 4 biocides (*Fig 2. and Table 4 for strains details*):

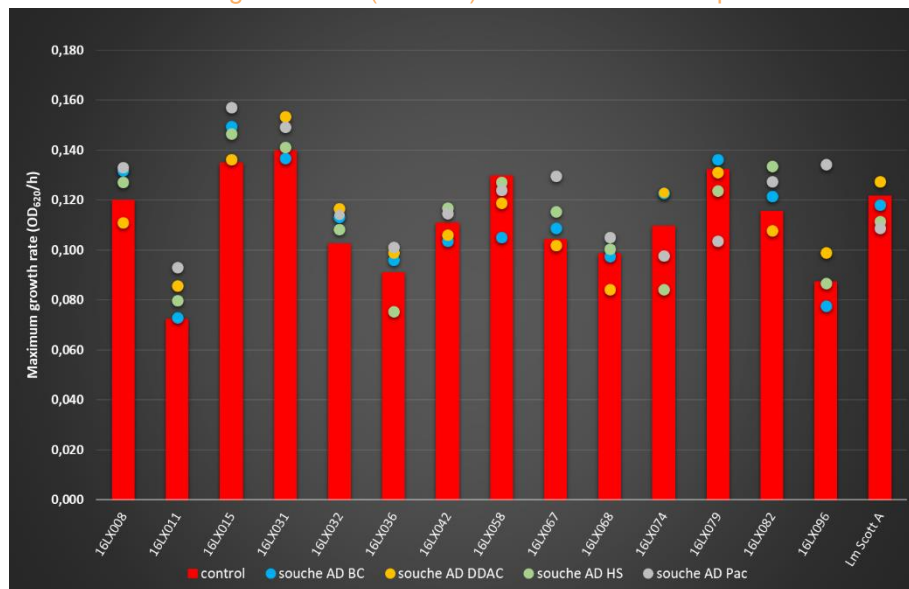
- Exposure to DDAC increases DDAC resistance with an 89% probability that this variation in MIC is significant (4-fold) for one strain: 16LX-031.
- For the majority of *Lm* strain, the exposure to the quaternary ammonium compounds (BC and DDAC) increases BC resistance with an 89% probability that this variation is significant (increase for 18 strains exposed to BC and for 23 strains exposed to DDAC).
It is the same case for strains 16LX-011 and ScottA exposed to Pac.
- It seems likely at 89% that exposure to Pac would increase PHMB resistance for strain 16LX-008 and significantly for strain 16LX-096. Exposure to BC increases also PHMB resistance for this strain 16LX-096. However, it is necessary to be careful with this type of increase of MIC values for the PHMB because it naturally disturbs the medium (BTS) and thus certain MIC values have been verified and determined by isolation on plate. This can induce a bias.
- It is also necessary to be careful with EtoH results because the evaporation of ethanol influences the MIC values determined

It is also important to notice that exposure to these four biocides does not influence the antimicrobial resistance profile of a single strain: 16LX-036

The main information is also that the quaternary ammonium compounds exposure influences the BC resistance for majority of *Lm* strains and that the type of ecological niches of strains (different food products) seems not influence antimicrobial resistance profiles.

Moreover, the impact of these biocide exposures on growth capacities of 15 of these strains were verified (*Fig 3*).

Figure 3. Variation of maximal growth rate (OD_{620}/h) for all *Lm* strains exposed to four biocides



Differences of maximal growth rate between these strains are observed as for strain 16LX-011 that has a lower maximal growth rate. No significant impacts of biocide exposures on maximal growth rate are found except for strain 16LX-096 where Pac exposure seems to increase the maximal growth rate. There are no impact on lag times and maximal population (data no shown).

After that, we wanted to verify if these modifications of antibiotics or biocides MIC values persisted over the time.

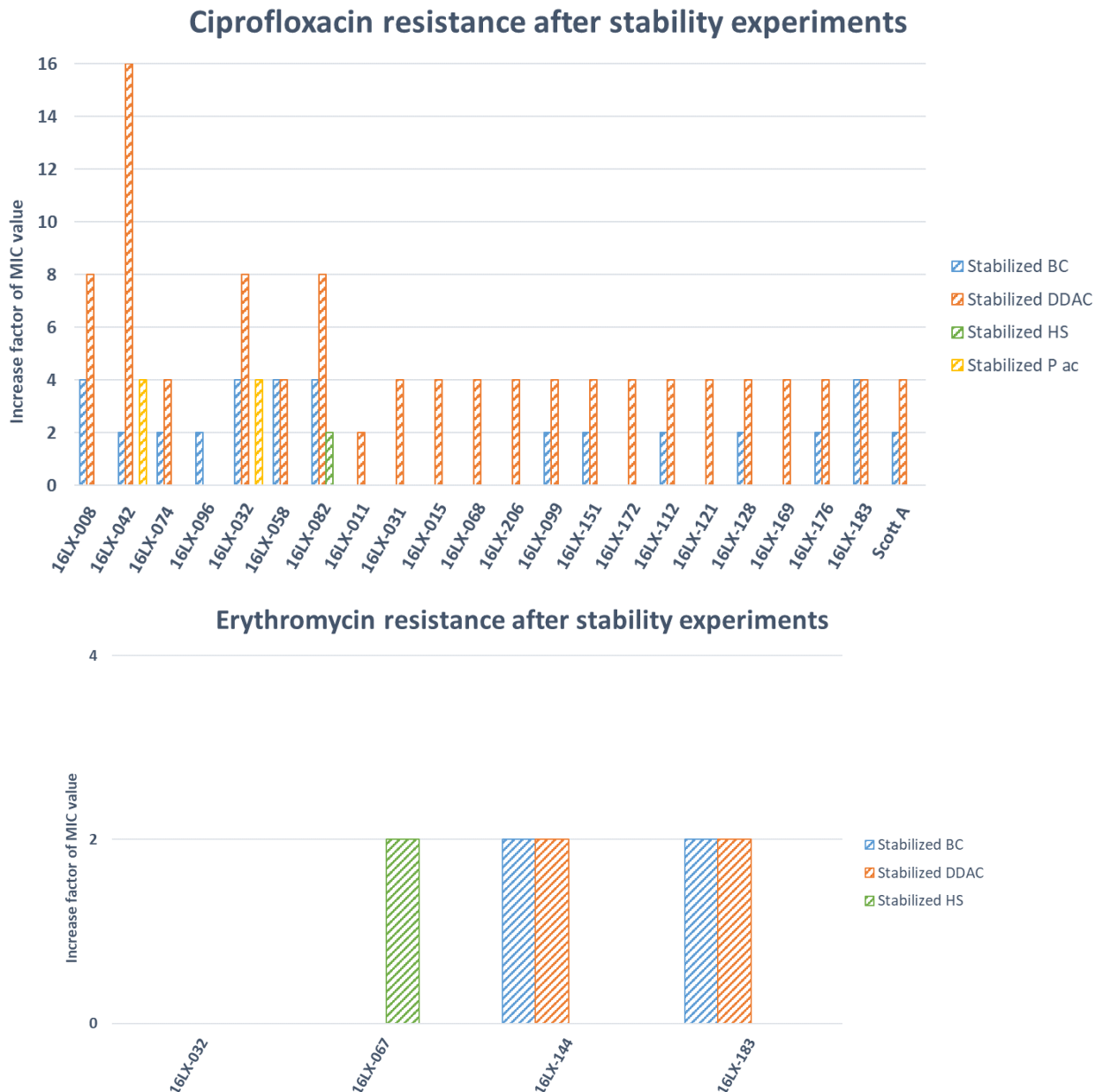
Therefore, we assessed the stability of the antimicrobial susceptibility profiles obtained after repetitive exposures to a biocide by cultivating these same fifteen strains (fourteen strains selected and *Lm* scottA) in nutritive broth without biocide during 10 consecutive days with a daily renewal of broth. After that, [25022020] [name of meeting] hosted by [name of host institution] in [location] Page



these strains were kept at -80 °C and their antibiotics (14) and biocides (8) susceptibility (MIC) were determined.

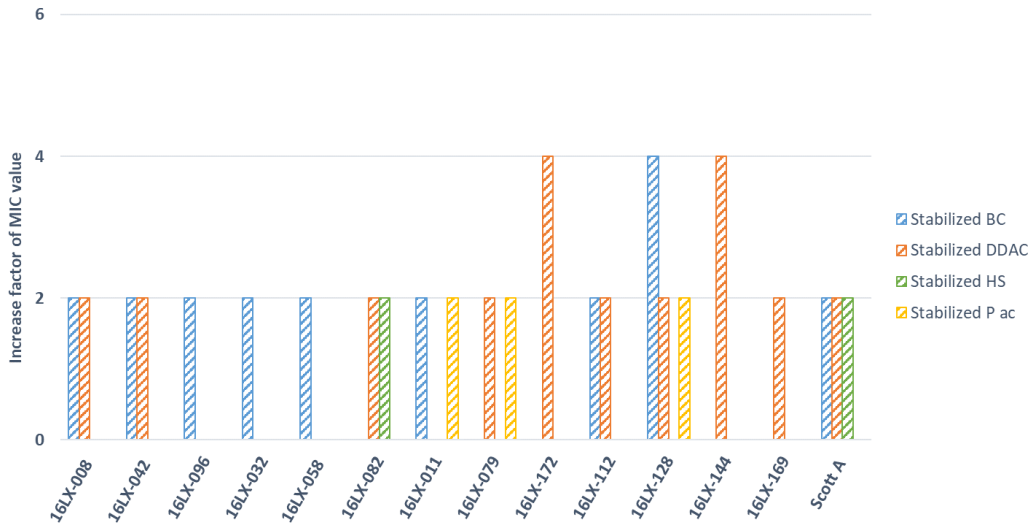
Here, we just presented results concerning strains with an antimicrobial resistance profiles that had changed after exposure to some biocides (*Fig 4 and 5*). The increase factors presented here correspond to the difference between the MIC values of the strains adapted/stabilized (stability experiment: 10 days in broth medium without biocides) and MIC value of control strains (adaptation step and stability step without biocide).

Figure 4. Variation of antibiotic MIC values after biocide exposures and after stability experiments

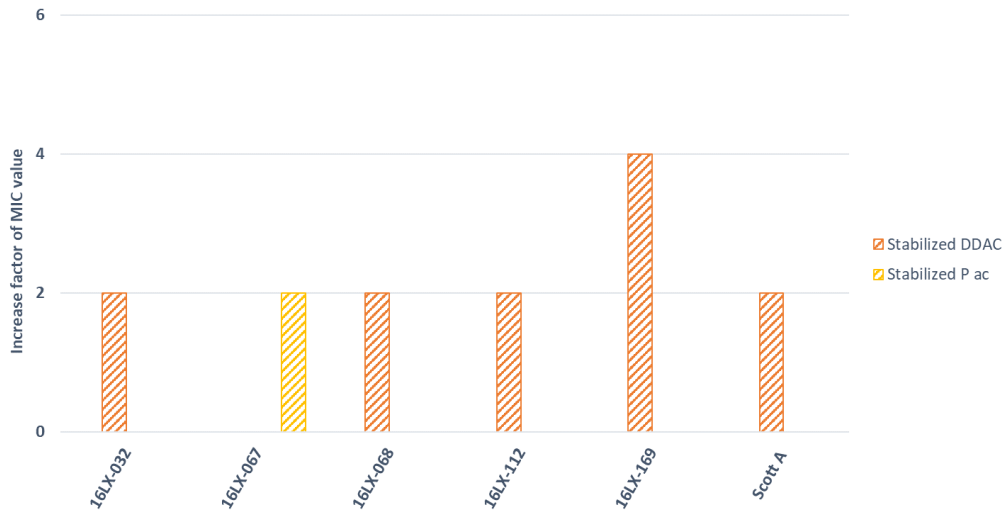




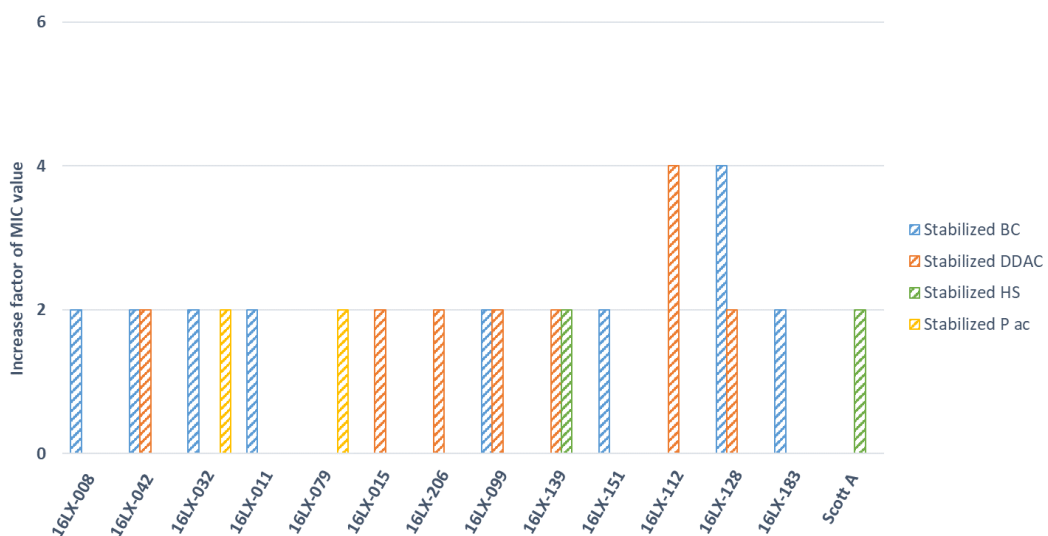
Gentamicin resistance after stability experiments



Meropenem resistance after stability experiments

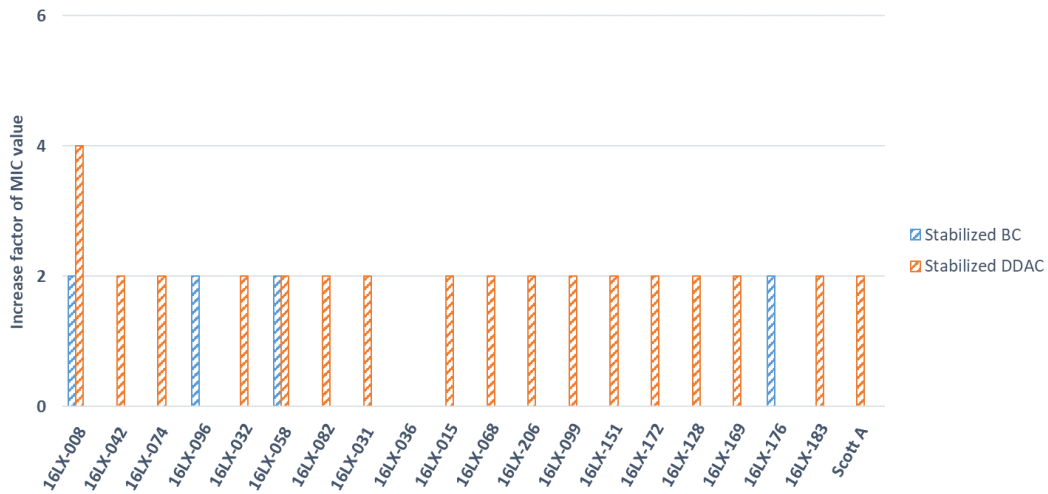


Streptomycin resistance after stability experiments

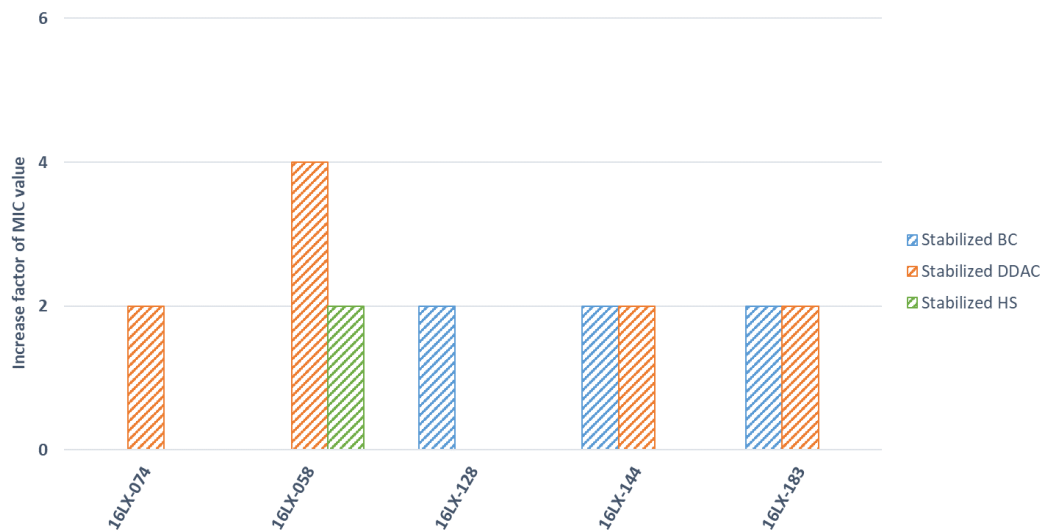




Trimethoprim-sulfamethoxazole resistance after stability experiments



Tetracyclin resistance after stability experiments



After this stability experiments, we have always seen an increase in ciprofloxacin resistance. Quaternary ammonium compounds exposure appears to increase this resistance, which persists over time, especially after exposure to DDAC.

We can observe that quaternary ammonium compounds exposure increase MIC values for other antibiotics:

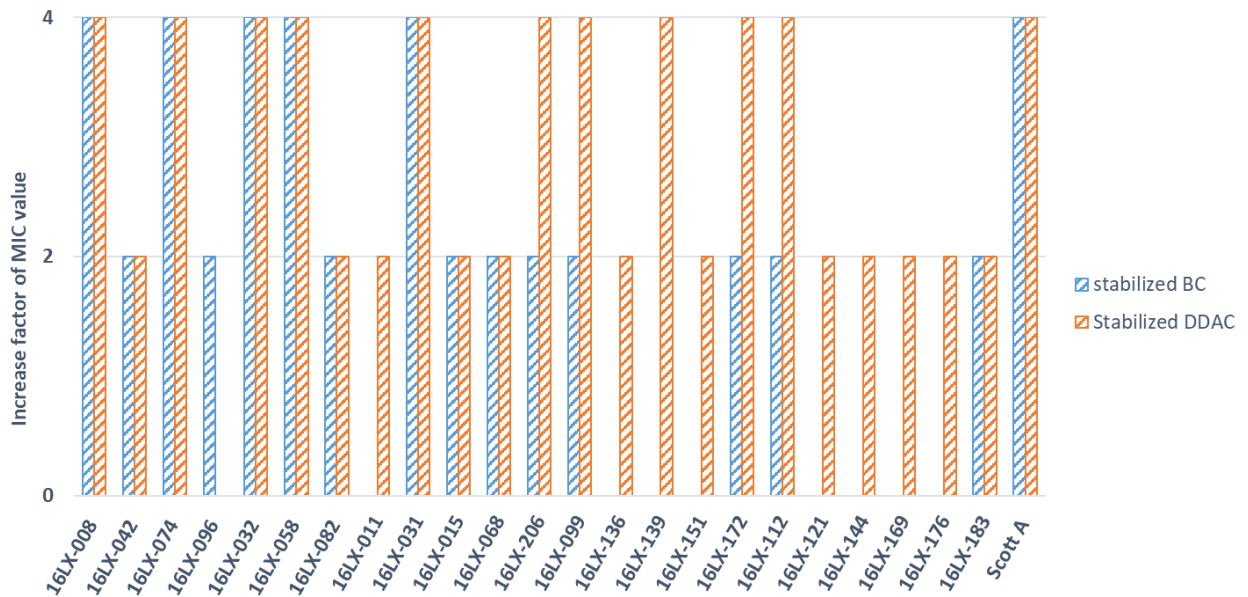
- MIC value of gentamicin after DDAC exposure for 16LX-172 and 16LX-144 increase by 4-fold and for strain 16LX-128 after BC exposure also
- MIC value of meropenem after DDAC exposure increase by 4-fold for 16LX-169
- MIC value of streptomycin after DDAC exposure increase by 4-fold for 16LX-112 and for 16LX-128 after BC exposure
- MIC value of trimethoprim-sulfamethoxazole after DDAC exposure increase by 4-fold for 16LX-008
- MIC value of tetracyclin after DDAC exposure increase by 4-fold for 16LX-058

Quaternary ammonium compounds exposure have a real impact on antibiotics resistance profiles. MIC values were presented in Table S3.

Figure 5. Variation of biocide MIC values after biocide exposures and after stability experiments



BC resistance after stability experiments



The 4-fold increase in BC resistance after exposure to DDAC and BC is maintained over time (10 days) for 11 *Lm* strains.

The increase of PHMB resistance with an increase by 4 or 8-fold after exposure to various biocides for several strains are not maintained over time (data not shown).

To sum up, we showed that there is a differential distribution of resistance profiles was observed in the 206 *Lm* strains before exposure to biocides, with food strains associated to higher resistance to quaternary ammonium compounds (BC and DDAC) than animal and environmental ones. Moreover we have found that quaternary ammonium compounds exposure have an impact on the resistance of *Lm* strains to several antibiotics as ciprofloxacin mainly after DDAC exposure. It was the same case for the increase of BC resistance after quaternary ammonium compounds exposure. These modifications of antimicrobial resistance profiles as the increase of BC or ciprofloxacin resistance persisted over time (10 days) especially for strains exposed to DDAC. However, the type of ecological niches of strains seems not influence the variation of antimicrobial resistance profiles after biocide exposure.

Ongoing experiments

Now, we check again the stability over time of changes in resistance to ciprofloxacin and BC after exposure to DDAC for strains: 16LX-008, 16LX-031, 16LX-042, 16LX-058, 16LX-074, 16LX-112, 16LX-121, 16LX-144 and 16LX-scottA. Moreover, we plan to investigate whether exposure to the biocides also influences the ability of these same strains to adhere and/or to form biofilms.



References

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Supplementary data

Table S1: MIC values of antibiotics determined after adaptation to these four biocides for the 28 *Lm* strains selected

The colour of cases corresponding to the increase factor after comparison with control (number of strain T)

factor ≤ -4
factor -2
factor 2
factor 4
factor ≥ 8

souche	AMP	FOT	AXO	CHL	CIP	ERY	GEN	MERO	NIT	STR	TET	TIA	SXT	VAN
16LX-008 T	1	>32	>32	8	2	0,25	0,5	0,25	>32	4	>8	64	0,03	1
16LX-042 T	0,5	>32	>32	16	1	0,25	0,5	0,12	>32	8	1	32	0,03	2
16LX-074 T	0,5	>32	>32	8	1	0,25	0,5	0,25	>32	4	2	64	0,03	1
16LX-096 T	1	>32	>32	8	2	0,25	0,5	0,5	>32	4	1	64	0,03	1
16LX-032 T	0,5	>32	>32	8	2	0,25	0,12	0,12	>32	4	1	64	0,03	1
16LX-058 T	1	>32	>32	8	2	0,25	1	0,25	>32	8	2	64	0,03	1
16LX-082 T	1	>32	>32	16	4	0,25	1	0,5	>32	16	1	64	0,06	1
16LX-011 T	2	>32	>32	8	4	0,5	0,25	>1	>32	4	1	>64	0,03	1
16LX-031 T	1	>32	>32	8	4	0,25	0,5	0,25	>32	4	1	64	0,03	1
16LX-036 T	1	>32	>32	8	1	0,25	0,12	0,25	>32	4	1	32	0,015	1
16LX-079 T	0,5	>32	>32	8	2	0,25	0,5	0,25	>32	4	1	64	0,03	1
16LX-015 T	1	>32	>32	8	2	0,25	0,5	0,25	>32	4	0,5	64	0,03	1
16LX-067 T	0,5	>32	>32	8	1	0,25	0,25	0,12	>32	4	1	32	0,015	1
16LX-068 T	1	>32	>32	8	2	0,25	0,25	0,12	>32	4	2	64	0,03	1
16LX-206 T	1	>32	>32	8	2	0,25	0,5	0,25	>32	8	1	64	0,03	1
16LX-099 T	0,5	>32	>32	8	2	0,25	1	0,25	>32	16	1	32	0,03	1
16LX-136 T	1	>32	>32	8	4	0,25	0,25	0,12	>32	4	1	64	0,03	1
16LX-139 T	0,5	>32	>32	8	2	0,25	0,25	0,12	>32	4	1	64	0,03	1
16LX-151 T	1	>32	>32	8	2	0,25	0,25	0,25	>32	4	1	32	0,03	1
16LX-172 T	0,5	>32	>32	8	2	0,25	1	0,12	>32	8	1	64	0,03	1
16LX-112 T	0,5	>32	>32	8	2	0,12	0,5	0,12	>32	8	1	64	0,06	1
16LX-121 T	0,5	>32	>32	8	2	0,25	1	0,25	>32	16	1	32	0,03	1
16LX-128 T	0,5	>32	>32	8	2	0,25	0,25	0,25	>32	16	1	64	0,03	1
16LX-144 T	0,25	8	16	8	2	0,25	0,25	0,12	>32	4	1	64	0,03	1
16LX-169 T	1	>32	>32	8	2	0,25	0,25	0,25	>32	16	1	>8	0,03	1
16LX-0176 T	1	>32	>32	8	2	0,25	1	0,25	>32	8	1	64	0,03	1
16LX-179 T	1	>32	>32	8	2	0,25	1	0,5	>32	8	1	32	0,03	1
16LX-183 T	0,5	>32	>32	8	2	0,25	0,5	0,12	>32	4	1	64	0,03	1
Scott A T	1	>32	>32	8	1	0,25	0,25	0,25	>32	4	1	64	0,03	1
16LX-008 AD BC	1	>32	>32	8	8	0,25	0,5	0,25	>32	8	>8	64	0,06	1
16LX-042 AD BC	0,5	>32	>32	16	4	0,25	0,5	0,12	>32	8	1	64	0,03	1
16LX-074 AD BC	0,5	>32	>32	8	4	0,25	0,25	0,25	>32	8	2	64	0,06	1
16LX-096 AD BC	1	>32	>32	8	8	0,25	0,5	0,5	>32	4	1	64	0,06	1
16LX-032 AD BC	0,5	>32	>32	8	4	0,25	0,5	0,12	>32	4	1	64	0,03	1
16LX-058 AD BC	1	>32	>32	16	8	0,5	1	0,25	>32	8	2	64	0,03	1
16LX-082 AD BC	1	>32	>32	8	8	0,25	1	0,25	>32	8	1	64	0,06	1
16LX-011 AD BC	2	>32	>32	8	8	2	0,5	1	>32	4	1	64	0,06	1
16LX-031 AD BC	1	>32	>32	8	8	0,25	0,25	0,25	>32	4	1	64	0,03	1
16LX-036 AD BC	0,5	>32	>32	8	2	0,25	0,12	0,25	>32	4	1	32	0,015	1
16LX-079 AD BC	0,5	>32	>32	8	1	0,25	0,25	0,25	>32	4	1	64	0,03	1
16LX-015 AD BC	1	>32	>32	8	4	0,25	1	0,25	>32	4	1	64	0,03	1
16LX-067 AD BC	0,5	>32	>32	8	2	0,25	0,25	0,12	>32	8	1	32	0,015	1
16LX-068 AD BC	1	>32	>32	16	4	0,25	0,25	0,25	>32	8	2	64	0,03	1
16LX-206 AD BC	1	>32	>32	8	4	0,25	0,5	0,25	>32	4	1	64	0,03	1
16LX-099 AD BC	1	>32	>32	8	8	0,25	1	0,25	>32	16	1	32	0,06	1
16LX-136 AD BC	0,5	>32	>32	8	8	0,25	0,25	0,12	>32	8	1	64	0,03	1
16LX-139 AD BC	0,5	>32	>32	8	4	0,25	0,25	0,25	>32	8	1	64	0,03	1
16LX-151 AD BC	1	>32	>32	8	8	0,25	0,5	0,25	>32	4	1	32	0,03	1
16LX-172 AD BC	0,5	>32	>32	8	4	0,25	0,5	0,25	>32	4	1	64	0,03	1
16LX-112 AD BC	0,5	>32	>32	8	8	0,12	0,25	0,25	>32	4	0,5	64	0,12	1
16LX-121 AD BC	0,5	>32	>32	8	4	0,25	0,25	0,25	>32	8	1	64	0,03	1



16LX-128 AD BC	1	>32	>32	8	4	0,25	1	0,25	>32	8	1	64	0,06	1
16LX-144 AD BC	0,25	8	32	8	8	0,12	0,5	0,12	>32	4	0,5	64	0,03	1
16LX-169 AD BC	1	>32	>32	8	4	0,25	0,5	0,25	>32	8	1	>8	0,03	1
16LX-0176 AD BC	1	>32	>32	8	8	0,25	0,5	0,5	>32	8	1	64	0,03	1
16LX-179 AD BC	1	>32	>32	8	2	0,25	0,25	0,5	>32	4	0,5	32	0,03	1
16LX-183 AD BC	0,5	>32	>32	8	8	0,25	0,25	0,12	>32	8	2	64	0,03	1
Scott A AD BC	1	>32	>32	8	4	0,25	0,25	0,25	>32	4	1	64	0,03	1
16LX-008 AD DDAC	1	>32	>32	8	16	0,25	2	0,25	>32	8	>8	32	0,12	1
16LX-042 AD DDAC	0,5	>32	>32	16	8	0,25	0,5	0,25	>32	8	2	32	0,06	2
16LX-074 AD DDAC	1	>32	>32	8	8	0,25	0,25	0,25	>32	4	2	64	0,06	1
16LX-096 AD DDAC	1	>32	>32	8	1	0,25	0,5	0,5	>32	4	1	64	0,06	1
16LX-032 AD DDAC	0,5	>32	>32	8	8	0,25	0,5	0,25	>32	4	2	64	0,06	1
16LX-058 AD DDAC	1	>32	>32	8	16	0,5	0,5	0,12	>32	4	2	64	0,06	2
16LX-082 AD DDAC	1	>32	>32	8	8	0,25	1	0,25	>32	8	1	64	0,06	1
16LX-011 AD DDAC	2	>32	>32	8	8	0,25	1	0,5	>32	4	1	64	0,06	1
16LX-031 AD DDAC	1	>32	>32	8	32	0,25	0,25	0,25	>32	4	2	64	0,06	1
16LX-036 AD DDAC	0,5	>32	>32	8	2	0,25	0,25	0,25	>32	4	1	32	0,03	1
16LX-079 AD DDAC	0,5	>32	>32	8	2	0,25	0,25	0,25	>32	16	1	64	0,03	1
16LX-015 AD DDAC	1	>32	>32	16	8	0,5	1	0,5	>32	8	1	64	0,12	1
16LX-067 AD DDAC	0,5	>32	>32	8	2	0,25	0,25	0,12	>32	4	1	32	0,015	1
16LX-068 AD DDAC	1	>32	>32	8	8	0,25	0,5	0,25	>32	8	2	32	0,06	1
16LX-206 AD DDAC	1	>32	>32	8	8	0,25	0,5	0,5	>32	8	1	64	0,06	1
16LX-099 AD DDAC	0,5	>32	>32	8	8	0,25	1	0,25	>32	8	1	32	0,06	1
16LX-136 AD DDAC	1	>32	>32	8	8	0,25	0,25	0,25	>32	4	1	64	0,06	1
16LX-139 AD DDAC	0,5	>32	>32	8	8	0,25	0,5	0,25	>32	8	1	64	0,06	1
16LX-151 AD DDAC	1	>32	>32	8	8	0,25	0,5	0,25	>32	4	1	32	0,06	1
16LX-172 AD DDAC	0,5	>32	>32	8	8	0,25	0,5	0,12	>32	8	1	64	0,06	1
16LX-112 AD DDAC	0,5	>32	>32	8	16	0,25	0,5	0,25	>32	4	1	32	0,12	1
16LX-121 AD DDAC	0,5	>32	>32	8	16	0,25	0,5	0,25	>32	8	1	64	0,06	1
16LX-128 AD DDAC	1	>32	>32	8	8	0,25	0,5	0,25	>32	8	1	64	0,03	1
16LX-144 AD DDAC	0,5	8	32	8	16	0,25	0,5	0,12	>32	4	1	64	0,06	1
16LX-169 AD DDAC	1	>32	>32	8	8	0,25	2	0,25	>32	32	1	>8	0,06	1
16LX-0176 AD DDAC	1	>32	>32	8	8	0,5	1	0,25	>32	8	2	64	0,06	1
16LX-179 AD DDAC	1	>32	>32	8	4	0,25	0,25	0,5	>32	8	0,5	32	0,03	1
16LX-183 AD DDAC	0,5	>32	>32	8	8	0,25	0,5	0,12	>32	8	2	64	0,06	1
Scott A AD DDAC	0,5	>32	>32	8	16	0,25	0,5	0,25	>32	4	1	64	0,03	1
16LX-008 AD HS	1	>32	>32	8	2	0,25	0,25	0,25	>32	8	>8	64	0,03	1
16LX-042 AD HS	0,5	>32	>32	8	1	0,25	0,25	0,25	>32	4	1	64	0,03	1
16LX-074 AD HS	0,5	>32	>32	8	2	0,25	0,5	0,12	>32	4	1	64	0,03	1
16LX-096 AD HS	1	>32	>32	8	2	0,25	0,5	0,5	>32	8	1	64	0,03	1
16LX-032 AD HS	0,5	>32	>32	8	1	0,25	0,5	0,12	>32	4	1	64	0,03	1
16LX-058 AD HS	1	>32	>32	8	4	0,25	1	0,25	>32	4	2	64	0,03	1
16LX-082 AD HS	1	>32	>32	8	4	0,25	0,5	1	>32	4	1	64	0,03	1
16LX-011 AD HS	1	>32	>32	8	1	0,25	0,25	0,5	>32	4	1	64	0,03	1
16LX-031 AD HS	1	>32	>32	8	2	0,25	0,25	0,25	>32	4	1	64	0,03	1
16LX-036 AD HS	0,5	>32	>32	8	1	0,25	0,25	0,12	>32	4	1	32	0,03	1
16LX-079 AD HS	0,5	>32	>32	8	1	0,25	0,5	0,25	>32	4	1	64	0,03	1
16LX-015 AD HS	1	>32	>32	8	1	0,25	1	0,25	>32	4	1	64	0,06	2
16LX-067 AD HS	1	>32	>32	8	4	0,25	0,25	0,12	>32	8	1	32	0,015	1
16LX-068 AD HS	0,5	>32	>32	8	4	0,25	1	0,25	>32	8	2	64	0,06	1
16LX-206 AD HS	1	>32	>32	8	2	0,25	0,5	0,5	>32	8	1	64	0,03	1
16LX-099 AD HS	1	>32	>32	8	4	0,25	1	0,25	>32	4	1	32	0,03	1
16LX-136 AD HS	1	>32	>32	8	2	0,25	0,25	0,25	>32	8	1	64	0,03	1
16LX-139 AD HS	0,5	>32	>32	8	2	0,25	0,5	0,12	>32	4	1	64	0,03	1
16LX-151 AD HS	1	>32	>32	8	2	0,25	0,25	0,25	>32	4	1	32	0,03	1
16LX-172 AD HS	0,5	>32	>32	8	2	0,25	0,5	0,25	>32	4	1	64	0,03	1
16LX-112 AD HS	0,5	>32	>32	8	2	0,12	1	0,25	>32	8	1	32	0,06	1
16LX-121 AD HS	1	>32	>32	8	2	0,25	0,5	0,25	>32	8	1	64	0,03	1
16LX-128 AD HS	1	>32	>32	8	8	0,25	1	0,25	>32	16	1	64	0,03	1
16LX-144 AD HS	0,25	16	32	4	2	0,25	0,25	0,12	>32	4	1	64	0,03	1
16LX-169 AD HS	0,5	>32	>32	8	2	0,25	1	0,25	>32	8	1	>8	0,03	1
16LX-0176 AD HS	1	>32	>32	8	2	0,25	1	0,5	>32	8	1	64	0,03	1
16LX-179 AD HS	1	>32	>32	8	2	0,25	0,25	0,5	>32	4	0,5	32	0,03	1
16LX-183 AD HS	0,5	>32	>32	8	2	0,25	0,5	0,12	>32	4	1	64	0,03	1
Scott A AD HS	1	>32	>32	8	4	0,25	0,25	0,25	>32	4	0,5	64	0,03	1
16LX-008 AD Pac	1	>32	>32	8	2	0,25	0,5	0,25	>32	8	>8	64	0,06	1
16LX-042 AD Pac	1	>32	>32	8	1	0,25	1	0,25	>32	8	1	32	0,03	1
16LX-074 AD Pac	0,5	>32	>32	8	2	0,25	0,12	0,25	>32	4	1	64	0,03	1
16LX-096 AD Pac	1	>32	>32	8	2	0,25	0,5	1	>32	4	1	64	0,03	1



16LX-032 AD Pac	0,5	>32	>32	8	2	0,25	1	0,25	>32	8	2	64	0,03	1
16LX-058 AD Pac	1	>32	>32	8	2	0,5	0,5	0,25	>32	4	2	64	0,03	2
16LX-082 AD Pac	1	>32	>32	8	2	0,25	1	0,25	>32	8	1	64	0,03	1
16LX-011 AD Pac	1	>32	>32	8	8	0,25	0,25	0,25	>32	4	1	64	0,06	1
16LX-031 AD Pac	1	>32	>32	8	2	0,25	0,25	0,25	>32	4	1	64	0,03	1
16LX-036 AD Pac	1	>32	>32	8	1	0,25	0,5	0,25	>32	4	1	32	0,03	1
16LX-079 AD Pac	1	>32	>32	8	2	0,25	0,5	1	>32	16	2	64	0,03	1
16LX-015 AD Pac	1	>32	>32	8	1	0,5	1	0,25	>32	8	0,5	64	0,03	1
16LX-067 AD Pac	0,5	>32	>32	8	4	0,25	0,5	0,25	>32	4	1	32	0,03	1
16LX-068 AD Pac	1	>32	>32	8	1	0,25	1	0,25	>32	16	1	32	0,03	1
16LX-206 AD Pac	1	>32	>32	8	2	0,25	1	0,25	>32	8	1	64	0,03	1
16LX-099 AD Pac	1	>32	>32	8	2	0,25	1	0,25	>32	8	1	32	0,03	1
16LX-136 AD Pac	0,5	>32	>32	8	4	0,25	0,25	0,12	>32	8	1	64	0,03	1
16LX-139 AD Pac	0,5	>32	>32	16	2	0,25	1	0,5	>32	16	1	64	0,03	1
16LX-151 AD Pac	1	>32	>32	8	2	0,25	0,5	0,25	>32	8	1	32	0,03	1
16LX-172 AD Pac	0,5	>32	>32	8	4	0,25	0,25	0,25	>32	8	1	64	0,03	1
16LX-112 AD Pac	0,5	>32	>32	8	2	0,12	0,5	0,12	>32	8	0,25	64	0,06	2
16LX-121 AD Pac	1	>32	>32	8	2	0,25	0,5	0,25	>32	8	1	32	0,03	1
16LX-128 AD Pac	0,5	>32	>32	8	2	0,25	1	0,25	>32	8	1	64	0,03	1
16LX-144 AD Pac	0,5	32	32	4	2	0,12	0,5	0,12	>32	4	1	32	0,06	1
16LX-169 AD Pac	1	>32	>32	8	2	0,25	0,25	0,25	>32	16	1	>8	0,03	1
16LX-0176 AD Pac	1	>32	>32	8	2	0,25	1	0,5	>32	16	2	64	0,03	1
16LX-179 AD Pac	0,5	>32	>32	8	4	0,25	1	0,25	>32	16	0,5	32	0,03	1
16LX-183 AD Pac	0,5	>32	>32	8	2	0,25	0,5	0,12	>32	8	2	64	0,03	1
Scott A AD Pac	1	>32	>32	8	1	0,25	0,25	1	>32	4	1	64	0,03	1



Table S2: MIC values of biocides determined after adaptation to these four biocides for the 28 *Lm* strains selected

The colour of cases corresponding to the increase factor after comparison with control (number of strain T)

factor ≤ -4
factor -2
factor 2
factor 4
factor ≥ 8

souches	AMPD (µg/ml)	DDAC	BC	PHMB	HPer	HS	Pac	EtOH (%)
16LX-008 T	4	0,6	1,25	1,6	62,5	625	313	25
16LX-042 T	8	0,6	1,25	3,1	125	625	313	50
16LX-074 T	8	0,6	0,6	1,6	125	625	313	50
16LX-096 T	8	0,6	1,25	1,6	125	625	313	50
16LX-032 T	8	0,6	1,25	3,1	62,5	625	313	50
16LX-058 T	8	0,6	1,25	6,25	125	625	313	50
16LX-082 T	8	0,6	1,25	12,5	125	625	313	50
16LX-011 T	4	0,6	1,25	1,6	62,5	625	156	12,5
16LX-031 T	2	0,6	1,25	1,6	125	625	313	25
16LX-036 T	8	1,25	5	3,1	62,5	625	313	>50
16LX-079 T	8	1,25	2,5	3,1	62,5	625	156	50
16LX-015 T	8	0,6	2,5	3,1	125	625	313	25
16LX-067 T	8	1,25	2,5	1,6	62,5	625	313	50
16LX-068 T	8	0,6	0,6	1,6	125	625	313	50
16LX-206 T	8	0,6	1,25	6,25	125	1250	313	25
16LX-099 T	4	0,6	0,6	3,1	125	1250	313	>50
16LX-136 T	2	0,6	1,25	1,6	62,5	625	156	>50
16LX-139 T	4	0,6	1,25	3,1	62,5	625	156	25
16LX-151 T	4	0,6	1,25	3,1	62,5	625	156	50
16LX-172 T	4	0,6	1,25	3,1	125	1250	156	25
16LX-112 T	4	0,6	0,6	3,1	62,5	625	313	>50
16LX-121 T	4	0,6	1,25	3,1	62,5	1250	313	25
16LX-128 T	4	0,6	1,25	1,6	62,5	625	313	>50
16LX-144 T	4	0,6	1,25	3,1	62,5	625	156	25
16LX-169 T	4	0,6	1,25	3,1	125	1250	156	25
16LX-176 T	4	0,6	1,25	6,25	125	1250	156	>50
16LX-179 T	4	1,25	5	3,1	125	1250	156	>50
16LX-183 T	4	0,6	1,25	3,1	125	1250	313	50
Scott A T	8	0,6	1,25	3,1	62,5	625	313	25
16LX-008 AD BC	8	0,6	5	3,1	62,5	625	313	12,5
16LX-042 AD BC	8	1,25	5	3,1	62,5	625	313	50
16LX-074 AD BC	8	1,25	2,5	1,6	125	625	313	50
16LX-096 AD BC	8	1,25	5	12,5	125	625	313	50
16LX-032 AD BC	8	0,6	5	3,1	62,5	625	313	50
16LX-058 AD BC	8	1,25	5	6,25	125	625	313	50
16LX-082 AD BC	8	1,25	5	6,25	125	625	313	50
16LX-011 AD BC	4	1,25	5	3,1	62,5	625	156	12,5
16LX-031 AD BC	4	0,6	5	1,6	125	625	313	12,5
16LX-036 AD BC	8	1,25	5	3,1	62,5	625	313	>50
16LX-079 AD BC	8	1,25	2,5	1,6	62,5	1250	156	>50
16LX-015 AD BC	8	1,25	5	3,1	125	625	313	25
16LX-067 AD BC	8	1,25	2,5	1,6	62,5	625	156	25
16LX-068 AD BC	8	1,25	2,5	1,6	62,5	625	313	50
16LX-206 AD BC	8	0,6	5	12,5	125	1250	313	25
16LX-099 AD BC	4	0,6	2,5	3,1	125	1250	313	>50
16LX-136 AD BC	4	0,6	2,5	1,6	62,5	625	156	>50
16LX-139 AD BC	4	0,6	2,5	3,1	62,5	625	156	50
16LX-151 AD BC	4	0,6	2,5	3,1	62,5	625	156	50
16LX-172 AD BC	4	1,25	5	3,1	125	1250	156	>50
16LX-112 AD BC	4	0,6	2,5	1,6	62,5	625	313	25
16LX-121 AD BC	4	0,6	2,5	3,1	62,5	1250	313	>50
16LX-128 AD BC	4	0,6	2,5	3,1	62,5	1250	313	>50
16LX-144 AD BC	4	1,25	2,5	3,1	62,5	625	156	>50
16LX-169 AD BC	4	0,6	2,5	3,1	125	1250	156	25



16LX-176 AD BC	4	1,25	5	3,1	125	1250	156	>50
16LX-179 AD BC	4	1,25	5	3,1	125	1250	156	>50
16LX-183 AD BC	4	1,25	5	1,6	62,5	1250	313	50
Scott A AD BC	8	1,25	5	3,1	62,5	625	313	50
16LX-008 AD DDAC	8	1,25	5	3,1	62,5	625	313	12,5
16LX-042 AD DDAC	8	1,25	5	3,1	62,5	625	313	50
16LX-074 AD DDAC	8	1,25	2,5	1,6	125	625	313	50
16LX-096 AD DDAC	4	1,25	2,5	1,6	62,5	625	313	50
16LX-032 AD DDAC	8	1,25	5	3,1	62,5	625	313	50
16LX-058 AD DDAC	8	1,25	5	6,25	125	625	313	>50
16LX-082 AD DDAC	8	1,25	5	3,1	125	1250	313	50
16LX-011 AD DDAC	4	1,25	5	3,1	62,5	625	156	12,5
16LX-031 AD DDAC	2	2,5	5	1,6	125	625	313	25
16LX-036 AD DDAC	8	1,25	5	3,1	125	625	313	50
16LX-079 AD DDAC	8	1,25	2,5	1,6	62,5	1250	156	>50
16LX-015 AD DDAC	8	1,25	5	3,1	125	625	313	25
16LX-067 AD DDAC	8	1,25	2,5	3,1	62,5	625	156	50
16LX-068 AD DDAC	8	1,25	2,5	1,6	62,5	625	313	>50
16LX-206 AD DDAC	8	1,25	5	12,5	125	1250	313	25
16LX-099 AD DDAC	4	0,6	2,5	6,25	125	1250	313	>50
16LX-136 AD DDAC	4	1,25	5	3,1	62,5	625	156	>50
16LX-139 AD DDAC	4	1,25	5	3,1	62,5	625	156	12,5
16LX-151 AD DDAC	4	1,25	5	3,1	62,5	625	156	12,5
16LX-172 AD DDAC	4	1,25	5	3,1	125	1250	156	12,5
16LX-112 AD DDAC	4	0,6	2,5	1,6	62,5	625	313	>50
16LX-121 AD DDAC	4	0,6	5	1,6	62,5	1250	313	>50
16LX-128 AD DDAC	4	0,6	2,5	1,6	62,5	1250	313	25
16LX-144 AD DDAC	4	1,25	5	6,25	62,5	625	156	>50
16LX-169 AD DDAC	4	1,25	5	3,1	125	1250	156	>50
16LX-176 AD DDAC	4	1,25	5	6,25	125	1250	156	>50
16LX-179 AD DDAC	4	1,25	5	3,1	125	1250	156	50
16LX-183 AD DDAC	4	1,25	5	1,6	125	1250	313	50
Scott A AD DDAC	8	1,25	5	3,1	125	1250	625	50
16LX-008 AD HS	8	0,6	1,25	3,1	62,5	625	313	12,5
16LX-042 AD HS	8	0,6	1,25	3,1	62,5	625	313	50
16LX-074 AD HS	4	0,6	0,6	1,6	125	625	313	50
16LX-096 AD HS	8	0,6	1,25	1,6	125	625	313	25
16LX-032 AD HS	8	0,6	1,25	6,25	62,5	625	313	>50
16LX-058 AD HS	8	0,6	1,25	6,25	125	625	313	50
16LX-082 AD HS	8	0,6	1,25	3,1	125	625	313	50
16LX-011 AD HS	4	0,6	1,25	3,1	62,5	625	156	12,5
16LX-031 AD HS	2	0,6	1,25	1,6	125	625	313	25
16LX-036 AD HS	8	1,25	5	3,1	125	625	313	50
16LX-079 AD HS	8	1,25	2,5	1,6	62,5	1250	156	>50
16LX-015 AD HS	8	0,6	1,25	3,1	125	1250	313	25
16LX-067 AD HS	4	1,25	2,5	1,6	62,5	625	156	50
16LX-068 AD HS	4	0,6	0,6	1,6	62,5	625	313	>50
16LX-206AD HS	8	0,6	2,5	12,5	125	1250	313	50
16LX-099 AD HS	4	0,6	1,25	3,1	125	1250	313	>50
16LX-136 AD HS	4	0,6	1,25	1,6	62,5	625	156	>50
16LX-139AD HS	4	0,6	1,25	3,1	62,5	625	156	>50
16LX-151 AD HS	4	0,6	1,25	3,1	62,5	625	156	25
16LX-172AD HS	4	0,6	1,25	3,1	125	1250	156	>50
16LX-112AD HS	4	0,6	1,25	1,6	62,5	1250	313	>50
16LX-121 AD HS	4	0,6	0,6	3,1	62,5	1250	313	>50
16LX-128 AD HS	4	0,6	1,25	3,1	62,5	1250	313	>50
16LX-144 AD HS	4	0,6	1,25	12,5	125	625	156	50
16LX-169 AD HS	4	0,6	1,25	3,1	125	1250	156	>50
16LX-176 AD HS	4	0,6	1,25	6,25	125	1250	156	>50
16LX-179 AD HS	4	1,25	5	1,6	125	1250	156	>50
16LX-183 AD HS	4	0,6	1,25	3,1	125	1250	313	25
Scott A AD HS	8	0,6	1,25	3,1	125	625	313	50
16LX-008 AD Pac	8	0,6	2,5	6,25	62,5	625	313	12,5
16LX-042 AD Pac	8	0,6	1,25	3,1	62,5	625	313	50
16LX-074 AD Pac	4	0,6	0,6	1,6	62,5	625	156	25
16LX-096 AD Pac	8	0,6	1,25	1,6	125	625	313	50
16LX-032 AD Pac	8	0,6	1,25	3,1	125	625	313	25
16LX-058 AD Pac	8	0,6	1,25	6,25	125	625	313	50
16LX-082 AD Pac	8	0,6	1,25	12,5	125	625	313	50



16LX-011 AD Pac	4	1,25	5	1,6	62,5	625	156	12,5
16LX-031 AD Pac	4	0,6	1,25	1,6	125	625	313	12,5
16LX-036 AD Pac	8	1,25	5	3,1	62,5	625	313	50
16LX-079 AD Pac	4	1,25	2,5	3,1	62,5	625	156	50
16LX-015 AD Pac	8	0,6	1,25	3,1	125	625	313	25
16LX-067 AD Pac	4	1,25	2,5	3,1	62,5	625	156	50
16LX-068 AD Pac	8	0,6	0,6	3,1	125	1250	313	>50
16LX-206 AD P ac	8	0,6	1,25	12,5	125	1250	313	50
16LX-099 AD P ac	8	0,6	1,25	6,25	125	1250	313	>50
16LX-136 AD P ac	2	0,6	1,25	1,6	62,5	625	156	50
16LX-139 AD P ac	4	0,6	1,25	3,1	62,5	625	156	>50
16LX-151 AD P ac	4	0,6	1,25	3,1	62,5	625	156	25
16LX-172 AD P ac	4	0,6	2,5	3,1	125	1250	156	50
16LX-112 AD P ac	4	0,6	1,25	1,6	62,5	625	313	50
16LX-121 AD P ac	4	0,6	1,25	6,25	125	1250	313	>50
16LX-128 AD P ac	4	0,6	1,25	6,25	125	625	313	50
16LX-144 AD P ac	4	0,6	1,25	3,1	62,5	625	156	50
16LX-169 AD P ac	4	0,6	1,25	3,1	125	1250	156	>50
16LX-176 AD P ac	4	0,6	1,25	6,25	125	1250	156	>50
16LX-179 AD P ac	4	1,25	5	3,1	125	1250	156	>50
16LX-0183 AD P ac	4	0,6	1,25	3,1	125	1250	313	50
Scott A AD Pac	8	0,6	5	3,1	125	625	313	50



Table S3: MIC values of antibiotics determined after stability experiments for the 28 *Lm* strains selected
 The colour of cases corresponding to the increase factor after comparison with control (number of strain T)

factor ≤ -4
factor -2
factor 2
factor 4
factor ≥ 8

souche	AMP	FOT	AXO	CHL	CIP	ERY	GEN	MERO	NIT	STR	TET	TIA	SXT	VAN
16LX008 DA T	1	>32	>32	8	2	0,25	0,5	0,25	>32	8	>8	32	0,03	1
16LX008 DA BC	1	>32	>32	8	8	0,25	1	0,25	>32	16	>8	32	0,06	1
16LX008 DA DDAC	1	>32	>32	8	16	0,25	1	0,25	>32	8	>8	32	0,12	1
16LX011 DA T	2	>32	>32	8	2	0,25	0,25	1	>32	4	1	64	0,06	1
16LX011 DA BC	1	>32	>32	8	1	0,25	0,5	1	>32	8	1	64	0,03	1
16LX011 DA DDAC	1	>32	>32	8	4	0,25	0,25	0,25	>32	4	1	32	0,03	1
16LX011 DA PAC	1	>32	>32	8	8	0,25	0,5	0,25	>32	4	1	32	0,03	1
16LX015 DA T	1	>32	>32	8	2	0,25	2	0,25	>32	8	0,5	64	0,03	1
16LX015 DA BC	1	>32	>32	8	4	0,25	0,5	0,25	>32	8	0,5	64	0,06	2
16LX015 DA DDAC	1	>32	>32	8	8	0,25	0,5	0,25	>32	16	0,5	64	0,06	1
16LX031 DA T	1	>32	>32	8	4	0,25	0,5	0,25	>32	4	1	64	0,03	1
16LX031 DA BC	1	>32	>32	8	4	0,25	0,5	0,25	>32	8	1	64	0,03	1
16LX031 DA DDAC	1	>32	>32	8	16	0,25	0,5	0,25	>32	4	1	64	0,06	1
16LX032 DA T	0,5	>32	>32	8	1	0,25	0,5	0,12	>32	4	1	64	0,03	1
16LX032 DA BC	0,5	>32	>32	8	4	0,25	1	0,12	>32	8	1	64	0,03	1
16LX032 DA DDAC	0,5	>32	>32	8	8	0,25	0,5	0,25	>32	4	1	64	0,06	1
16LX032 DA PAC	0,5	>32	>32	8	4	0,25	0,5	0,12	>32	8	1	64	0,03	1
16LX042 DA T	0,5	>32	>32	8	1	0,25	0,5	0,25	>32	4	1	32	0,03	1
16LX042 DA BC	1	>32	>32	8	2	0,25	1	0,12	>32	8	1	32	0,03	1
16LX042 DA DDAC	0,5	>32	>32	8	16	0,25	1	0,25	>32	8	1	32	0,06	1
16LX042 DA HS	0,5	>32	>32	8	1	0,25	0,25	0,12	>32	16	1	64	0,03	1
16LX042 DA PAC	0,5	>32	>32	8	1	0,25	0,5	0,12	>32	8	1	32	0,03	1
16LX058 DA T	1	>32	>32	8	2	0,25	0,5	0,25	>32	8	1	64	0,03	1
16LX058 DA BC	1	>32	>32	8	8	0,25	1	0,25	>32	8	1	64	0,06	1
16LX058 DA DDAC	2	>32	>32	8	8	0,25	0,25	0,25	>32	4	4	32	0,06	1
16LX058 DA HS	1	>32	>32	8	2	0,25	0,5	0,25	>32	4	2	64	0,03	1
16LX058 DA PAC	1	>32	>32	8	1	0,25	1	0,25	>32	8	1	64	0,03	1
16LX067 DA T	0,5	>32	>32	8	2	0,12	0,5	0,12	>32	8	1	32	0,03	1
16LX067 DA BC	0,5	>32	>32	8	2	0,25	0,25	0,12	>32	4	1	32	0,015	1
16LX067 DA DDAC	0,5	>32	>32	8	0,25	0,25	0,12	0,12	>32	8	1	32	0,03	1
16LX067 DA HS	0,5	>32	>32	8	2	0,25	0,25	0,12	>32	8	1	32	0,03	1
16LX067 DA PAC	1	>32	>32	8	2	0,12	0,5	0,25	>32	8	1	32	0,015	1
16LX068 DA T	1	>32	>32	8	2	0,25	1	0,25	>32	8	1	64	0,03	1
16LX068 DA BC	0,5	>32	>32	8	4	0,25	0,5	0,25	>32	8	1	32	0,03	1
16LX068 DA DDAC	1	>32	>32	8	8	0,25	0,25	0,5	>32	4	1	64	0,06	1
16LX068 DA HS	1	>32	>32	8	2	0,25	0,5	0,25	>32	4	1	64	0,03	1
16LX068 DA PAC	1	>32	>32	8	2	0,25	0,5	0,25	>32	8	1	32	0,03	1
16LX074 DA T	0,5	>32	>32	8	2	0,25	0,5	0,25	>32	8	1	32	0,03	1
16LX074 DA BC	0,5	>32	>32	8	4	0,25	0,5	0,25	>32	8	1	64	0,03	1
16LX074 DA DDAC	0,5	>32	>32	8	8	0,25	0,5	0,25	>32	4	2	64	0,06	1
16LX079 DA T	1	>32	>32	8	2	0,25	0,5	0,25	>32	8	1	64	0,03	1
16LX079 DA DDAC	1	>32	>32	8	2	0,25	1	0,12	>32	8	1	64	0,03	1
16LX079 DA PAC	1	>32	>32	8	2	0,12	1	0,25	>32	16	1	64	0,03	1
16LX082 DA T	1	>32	>32	8	1	0,25	0,5	0,25	>32	16	1	64	0,03	1
16LX082 DA BC	1	>32	>32	8	4	0,25	0,5	0,25	>32	8	1	64	0,03	1
16LX082 DA DDAC	1	>32	>32	8	8	0,25	1	0,25	>32	16	1	32	0,06	1



16LX082 DA HS	1	>32	>32	8	2	0,25	1	0,25	>32	8	1	64	0,03	1
16LX096 DA T	1	>32	>32	8	2	0,25	0,25	1	>32	8	1	64	0,03	1
16LX096 DA BC	1	>32	>32	8	4	0,25	0,5	1	>32	4	1	32	0,06	1
16LX096 DA DDAC	1	>32	>32	8	2	0,25	1	1	>32	4	1	64	0,06	1
16LX096 DA PAC	1	>32	>32	8	2	0,25	0,5	1	>32	4	1	32	0,03	1
Lm Scott A DA T	1	>32	>32	8	2	0,25	0,25	0,25	>32	4	1	64	0,03	1
Lm Scott A DA BC	1	>32	>32	8	4	0,25	0,5	0,25	>32	4	1	64	0,03	1
Lm Scott A DA DDAC	2	>32	>32	8	8	0,25	0,5	0,5	>32	4	1	64	0,06	1
Lm Scott A DA HS	2	>32	>32	8	1	0,25	0,5	0,25	>32	8	1	64	0,03	1
Lm Scott A DA PAC	0,5	>32	>32	8	1	0,25	0,25	0,25	>32	8	1	64	0,03	1
16LX099 DA T	1	>32	>32	8	2	0,25	0,25	0,25	>32	4	1	64	0,03	1
16LX099 DA BC	1	>32	>32	8	4	0,25	1	0,25	>32	8	1	64	0,03	1
16LX099 DA DDAC	0,5	>32	>32	8	8	0,25	1	0,25	>32	8	1	32	0,06	1
16LX112 DA T	0,5	>32	>32	8	2	0,25	0,25	0,25	>32	4	1	64	0,12	1
16LX112 DA BC	0,5	>32	>32	8	4	0,25	0,5	0,25	>32	4	1	64	0,12	1
16LX112 DA DDAC	0,5	>32	>32	8	8	0,25	0,5	0,5	>32	16	0,5	64	0,12	1
16LX128 DA T	0,5	>32	>32	8	2	0,25	0,25	0,25	>32	4	1	64	0,03	1
16LX128 DA BC	1	>32	>32	16	4	0,25	1	0,25	>32	16	2	64	0,03	1
16LX128 DA DDAC	1	>32	>32	8	8	0,25	0,5	0,25	>32	8	1	64	0,06	1
16LX128 DA HS	0,5	>32	>32	8	2	0,25	0,25	0,25	>32	4	1	64	0,03	1
16LX128 DA PAC	0,5	>32	>32	8	2	0,25	0,5	0,25	>32	4	1	64	0,03	1
16LX139 DA T	0,5	>32	>32	8	2	0,25	0,5	0,25	>32	4	1	64	0,06	1
16LX139 DA DDAC	0,5	>32	>32	8	8	0,25	0,5	0,25	>32	8	1	64	0,06	1
16LX139 DA PAC	1	>32	>32	8	4	0,25	0,5	0,25	>32	8	1	64	0,03	1
16LX144 DA T	0,25	16	32	4	8	0,12	0,25	0,12	>32	4	0,5	32	0,03	1
16LX144 DA BC	0,5	16	32	8	8	0,25	0,5	0,12	>32	4	1	32	0,03	1
16LX144 DA DDAC	0,25	16	32	8	8	0,25	1	0,12	>32	4	1	32	0,03	1
16LX144 DA PAC	0,25	16	32	4	4	0,12	0,25	0,12	>32	4	0,5	32	0,03	1
16LX151 DA T	0,5	>32	>32	8	2	0,25	0,5	0,25	>32	4	1	32	0,03	1
16LX151 DA BC	1	>32	>32	8	4	0,25	0,5	0,25	>32	8	1	32	0,03	1
16LX151 DA DDAC	0,5	>32	>32	8	8	0,25	0,25	0,25	>32	4	1	32	0,06	1
16LX169 DA T	0,5	>32	>32	8	2	0,25	0,5	0,25	>32	16	1	≤8	0,03	1
16LX169 DA DDAC	1	>32	>32	8	8	0,25	1	1	>32	16	1	≤8	0,06	1
16LX169 DA HS	0,5	>32	>32	8	2	0,25	0,25	0,25	>32	8	1	≤8	0,03	1
16LX172 DA T	0,5	>32	>32	8	2	0,25	0,5	0,25	>32	16	1	64	0,03	1
16LX172 DA DDAC	0,5	>32	>32	8	8	0,25	2	0,25	>32	16	1	64	0,06	1
16LX176 DA T	1	>32	>32	8	2	0,25	1	0,25	>32	8	1	64	0,03	1
16LX176 DA BC	1	>32	>32	8	4	0,25	1	0,25	>32	8	1	64	0,06	1
16LX176 DA DDAC	1	>32	>32	8	8	0,25	1	0,25	>32	8	1	64	0,03	1
16LX183 DA T	0,5	>32	>32	8	2	0,12	0,5	0,12	>32	8	1	64	0,03	1
16LX183 DA BC	0,5	>32	>32	8	8	0,25	0,5	0,12	>32	16	2	32	0,03	1
16LX183 DA DDAC	0,5	>32	>32	8	8	0,25	0,5	0,12	>32	8	2	64	0,06	1
16LX206 DA T	1	>32	>32	8	2	0,25	0,5	0,5	>32	8	1	64	0,03	1
16LX206 DA DDAC	1	>32	>32	8	8	0,25	0,5	0,5	>32	16	1	64	0,06	1