

# Resistance of *Escherichia coli* from the cloacal swabs of buffy fish owls (*Ketupa ketupu*) to several antibiotics

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**ABSTRACT:** Antibiotic resistance has become a problem worldwide. Although *E. coli* is a normal flora, there are several pathogenic strains. This study aimed to determine the resistance patterns of *E. coli* isolates from cloacal swabs of buffy fish owls (*Ketupa ketupu*) from captive birds to streptomycin, tetracycline, gentamicin, nalidixic acid, ampicillin, and doxycycline using the Kirby-Bauer disc diffusion test. The inhibition zone formed was compared to the Clinical Laboratory Standards Institute (CLSI) 2020. The results showed that all isolates were resistant to ampicillin but were still sensitive to gentamicin. Two isolates remained sensitive to tetracycline, nalidixic acid, doxycycline, and streptomycin. One isolate was intermediate to streptomycin and was resistant to tetracycline, nalidixic acid, and doxycycline.

**Keywords:**

buffy fish owl (*Ketupa ketupu*), *Escherichia coli*, antibiotic resistance

## ■ INTRODUCTION

In Indonesia, owners are included in the category of exotic animals. Data and information regarding bacterial diseases in fish-eating owls or the buffy fish owl (*Ketupa ketupu*) are still limited, so nurses and owners generally administer antibiotics when sick in the hope of curing the disease immediately. The inappropriate use of antibiotics is one of the factors that can cause antibiotic resistance (Manishimwe *et al.* 2021). Diarrhea, inflammation of air sacs, and sepsis are examples of diseases caused by *Escherichia coli* (*E. coli*) infection in birds (Sanches *et al.* 2017). Therefore, resistance testing needs to be carried out to provide information regarding the resistance of *E. coli* isolated from cloacal buds to several types of antibiotics in buffy fish owl.

## ■ MATERIALS AND METHODS

The materials used consisted of cloacal swab samples from three buffy fish owl (*Ketupa ketupu*), bacterial isolation and identification media, and antibiotic discs (tetracycline, gentamicin, ampicillin, streptomycin, nalidixic acid, and doxycycline). Testing for sensitivity to antibiotics was performed using the disc diffusion method according to Kirby Bauer with a bacterial concentration of 0.5 MacFarland No. 1. Data analysis was performed by the Clinical Laboratory Standards Institute (CLSI) 2020.

## ■ RESULTS AND DISCUSSION

Based on the results of the identification of cloacal samples from three buffy fish owl tails, three isolates were obtained, which had characteristics consistent with *E. coli*. Resistance test results showed that all *E. coli* isolates were resistant to

ampicillin and sensitive to gentamicin. There were differences in results between isolates 1, 2, and 3 against the antibiotics tetracycline, streptomycin, nalidixic acid, and doxycycline (Table 1).

The results of testing the three *E. coli* isolates in this study showed that all isolates were resistant to ampicillin. Shobrak and Amer (2014) reported that 24 of 32 *E. coli* isolates (75%) from migratory birds and 20 of 50 *E. coli* isolates (40%) from non-migrating birds in Taif were resistant to ampicillin. This resistance was observed in water sources contaminated with resistant bacteria. The ampicillin works by inhibiting the formation of mucopeptides, which are required for bacterial cell wall synthesis. The resistance of *E. coli* to ampicillin occurs because of the presence of the beta-lactamase enzyme, which hydrolyzes the beta-lactam ring in the structure of ampicillin (Milanda *et al.* 2014).

Table 1. Results of testing the sensitivity of *Escherichia coli* from the cloaca of fish-preying owls to several antibiotics.

Antibiotic	Disc (µg)	Sensitivity Zone (mm)			Total		
		Isolate 1 (mm)	Isolate 2 (mm)	Isolate 3 (mm)	S	I	R
Tetracycline	30	20 (S)	24 (S)	6 (R)	2	0	1
Gentamicin	10	18 (S)	21 (S)	18 (S)	3	0	0
Ampicillin	10	6 (R)	6 (R)	6 (R)	0	0	3
Streptomycin	10	16 (S)	18 (S)	14 (I)	2	1	0
Nalidixic acid	30	20 (S)	8 (R)	20 (S)	2	0	1
Doxycycline	30	18 (S)	24 (S)	10 (R)	2	0	1

Note: susceptible (S), intermediate (I), and resistant (R)

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The resistance of *E. coli* to ampicillin in the three buffy fish owners probably originated from feed containing resistant *E. coli*. The food given by the owner to this bird is catfish, which is sold for human consumption and is occasionally given day-old-chick food. Ampicillin is one of the antibiotics that is widely used in the poultry sector, so this has the potential to reduce the level of effectiveness of ampicillin against *E. coli* (Shecho *et al.* 2017). According to research by Damayanti *et al.* (2019) found that 9 *E. coli* isolates from catfish samples were resistant to ampicillin.

The gentamicin used in this study was effective against all *E. coli* isolates. According to Machado *et al.* (2018), of the 51 *E. coli* isolates from the cloaca of *Pyrhura griseipectus*, only one isolate (2.0%) was resistant to gentamicin. The results of the resistance test in this study did not show that there were any *E. coli* isolates that were resistant to the streptomycin, but there was one intermediate isolate. Based on information from the current owner, the three buffy fish owls are the result of a gift, so there are differences in the cage environment and treatment compared with the previous owner.

## ■ CONCLUSION

There were differences in resistance patterns among the three isolates from the buffy fish owl cloacal swab samples to the tetracycline, doxycycline, and nalidixic acid, where two isolates were still sensitive but one isolate had developed resistance, whereas for the streptomycin, two isolates were still sensitive and one isolate was intermediate.

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