

Antimicrobial susceptibility of coagulase-negative staphylococci isolated from red-tailed racers (*Gonyosoma oxycephalum*)

Lydia Pow Kar Men¹, Usamah Afiff^{2,*}, Deni Noviana³

¹Student from the Degree Program of School of Veterinary Medicine and Biomedical Sciences, IPB University

²Lecturing Staff of the Department of Infectious Disease and Veterinary Public Health, School of Veterinary Medicine and Biomedical Sciences IPB University

³Lecturing Staff of the Department of Veterinary Clinic Reproduction and Pathology, School of Veterinary Medicine and Biomedical Sciences, IPB University

ABSTRACT: Antibiotic resistant coagulase-negative staphylococci (CoNS) have been reported around the world. The aim of this study was to determine the antimicrobial susceptibility of CoNS isolated from red-tailed racers. Samples were swabbed from the oral cavity of 5 wild caught red-tailed racers, and were identified with biochemical test using the Kirby-Bauer disc diffusion test interpreted by referring to Clinical and Laboratory Standards Institute. The results obtained 4 species of CoNS isolated from swab samples including *S. sciuri*, *S. xylosus*, *S. lentus*, and *S. kloosii*. The antibiotic resistance test of *S. xylosus*, *S. sciuri*, and *S. lentus* showed susceptibility to amoxicillin, gentamicin, erythromycin, bacitracin, vancomycin and oxacillin, but resistance towards penicillin G. *S. sciuri* isolated from snake number 1 was intermediate towards erythromycin. *S. kloosii* showed susceptibility towards amoxicillin, gentamicin, bacitracin, penicillin G, vancomycin, and oxacillin, but was resistant towards erythromycin.

Keywords:

antimicrobial susceptibility, coagulase-negative staphylococci, red-tailed racers, *Gonyosoma oxycephalum*

■ INTRODUCTION

The red-tailed racer (*Gonyosoma oxycephalum*), commonly known as red-tailed green rat snake is primarily an arboreal species snake that is generally distributed in Indonesia. In the Indonesian pet trade, there is a particular demand for a grey and yellow color morph associated with some snakes from Java (Dieckmann *et al.* 2015).

One of the most commonly isolated bacterial samples from snakes is coagulase-negative staphylococci (CoNS). CoNS are commensal flora of reptile skin and mucous membrane, and rarely cause primary disease. These opportunistic bacteria are usually treated as non-pathogenic or environmental contamination when detected in a sample. Currently, they are gaining the attention of researchers due to reports the bacteria can cause infections when present in large amounts, or when present in the bloodstream (Souvenir *et al.* 1998). The aim of this study was to determine the antimicrobial susceptibility of CoNS isolated from red-tailed racers.

■ MATERIALS AND METHOD

The materials used in this study were swabbed samples from the oral cavity of 5 red-tailed racers (*Gonyosoma oxycephalum*) in Purnomo Luak Kampus pet shop, medium for isolation and identification of bacteria, and antibiotic disc amoxicillin, gentamicin, oxacillin, penicillin G, bacitracin, vancomycin, and erythromycin. Isolates of *Staphylococcus*

were classified as CoNS using a coagulase tube test. Species identification was conducted using biochemical tests are then compared with the table for the identification of CoNS based on Barrow and Feltham (2003). Antibiotic sensitivity test were carried out using Kirby Bauer Agar Disc diffusion method. Interpretation data with Clinical Laboratory Standards Institute (CLSI) 2022 for *Staphylococcus* spp.

■ RESULT AND DISCUSSION

In total, there are 4 species of CoNS isolated from swab samples of 5 red-tailed racers (*Gonyosoma oxycephalum*) including *S. sciuri*, *S. xylosus*, *S. lentus*, and *S. kloosii*. The antimicrobial susceptibility of the CoNS isolate was tested with different antibiotics served in Table 1.

According to the result, it can be seen that all the CoNS isolated were susceptible to amoxicillin, gentamicin, bacitracin, vancomycin, and oxacillin. *S. xylosus*, *S. sciuri*, and *S. lentus* were susceptible to erythromycin, while *S. kloosii* was resistant to erythromycin. This result was compared to Osman *et al.* (2016) that reported that coagulase-positive staphylococci (CoPS) and CoNS isolated from chicken meat were resistant to methicillin, quinolones, β -lactams, macro-

Received: 13-09-2022 | Revised: 07-10-2022 | Accepted: 10-10-2022

© 2022 CC-BY-SA. This is an Open Access article distributed under the terms of the Creative Commons Attribution ShareAlike 4.0 International License (<https://creativecommons.org/licenses/by-sa/4.0/>).

lides, lincosamides and streptogamin. Another report found that *S. aureus* isolated from pig was resistant to tetracyclines and macrolides (Oppliger *et al.* 2012). Erythromycin is a macrolide. Bacterial resistance to macrolides is often due to efflux systems, methylases or inactivating enzymes. It can also be caused by mutations in genes encoding ribosomal proteins and in the 23S rRNA gene. These chromosomal mutations alter the erythromycin binding site in the 23S rRNA molecule (Waško *et al.* 2012).

Table 1. Antimicrobial susceptibility of the Coagulase-Negative Staphylococci towards different antibiotics

Snake No.	Bacteria Isolated	Bacterial susceptibility towards different antibiotics						
		AML	CN	E	B	P	VC	OX
1.	<i>S. scuri</i>	S	S	I	S	R	S	S
	<i>S. xylosus</i>	S	S	S	S	R	S	S
2.	<i>S. xylosus</i>	S	S	S	S	R	S	S
3.	<i>S. scuri</i>	S	S	S	S	R	S	S
4.	<i>S. lentus</i>	S	S	S	S	R	S	S
5.	<i>S. kloosii</i>	S	S	R	S	S	S	S

Note: AML (Amoxicillin), CN (Gentamicin), E (Erythromycin), B (Bacitracin), P (Penicillin G), VC (Vancomycin), OX (Oxacillin), S (Susceptible), I (Intermediate), R (Resistant)

Lastly, all the CoNS isolated showed resistance to penicillin G. Where Penicillin G is one of the most widely used antibiotics and the oldest one. Many known bacteria have already developed resistance towards Penicillin G. Staphylococcal resistance to penicillin is mediated by *Blaz*, the gene that encodes β -lactamase. This predominantly extracellular enzyme, synthesized when staphylococci are exposed to β -lactam antibiotics, hydrolyzes the β -lactam ring, rendering the β -lactam inactive (Lowy 2003).

CONCLUSION

This study provides information on the current antimicrobial resistance in *Staphylococcus xylosus*, *Staphylococcus scuri*, *Staphylococcus lentus* and *Staphylococcus kloosii* isolated from swabbed of oral cavity of 5 red-tailed racers (*Gonyosoma oxycephalum*).

AUTHOR INFORMATION

Author for correspondence

*UA: usamahaf@apps.ipb.ac.id

Department of Infectious Disease and Veterinary Public Health, School of Veterinary Medicine and Biomedical Sciences IPB University.

REFERENCES

- Barrow GI, Feltham RKA. 2003. Cowan and Steel's Manual for Identification of Medical Bacteria. 3rd ed. Cambridge (UK): Cambridge University Press.
- CLSI. Performance Standards for Antimicrobial Susceptibility Testing. 2022. 32nd ed. CLSI supplement M100. West Valley (USA): Clinical and Laboratory Standards Institute.
- Dieckmann S, Norval G, Mao JJ. 2015. A gravid Indonesian red-tailed green ratsnake (*Gonyosoma oxycephalum* [Boie 1827]) in the Pet Trade. *IRCF Reptiles and Amphibians*. 22(1):32-33.
- Lowy FD. 2003. Antimicrobial resistance: the example of *Staphylococcus aureus*. *The Journal of Clinical Investigation*. 111(9):1265-1273.
- Oppliger A, Moreillon P, Charrière N, Giddey M, Morisset D, Sakwinska O. 2012. Antimicrobial resistance of *Staphylococcus aureus* strains acquired by pig farmers from pigs. *Applied and Environmental Microbiology*. 78(22): 8010-8014.
- Osman K, Badr J, Al-Maary KS, Moussa IM, Hessain AM, Girah ZM, Abo-Shama UH, Orabi A, Saad A. 2016. Prevalence of the antibiotic resistance genes in coagulase-positive and negative staphylococcus in chicken meat retailed to consumers. *Frontiers in Microbiology*. 7(1846):1-12.
- Souvenir D, Souvenir D, Anderson Jr DE, Palpant S, Mroch H, Anderson J, Claridge J, Eiland J, Malone C, Garrison MW, Watson P, Campbell DM. 1998. Blood cultures positive for coagulase-negative staphylococci: Antisepsis, pseudobacteremia, and therapy of patients. *Journal of Clinical and Microbiology*. 36(7):1923-1926.
- Waško A, Skrzypczak K, Polak-Berecka M, Kuzdraliński A. 2012. Genetic mechanisms of variation in erythromycin resistance in *Lactobacillus rhamnosus* strains. *The Journal of Antibiotics*. 65(11): 583-586.