SSTMVA

Les 10èmes Journées Nationales Avicoles

ESBL/pAmpC-producing *Escherichia coli* from retail poultry meat in Tunisia: Predominance of *bla*$_{CTX-M}$ gene and multidrug resistance

- Introduction
- Objectives
- Matrials & Methods
- Resultats & discussion
- Conclusion

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INTRODUCTION

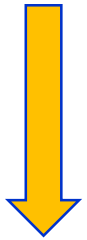
Antibiotic use in avian industries

- **Curative purposes**, to eliminate the bacteria responsible for infections in affected animals.
- **Prophylactic**, to prevent against possible infection during transport, stress…
- **Metaphylactic purposes**, to prevent the spread of an infection to a group of animals, some of which are sick.

Escherichia coli and antibiotic resistance

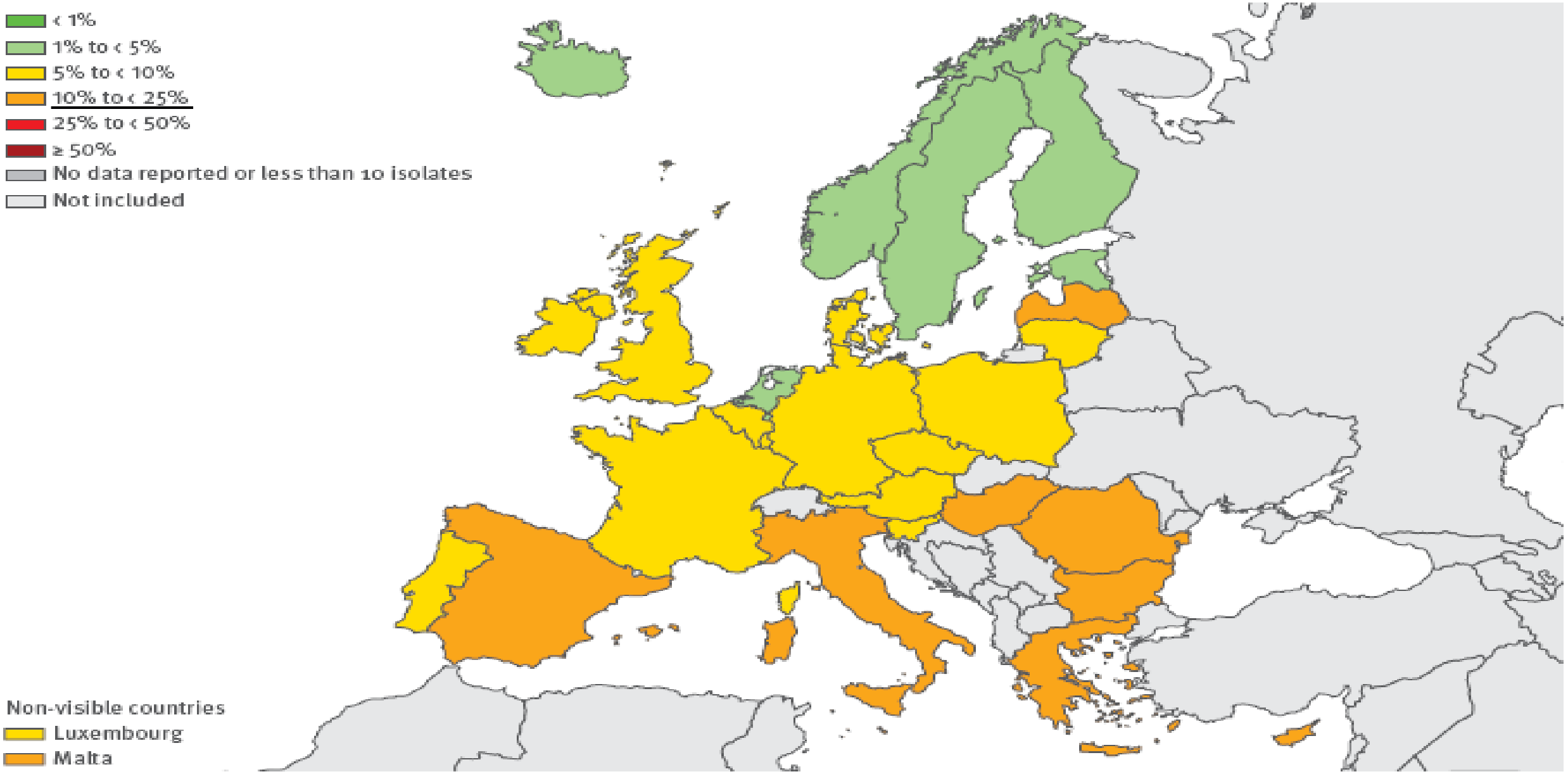
- Beta-lactams : ESBL/pAmpC/Carbapenemase
- Aminosides
- Quinolones
- Sulfonamides/trimethoprim
- Tetracycline
- Colistin

Multidrug resistance



Mobil Genetic Elements:
Plasmids + Integrons

Figure 5.14: ***Escherichia coli*: proportion of third-generation cephalosporin resistance in 2009**



OBJECTIVES

1. Investigate the occurrence of cefotaxime (3GC)-resistant *E. coli* in retail poultry meat;
2. Determine the antibiotic susceptibility;
3. • Detection the genetic support of 3GC.

MATERIALS & METHODS

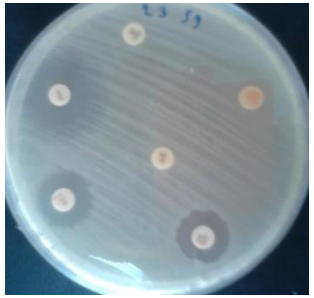
100 SAMPLES

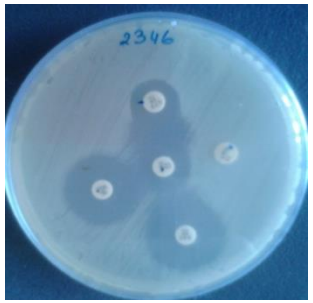
Mac Conkey +2mg/L cefotaxime

Identification: ApiE + Conventionnel Test

Antibiogramm

+ Double Synergy Test





DNA

PCR

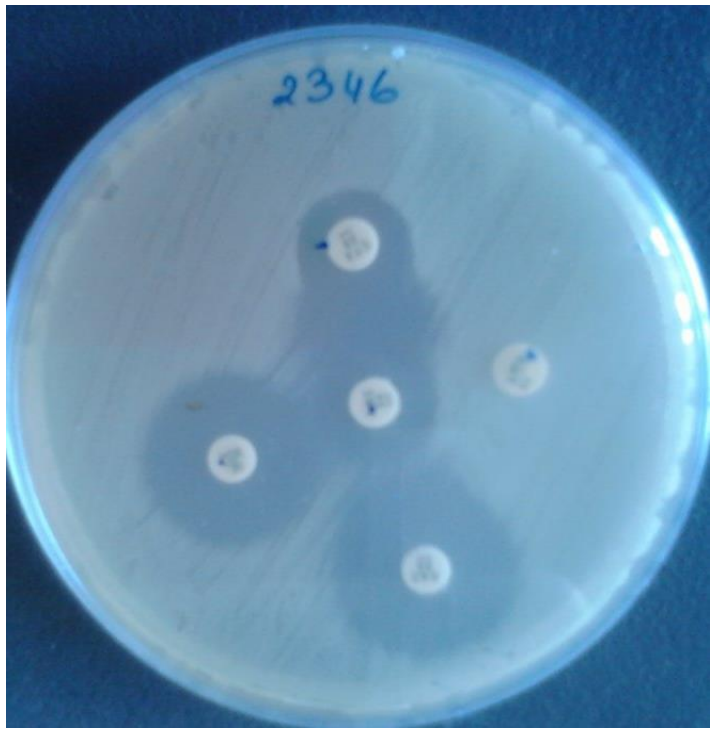
ESBL: CMY, CTX-M, TEM, SHV

Phylogroups (A, B1, B2, D)

RESULTATS & DISCUSSION

100 samples: 71 Cefotaxime-resistant *E. coli*

57 with positive double-disc synergy test: ESBL producers

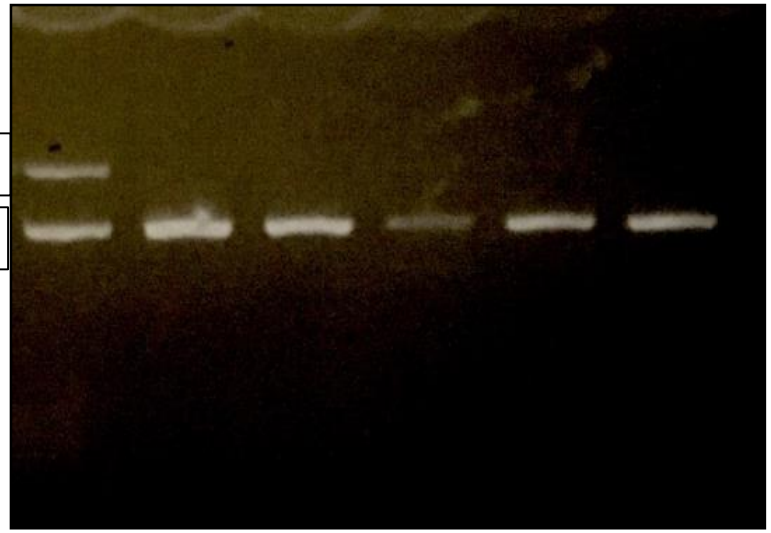


14 with negative DDST: pAmpc/AmpC/+ESBL ?

Detection of *bla* genes

850bp (*bla*$_{TEM}$)

543bp (*bla*$_{CTX-M}$)



797bp (*bla*$_{SHV}$)

- ✓ **63 (88.7 %) *bla*$_{CTX-M}$**
- ✓ 14 (19.7 %) *bla*$_{SHV}$
- ✓ 7 (9.8 %) *bla*$_{TEM}$

Characteristics of cefotaxime-resistant *E. coli* isolates

Isolates	Antibiotic resistance profiles	Synergy test	Genes	Phylogroups
Ec.1	NAL, CIP, SXT, TET, S, AMX, AMC, CAZ, CTX	+	CTX-M-1	A
Ec.2	NAL, CIP, SXT, TET, S, AMX, AMC, FOX, CAZ, CTX	-	CTX-M-1	A
Ec.3	NAL, CIP, SXT, TET, AMX, AMC, FOX, CAZ, CTX	-	CTX-M-1	
Ec.4	NAL, CIP, SXT, TET, S, AMX, AMC, CAZ, CTX	+	CTX-M-1	A
Ec.5	NAL, CIP, SXT, TET, AMX, AMC, CAZ, CTX	+	CTX-M-1	A
Ec.6	NAL, CIP, SXT, TET, AMX, AMC, FOX, CAZ, CTX	-	-	A
Ec.7	NAL, CIP, SXT, TET, S, AMX, AMC, CAZ, CTX	+	**CTX-M-15+SHV-2A**	A
Ec.8	NAL, CIP, SXT, TET, S, AMX, AMC, CAZ, CTX	+	CTX-M-1	A
Ec.9	NAL, CIP, SXT, TET, S, AMX, AMC, CAZ, CTX	+	CTX-M-1	A
Ec.10	NAL, CIP, SXT, TET, S, AMX, AMC, CAZ, CTX.	+	CTX-M-1	A
Ec.11	NAL, CIP, SXT, TET, AMX, AMC, CAZ, CTX	+	CTX-M-1	A
Ec.12	NAL, CIP, SXT, TET, AMX, AMC, FOX, CAZ, CTX	-	CTX-M-1	A
Ec.13	NAL, CIP, SXT, TET, S, AMX, AMC, CAZ, CTX	+	CTX-M-27	B2
Ec.14	NAL, CIP, SXT, TET, AMX, AMC, FOX, CAZ, CTX	-	CTX-M-1	A
Ec.15	NAL, CIP, SXT, TET, S, AMX, AMC, CAZ, CTX	+	CTX-M-1	A
Ec.16	NAL, CIP, SXT, TET, S, AMX, AMC, CAZ, CTX	+	CTX-M-1	A
Ec.17	NAL, CIP, SXT, TET, AMX, AMC, FOX, CAZ, CTX	-	-	A
Ec.18	NAL, CIP, CO, AMX, AMC, CTX	+	CTX-M-27	B2
Ec.19	NAL, CIP, SXT, TET, S, AMX, AMC, CAZ, CTX	+	**CTX-M-1+TEM-1**	A
Ec.20	NAL, CIP, SXT, TET, S, AMX, FOX, CAZ, CTX	+	CTX-M-1	A
Ec.21	NAL, CIP, SXT, TET, S,,AMX, AMC, FOX, CAZ, CTX	-	TEM24	A
Ec.22	NAL, CIP, SXT, TET, S, AMX, CAZ, CTX	+	CTX-M-1	A
Ec.23	NAL, CIP, SXT, TET, S, AMX, CAZ, CTX	+	CTX-M-1	A
Ec.24	SXT, TET, S, AMX, CAZ, CTX	+	**CTX-M -1+TEM-1**	A
Ec.25	SXT, TET, S, AMX, CAZ, CTX	+	**CTX-M -1+TEM-1**	A
Ec.26	SXT, TET, S, AMX, CAZ, CTX	+	**CTX-M -1+TEM-1**	A
Ec.27	SXT, TET, S, AMX, CAZ, CTX	+	CTX-M -1	A
Ec.28	SXT, TET, S, AMX, CAZ, CTX	+	CTX-M-1	A
Ec.29	SXT, TET, S, AMX, CAZ, CTX	+	CTX-M-1	A
Ec.30	SXT, TET, AMX, CAZ, CTX	+	CTX-M-1	A

Phylogroups: A (69 isolates); B2 (2 isolates)

A: commensal isolates
B2: mainly involved in human infection

Multidrug resistant/ Predominance de CTX-M-1**/Emergence of CTX-M-27 in food of animal origin**

CONCLUSION

CONCLUSION

- Retail poultry meat *maight be* a **RESERVOIR** of ESBL producing *E. coli;*
- ESBL producers are MDR ;
- *bla*$_{\textbf{CTX-M}}$ **PREDOMINANCE** (mainly CTX-M-1);
- **BIOSECURITY** in avian industry is the first step to control the use of antibiotics and to reduce antibiotic-resistance in *bacteria*.

- **It is difficult to define the reservoir**
- **The most important action is : The antibiotic stewardship**
- **betalactams are not a homogeneous class**: Choose the molecules whith a favorable profile- Pharmacokinetics and Pharmaco Dynamics
- **The Zero risk doesn’t exist**

1. Think about it individually
2. Monitor your ecology

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