

# Staphylococcus hyicus isolates from pig samples – What about the antibiotic resistance challenging exudative epidermitis treatment?

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## Background

- *Staphylococcus hyicus* can cause cutaneous or arthritis diseases in suckling and weaned piglets.
- Exudative epidermitis (EE, Greasy pig disease) is clinically characterized by reddening and exfoliation of the skin, spread of exudative pustules and crusts which can lead to mortality in severely affected pigs<sup>1</sup>.
- The presence of antibiotic (AB)-resistant *S. hyicus* isolates may have a major impact on EE management.



Figure 1. Exudative epidermitis (generalized form)

## Objective

To characterize *S. hyicus* AB resistance of isolates obtained from swine samples.

## Material and methods

- A retrospective study conducted on frozen *S. hyicus* isolates from Laboratoire de santé animale du MAPAQ (St-Hyacinthe and Quebec) isolated from swine biological samples submitted between March 2021 and June 2023.
- For each *S. hyicus* isolate, laboratory results sent to the veterinarian, including pathology, bacterial cultures, and antimicrobial susceptibility testing were obtained following veterinarian consent.
- Data were gathered in a database to allow descriptive statistics in SAS software.

## Results

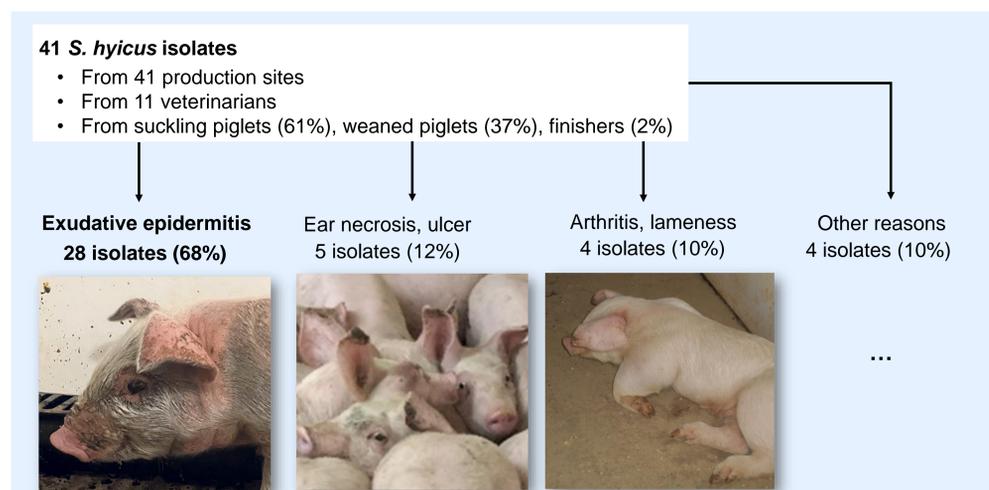


Figure 2. Reasons for submission of swine biological samples for each *S. hyicus* isolates.

28 EE samples: 18 samples from suckling piglets + 10 samples from weaned piglets

Proportion of samples submitted for EE with coinfection (%)

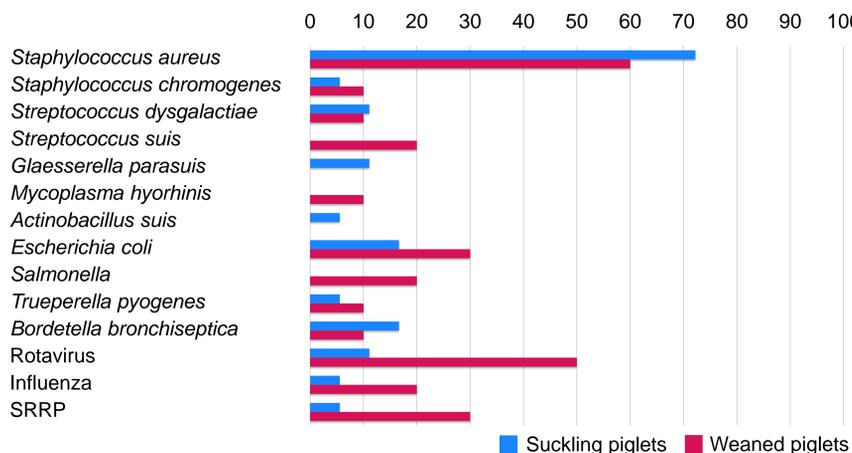


Figure 3. Proportion (%) of the 28 samples submitted for exudative epidermitis also having specific coinfections.

Samples submitted for EE and positive for *S. hyicus* were also positive to additional pathogens (Fig.3), with a mean (min-max) of 3 coinfections (1-6) and 4 (2-9) for suckling and weaned piglets, respectively.

## *S. hyicus* AB resistance

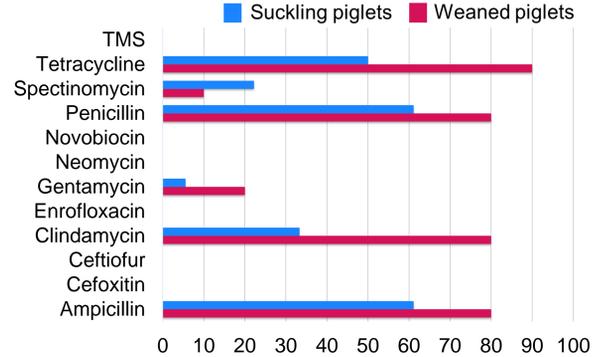


Figure 4. Proportion (%) of *S. hyicus* isolates from EE samples (n=28) showing antibiotic resistance.

Resistance to tetracycline, penicillin and ampicillin (Fig. 4)

- ≥50% of the isolates from suckling piglets.
- ≥80% from weaned piglets.

Resistance to clindamycin (Fig. 4)

- 30% in suckling piglets
- 80% in weaned piglets

Multi-resistance (≥5 antibiotics)

- 11% of *S. hyicus* isolates (3/28)

## *S. hyicus* AB intermediate resistance

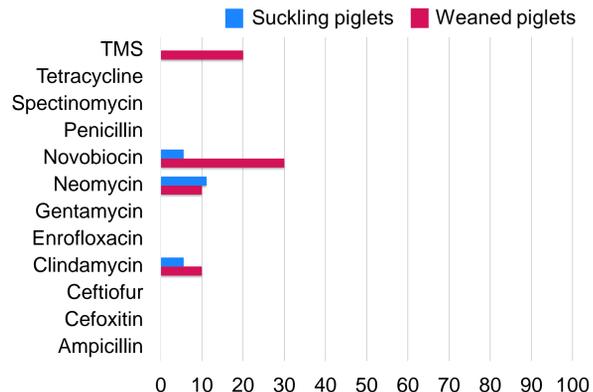


Figure 5. Proportion (%) of *S. hyicus* isolates from EE samples (n=28) showing intermediate resistance.

Intermediate resistance to trimethoprim-sulfa (TMS), novobiocin and neomycin

- <30% of the isolates (Fig. 5).

## *S. aureus* AB resistance

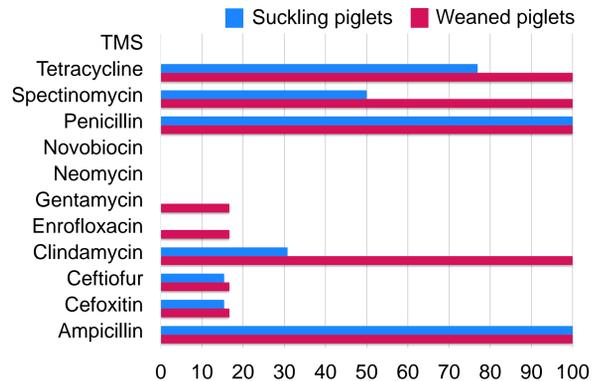


Figure 6. Proportion (%) of *S. aureus* isolates from EE samples (n=19) showing resistance.

*S. aureus* was the most frequently observed co-infecting pathogen (Fig. 3), present along 68% of the *S. hyicus* isolates (19/28).

*S. aureus* isolates showed AB resistance to more AB than *S. hyicus* isolates.

Multi-resistance (≥5 antibiotics)

- 58% of *S. aureus* isolates (11/19).

## Discussion and Conclusion

- Since *S. hyicus* isolates may have often been preserved for producing an autogenous vaccine in herds struggling to control the disease, the level of AB resistance observed could better reflect herds with significant problems in controlling the disease. Samples could also have been selected in order to isolate other bacteria to include within the vaccine, which could explain part of the coinfections observed.
- *S. hyicus* showed intermediate AB resistance to molecules used for EE topic treatment (e.g., neomycin).
- Since about two third of EE samples were positive for both *S. hyicus* and *S. aureus*, and the latter showed resistance to more AB compared to *S. hyicus*, we could speculate that the presence of both pathogens might have a major impact on both clinical signs and treatments.
- More studies are needed to better characterize *Staphylococcus* species and isolates involved in EE, identify virulence factors and risk factors favoring disease expression at the farm.

## References

<sup>1</sup>Frana, T. S., and Hau, S. J. (2019). "Staphylococcosis," in Diseases of Swine, 11th Edn., eds J. J. Zimmermann, L. A. Kariker, A. Ramirez, K. J. Schwartz, G. W. Stevenson, and J. Zhang (Wiley).

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