

# Methicillin resistant *Staphylococcus aureus* in poultry

Davy Persoons<sup>1,2</sup>, Sebastiaan Van Hoorebeke<sup>1</sup>, Katleen Hermans<sup>3</sup>, Patrick Butaye<sup>3,4</sup>, Jeroen Dewulf<sup>1</sup>

<sup>1</sup> Department of Reproduction, Obstetrics, and Herd Health, Veterinary Epidemiology Unit, Faculty of Veterinary medicine, Ghent University, Merelbeke, Belgium

<sup>2</sup> Unit Technology and Food, Institute for Agricultural and Fisheries Research, Melle, Belgium

<sup>3</sup> Department of Pathology, Bacteriology and Avian Diseases, Faculty of Veterinary medicine, Ghent University, Merelbeke, Belgium

<sup>4</sup> Department of Bacteriology and Immunology, CODA-CERVA-VAR, Brussels, Belgium

E-mail: davy.persoons@ugent.be

## INTRODUCTION

The story about methicillin-resistant *Staphylococcus aureus* (MRSA) is one of a highly prevalent nosocomial pathogen of major importance, detected in an increasing number of countries worldwide and in a vast variety of different environments and hosts. To gain insight in the presence of methicillin-resistant *Staphylococcus aureus* in industrial poultry, a study was conducted among 14 broiler farms and 10 egg producing units in Belgium.

## MATERIALS AND METHODS

Cloacal and nasal samples were collected from five randomly selected animals per flock. Flocks were sampled shortly before depopulation. One broiler flock was sampled twice with 4 months interval (two different production rounds). MRSA-ID plates (Biomérieux®) were used to screen the samples for the presence of MRSA. All growing colonies were biochemically tested to confirm the presence of MRSA. A Triplex *mecA/nuc/16SrRNA* PCR was used to confirm all positively identified strains. After confirmation, all strains were *spa*-typed. Additionally, antimicrobial susceptibility was tested by disk diffusion.

## RESULTS

- No MRSA-strain could be detected in any of the laying hen samples.
- In the broilers, MRSA was found in 11 different animals on 2 different farms. One farm was sampled twice with a time lapse of 4 months. MRSA was detected in both time periods.
- The between herd prevalence for broiler flocks found in this study was 13.4%, while the within herd prevalence in the positive herds varied between 20 and 100%
- MRSA was found in 7 cloacal and 8 nasal swabs.
- Only one *spa*-type was found: t1456.
- All strains were multi-resistant, being at least resistant to at least six antimicrobial agents.
- Susceptibility tests showed that all isolated strains were fully resistant against erythromycin, tetracycline, lincomycin, tylosin, clindamycin and penicillin but there was no resistance against neomycin, enrofloxacin and ceftiofur. There was only very limited resistance against oxacillin, trimethoprim and sulfonamide.

Table 1: origin of the isolated MRSA strains and *Spa*-typing results

MRSA strain	farm	animal	Isolation area	<i>Spa</i> -type
1	A	A1	nares	t1456
2	A	A1	cloaca	t1456
3	A	A4	nares	t1456
4	B	B1	nares	t1456
5	B	B1	cloaca	t1456
6	B	B2	nares	t1456
7	B	B2	cloaca	t1456
8	B	B3	nares	t1456
9	B	B3	cloaca	t1456
10	B	B4	nares	t1456
11	B	B4	cloaca	t1456
12	B	B5	nares	t1456
13	B	B5	cloaca	t1456
14	B'	B'3	nares	t1456
15	B'	B'3	cloaca	t1456

B' = the second sampling of farm B

## DISCUSSION

- To our knowledge, this is the **first report of the presence of MRSA in live poultry**.
- The results of this screening suggest that in broilers, the between-herd prevalence of MRSA is relatively low where the within-herd prevalence can be rather high.
- *Spa*-typing showed that all isolated MRSA strains are t1456, a less common type which has not been described in animal hosts before. This type shows strong similarity to *spa*-type t011. MLST typing is being done to further reveal the relationship between both types.
- The fact that **no MRSA was detected in laying hens** could be the result of a lower overall usage of antimicrobials in laying hens. However one has to remain careful on final conclusions since only a limited number of flocks and hens per flock were sampled.
- Given the small number of egg-producing and broiler farms sampled and the limited number of animals tested per herd, the obtained results are only indicative and **further research is needed** to obtain more accurate data on the prevalence of MRSA in industrial poultry and the evolution of its presence in time.

## ACKNOWLEDGEMENTS

This work was supported by BAPCOC, the Belgian Antibiotics Policy Coordinating Committee.

In cooperation with:

