

## Antimicrobial Resistance of Bacterial Strains Isolated from Layer Chicken on Poultry Village in North Lombok, West Nusa Tenggara, Indonesia

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### INTRODUCTION

Egg of Layer chicken is one of the main income and protein sources at Kampung Unggas in North Lombok. Kampung Unggas is Village which produce and supply egg for Three Gili as tourist destination in Lombok Island. They are Gili Trawangan, Gili Meno, and Gili Air. Farmers in Kampung Unggas are used several antibiotics for treating infections in poultry. The use of antimicrobials in chicken farm in Lombok Island can facilitate the antimicrobial resistant. Antimicrobial resistance (AMR) is not a recent phenomenon, but it is rising concern for both public and animal health [1].

Chicken farmers in the study region are mostly family run and they don't have good bio security and sanitation procedure. Knowledge of farmer on antimicrobials resistance are very low and they are often kept free ranged among other animals and people. This means that the risk of contamination to food and water from bacteria and other pathogen infected poultry is high. Many farmers in Kampung unggas have other poultry, mostly ducks, in the same enclosure as their Chickens. The closeness between many different animals and humans as well as the short distance to temperate water, without cleaning or buffering stages, is a concern both in disease transmission and antibiotic resistance development [2].

In Indonesia, study on 35 sampels of broiler meat and chicken meat from 9 distric in Bogor showed that prevalence *E. coli* 97.4% from broiler meat and 71.1% chicken meat resistance with Ampisilin, Enrofloksasin, Teterasiklin, Eritromisin, Streptomisin, Gentamisin, Kloramfenikol, Sefatotin, Trimetoprim-Sulfametoksasol, Nalidixid Acid [3]. According by [4] from 66 layer chicken 44% and from 35 broiler chicken 97.1% *E. coli* resistance with Oxytetracycline Hydrochloride, Chloramphenicol, Dihydrostreptomycin, Sulfadimethoxine Kanamycine and Aminobenzyl-penicillin.

Based on thus facts, it is very important to know prevalence and antimicrobial resistance on bacterial strains isolated from Layer chicken and

knowledge of antibiotic resistance among farmers on Poultry Village in North Lombok, West Nusa Tenggara Province, Indonesia for effective medical treatment of humans and poultry. Further, knowing the reasons for chicken farmers to treat their animals and which types of antibiotics chosen can facilitate prevention of antimicrobial resistance development.

### MATERIAL AND METHODS

This study was conducted March 2018 in Santong district, North Lombok, Indonesia. This State is located at -8.2939809°S, 116.2748427°. Santong, also known as the Poultry village (Kampung Unggas). This Villages have farmer association, the name is Asosiasi Peternakan Ayam Petelur dan Pedaging Gerbang Telur Emas (Gemas). The target population are 40,000 layer chiken of 37 commercial layer chicken farms. Therefore 2 of 37 commercial layer chicken farms was choosen from based on case report and number of population of each farms. So, 16 samples taken on each farms for a total of 32 samples.

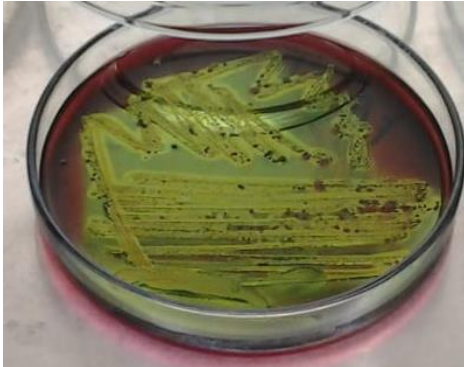
Samples was taken with sterile cotton swabs from the cloacae of live poultry and the samples was kept cold during transport. The Samples was dipped in sterile BHI and incubated over the night. After 24 hours the samples was inoculated in Blood Agar and McConkey agar under aerobic conditions at Balai Laboratorium Kesehatan Masyarakat Pulau Lombok. The colonies will be purified and characterized by standard Gram staining and biochemical methods. Gram-negative and gram-positve of bacteria isolated of was determined by standard biochemical procedures using Bergey's Manual, book of Clinical Veterinary Microbiology, and Basic Laboratory Procedure of World Health Organization [1,3].

Finally, isolates from different farms will be selected for their susceptibility to antimicrobial agents (Trimetoprin, Ciprofloxacin, Ampicillin, Penicillin G, Eritromicin) using the disk diffusion test. Antimicrobial susceptibility testing will be determined by the Kirby-Bauer disc diffusion method according to CLSI recommendations [5]. The

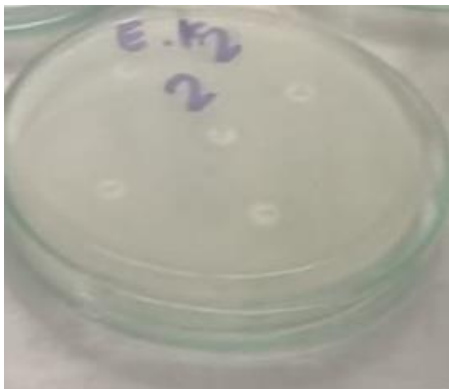
reference strains *Escherichia coli* ATCC 25922 was used as control of quality.

## RESULT AND DISCUSSION

The result of bacterial isolation from 32 samples showed 27 samples positive of *E. coli*, 13 from farm 1 and 14 from farm 2, from 27 positive samples were identified bacteria then tested the resistance, the data of resistance test result can be seen in Table 1 and interpretation diameter obstacle zone in Table 2.



Picture 1. *Escherichia coli* on media Eosin Methylene Blue Agar



Picture 2. Resistance test from isolat *Escherichia coli*

Table 1. Data result test resistance of *Escherichia coli*

	Farm 1	Farm 2
Sulfamethosazole/Trimetoprin	9	8
Ciprofloxacin	12	11
Ampicillin	8	8
Penicillin G	10	14
Eritromicin	7	10

Table 2. Interpretation diameter obstacle zone (5)

	Interpretation Diameter Zone (mm)					
	S		I		R	
	n	%	n	%	n	%
Sulfamethosazole/Trimetoprin	10	37	-	-	17	63
Ciprofloxacin	4	15	-	-	23	85
Ampicillin	9	33	2	8	16	59
Penicillin G	3	11	-	-	24	89
Eritromicin	10	37	-	-	17	63

Description: susceptible (S), intermediate (I), resistance (R)

*Escherichia coli* resistance with Penicillin-type antibiotics can attributed to the ability of bacteria to produce  $\beta$ -lactamase enzymes encoded by the R factor, this resistance mechanism is related to membrane permeability, the presence of transfer of the gene occurring to the polymer, further combining some resistant genes can cause bacteria resistant to most antibiotics [6,8,9].

*Escherichia coli* is often used as a bacterium commensal, because it has the ability to spread resistant factor [10]. In general the transfer of resistant genes can be through three mechanisms, transformation, conjugation and transduction. The precise environment of *E. coli* is the optimal place for gene transfer [11,12].

Factors that support the occurrence of multidrug resistance because of the perceived obligation to use antibiotics when ill, the selection of antibiotics based on price, increased unnecessary health care expenditure, the use of animals for use as a routine supplement for prophylaxis or stimulate animal growth. The presence of multidrug resistant bacteria can have an impact on the health of animals and humans, which may lead to increased medical expenses, limited treatment options, longer hospitalization and death [13].

## CONCLUSION

A total of 27 samples of *Escherichia coli* were tested for resistance antibiotic, 89% of which were resistant to penicillin G antibiotics, 85% ciprofloxacin, 63% erythromycin and sulfamethosazole/trimetoprin, and 59% resistant to Ampicillin antibiotics. It can be interpreted that *Escherichia coli* has been tested multidrug resistance that can spread resistant genes through food of animal origin and environment that can be a health care for the community and other animals.

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