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Research Article

Detection of *Escherichia coli* Resistance in Chicken Meat Against Various Types of Antibiotics at Tradisional Markets, Banyuwangi, Indonesia

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Abstract | Antimicrobial resistance is currently become a serious world health problem because it reduces the effectiveness of antibiotics. Bacteria are microorganisms responsible for causing foodborne illnesses. The occurrence of *Escherichia coli* has been extensively documented in food products, particularly in chicken meat. Microbial contamination of food causes a decrease in meat quality and can act as a medium for the growth of microorganisms. Food sanitation is essential, especially in public areas such as marketplaces, where large crowds frequently gather. This study employed a quota sampling technique and was exploratory in nature. The objective was to determine whether chicken meat from the Blambangan and Banyuwangi Traditional Markets, which are closely associated with the local community, harbors *Escherichia coli* resistant to multiple antibiotics. Antimicrobial resistance was assessed using the Kirby–Bauer disk diffusion method. A total of 20 samples were collected from the two markets in accordance with the research sample requirements. Identification results showed that nine samples (45%) tested positive for *E. coli*. Antibiotic susceptibility testing revealed that the *E. coli* isolates exhibited 100% resistance to erythromycin, 66.6% resistance to streptomycin, 55.5% resistance to ciprofloxacin and trimethoprim, and 33.3% resistance to tetracycline. The isolates remained 100% sensitive to aztreonam and chloramphenicol. The study also shows that 77.7% isolates were multidrug resistant (MDR). The study concluded that *E. coli* resistant to multiple antibiotics was present in chicken meat from traditional markets, highlighting the need for improved food hygiene and antimicrobial resistance monitoring.

Keywords | Antimicrobial resistance, Banyuwangi, *Escherichia coli*, One health, Public health

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INTRODUCTION

Chicken meat has emerged as one of the most preferred protein sources globally, widely consumed due to its exceptional nutritional profile and palatability (Mir *et al.*, 2017). Chicken meat is rich in essential vitamins and minerals, including B-complex vitamins, phosphorus, selenium, zinc, and iron, while maintaining relatively low-fat content and moderate caloric density (Liu *et al.*, 2023). Despite these nutritional benefits, chicken meat exhibits heightened susceptibility to microbial contamination, which poses significant food safety risks. The high protein content, moisture levels, and neutral pH of chicken meat create an ideal environment for bacterial proliferation, especially when proper storage and handling protocols are not maintained (Silva *et al*., 2018).

The primary bacterial agents responsible for human intestinal infections from meat source include several bacteria such as *Campylobacter* spp., *Staphylococcus* spp., *Escherichia coli*, and *Salmonella* spp. (Uddin *et al*., 2021). The persistence and prevalence of these foodborne pathogens throughout the poultry processing chain, from slaughterhouses to retail markets, present substantial public health challenges. The risk of foodborne diseases is further amplified by cross-contamination occurring throughout various stages of food handling and preparation, particularly when temperature abuse takes place during storage and distribution (Akinsemolu *et al*., 2024; Hamaideh *et al*., 2024). Among the various foodborne pathogens, bacterial contamination represents the most serious threat to food safety in chicken meat. Bacterial pathogens are particularly dangerous because they can multiply rapidly under favourable conditions, produce toxins, and develop resistance to antimicrobial treatments (Salam *et al*., 2024). *E. coli* represents one of the most significant bacterial threats associated with chicken meat consumption. Although *E. coli* typically lives harmlessly in the intestines of both humans and animals some pathogenic strains can lead to serious illness in humans (Brătfelan *et al*., 2023). Research has documented *E. coli* contamination rates ranging from 44.26% to 100% in broiler chicken meat samples across various studies (Wibawati *et al*., 2023; Suswati *et al*., 2025). Virulence factors and toxins produced by pathogenic *E. coli* strains can lead to a wide spectrum of illnesses, starting with mild intestinal disturbances and potentially progressing to severe complications such as hemolytic uremic syndrome and hemorrhagic colitis (Whang *et al*., 2021). The organism's ability to survive under diverse environmental conditions and to undergo horizontal gene transfer make it a particularly concerning foodborne pathogen (Vinayamohan *et al*., 2022).

The emergence of antibiotic-resistant *E. coli* in chicken meat has become an increasingly critical public health concern. Contaminated chicken meat serves as a reservoir for multidrug-resistant (MDR) *E. coli* strains that carry resistance genes against clinically important antibiotics (Suswati *et al*., 2025). Research has reported resistance levels greater than 60% against frequently used antibiotics such as erythromycin, trimethoprim, and ampicillin in *E. coli* isolates from chicken meat (Wibawati *et al*., 2023; Jaiswal *et al*., 2024; Wibisono *et al*., 2025). The detection of Extended Spectrum Beta-Lactamase (ESBL)-producing *E. coli* is especially concerning because these strains resist third-generation cephalosporins and other vital antimicrobials used in human healthcare (Wardhana *et al*., 2021). Studies have reported that the prevalence of ESBL-producing *E. coli* in chicken meat samples ranges from 14.84% to 100%. Frequently detected resistance genes include β-lactamase TEM (*bla*TEM), which confers resistance to penicillin and some cephalosporins; β-lactamase Cefotaximase-Munich (*bla*CTX-M), which is highly effective at hydrolyzing cefotaxime; and mobilized colistin resistance-1 (*mcr-1*), which modifies lipid A in the bacterial outer membrane and reduces affinity for colistin (Faridah *et al*., 2023; Lemlem *et al*., 2023; Handayani *et al*., 2024; Jaiswal *et al*., 2024).

Global monitoring studies have repeatedly shown a high occurrence of multidrug-resistant *E. coli* in chicken meat from various regions. Research from Peru documented that non-organic chicken isolates were more resistant to most antibiotics tested compared to human isolates, with *E. coli* strains containing clinically relevant resistance genes including *mcr-1* for colistin resistance and *bla*CTX-M ESBLs (Murray *et al*., 2021). Studies from Saudi Arabia found 57% of *E. coli* isolates from chicken meat to be multidrug-resistant, with maximum resistance observed against penicillin G (95%) and amoxicillin (85%) (Ali and Chidrawar, 2021). In Bangladesh, research revealed 84.71% of multidrug resistance was observed in *E. coli* isolates from broiler meat, with high resistance rates recorded for tetracycline reach 86.78% and sulfamethoxazole-trimethoprim until 88.84% (Khanom *et al*., 2025). Indonesia, studies have documented *E. coli* prevalence rates of 44.26% in East Java broiler meat, with 59.26% of isolates showing multidrug resistance patterns. *E. coli* isolates exhibited resistance to ampicillin reach (59.3%), trimethoprim (61.1%), and erythromycin (66.7%) (Wibawati *et al*., 2023).

Traditional marketplaces present particularly high-risk environments for microbial contamination and growth due to suboptimal hygiene and sanitation practices. These markets often lack adequate refrigeration systems, proper waste management, and clean water supplies, creating conditions conducive to bacterial proliferation and cross-contamination (DeWaal *et al*., 2022; Gusti and Fitriyani, 2022). Studies have documented that traditional markets frequently fail to meet sanitation requirements, with vendors often not implementing proper personal hygiene behaviours and lacking access to clean water and appropriate waste disposal facilities (Jannah and Asyfiradayati, 2024). The absence of temperature control, combined with prolonged exposure to ambient conditions, increases the risk of bacterial multiplication and toxin production in chicken meat (Young *et al*., 2017). The physical infrastructure of traditional markets, including wooden surfaces that are difficult to sanitize and inadequate drainage systems, further contributes to the persistence and spread of pathogenic microorganisms (Ngan *et al.*, 2020). The antimicrobial resistance profile of *E. coli* isolates from broiler chicken meat sold in Blambangan and Banyuwangi traditional markets has not been previously examined. This study aimed to determine whether chicken meat from these community-associated markets contains *E. coli* strains resistant to multiple antibiotics.

MATERIALS AND METHODS

Study period and location

This study was conducted at the Faculty of Health, Medicine, and Life Science, Universitas Airlangga, Banyuwangi, East Java, Indonesia from August to October 2024.

Experimental design

An exploratory laboratory study was performed to isolate, identify, and determine the antimicrobial resistance profile of *E. coli* from broiler chicken meat. A quota sampling method was used, with inclusion criteria consisting of broiler chicken breast meat (*Musculus pectoralis*) sold in poultry meat sections, not adjacent to stalls selling other food products. Ten samples were collected from each market, resulting in a total of 20 samples.

Sample collection and preparation

A total of 20 samples of fresh broiler chicken meat were collected from two wet markets (Blambangan and Banyuwangi Traditional Market) in Banyuwangi Subdistrict (lat 8°13′; long 114°22′), Banyuwangi District, East Java, Indonesia during the dry season. Each sample weighing approximately 100 g was placed into a sterile polypropylene bag, labelled according to market and sample number, and transported to the laboratory under chilled conditions. Sterilization of laboratory equipment and materials was performed using an oven, autoclave, and UV light. Petri dishes, inoculating loops, and test tubes were sterilized in a hot air oven at 160 °C for 2 h, while plastic materials and cotton swabs were sterilized under UV light. Media used for bacterial isolation and identification were sterilized in an autoclave at 121 °C for 15 min.

Isolation and identification of *E. coli*

Bacterial isolation was carried out by swabbing the surface of chicken meat and streaking it onto Eosin Methylene Blue Agar (EMBA) (Merck, Germany) using the zig-zag method. The plates were then incubated for 24 hours at 37°C. *E. coli* colonies displayed a metallic green sheen, resulting from lactose fermentation that increased medium acidity and precipitated methylene blue in the medium. Suspected positive samples of *E. coli* were further identified using Gram staining and IMViC biochemical tests, including Indole (I), Methyl Red (MR), Voges–Proskauer (VP), and Citrate (C) tests. Samples confirmed as *E. coli* showed positive results for Indole and MR tests (Merck, Germany), but negative results for VP (Merck, Germany) and Simmons Citrate Agar (SCA) (Merck, Germany). In Grams' staining, *E. coli* colonies appeared pink, short rod-shaped, and non-spore forming (Khoiriyah *et al.*, 2023). In the SIM test (Merck, Germany), *E. coli* exhibited positive growth indicated by bacterial proliferation beyond the stab line and the formation of a pink layer (ring) on the surface after the addition of Kovac's or Ehrlich's reagent. The MR test was positive, as indicated by the medium turning red, whereas the VP test was negative, showing no color change in the medium (Roy *et al.*, 2023). The Citrate test also yielded a negative result, as the medium remained green and did not turn blue (Gita *et al.*, 2021).

Antibiotic susceptibility testing

Antibiotic susceptibility was assessed using the Kirby–Bauer disc diffusion method on Mueller Hinton Agar (Oxoid, United Kingdom). Bacterial suspensions were adjusted to the 0.5 McFarland standard (approximately 1.5 × 10^8 CFU/ml) and evenly spread over the agar surface. After 5 min, antibiotic discs containing streptomycin 10 µg (Oxoid, United Kingdom), tetracycline 30 µg (Oxoid, United Kingdom), erythromycin 15 µg (Oxoid, United Kingdom), chloramphenicol 30 µg (Oxoid, United Kingdom), trimethoprim 5 µg (Oxoid, United Kingdom), aztreonam 10 µg (Oxoid, United Kingdom), and ciprofloxacin 5 µg (Oxoid, United Kingdom) were applied and plates were incubated at 37 °C for 24 hours, after which inhibition zones were measured using a caliper and interpreted based on the CLSI (2018) guidelines.

Data collection and analysis

Primary data were obtained from bacterial isolation, identification, and antibiotic susceptibility testing. All results were recorded directly by the researchers. Data were tabulated and analysed descriptively to present the resistance profiles of *E. coli* isolated from broiler chicken meat.

RESULTS

Isolation and identification of *E. coli*

Distinctive metallic green colonies with dark centers were produced by *E. coli* on Eosin Methylene Blue Agar (EMBA). Suspected *E. coli* colonies were purified by subculturing the metallic green colonies onto fresh EMBA plates. The isolation results are presented in Figure 1, with an estimated *E. coli* recovery rate of 85%.

Based on Grams' staining, the colony was confirmed to be Gram-negative (Figure 1B). Identification of *E. coli* was performed using a series of IMViC biochemical tests with positive indole production test results (+), indicated by the formation of a red ring at the interface. Positive methyl red test results (+), indicated by a color change to red. Negative Voges-Proskauer test results (-), indicating no color change in the medium. Negative citrate utilization test results (-), indicated by no color change in the medium. Isolation and identification of *E. coli* yielded positive results in 9 of the 20 test samples (45%). These results are presented in Table 1.

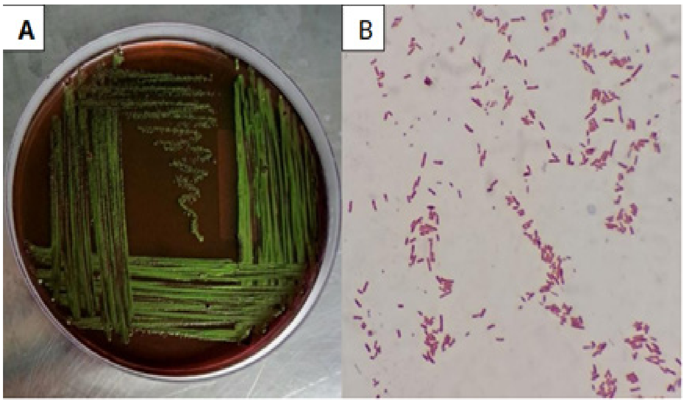

Figure 1: *Escherichia coli* observed on culture media and under the microscope.
Note: (A) Suspected *E. coli* colonies on eosin methylene blue agar (EMBA); (B) *E. coli* observed under a light microscope at 1000× magnification.

Table 1: Isolation and identification results of *Escherichia coli* from chicken meat.

Market*	N	Media isolation (EMBA)	Grams' staining	Biochemical identification (IMViC)
A	10	7	6	3
B	10	10	10	6
Total	20	17	16	9

*A= Banyuwangi Market, B= Blambangan Market. EMBA: eosin methylene blue agar; IMViC: A series of tests carried out to idetrify the *E.coli* isolates.

Resistance test

Antimicrobial resistance testing revealed that *E. coli* isolates were 100% resistant to erythromycin (9/9), 66.7% resistant to streptomycin (6/9), 55.6% resistant to ciprofloxacin (5/9), 55.6% resistant to trimethoprim (5/9), and 33.3% resistant to tetracycline (3/9). All *E. coli* isolates demonstrated 100% susceptibility to chloramphenicol and aztreonam. The findings of the antimicrobial susceptibility assessment are displayed in Table 2, while Figure 2 displays the resistance patterns obtained using the Kirby-Bauer disc diffusion method on Mueller-Hinton Agar (MHA).

This study showed that 77.7% of the *E. coli* (7/9) isolates exhibited multidrug resistance (MDR). MDR results on *E. coli* isolated from meat broiler chickens can be seen in Table 3.

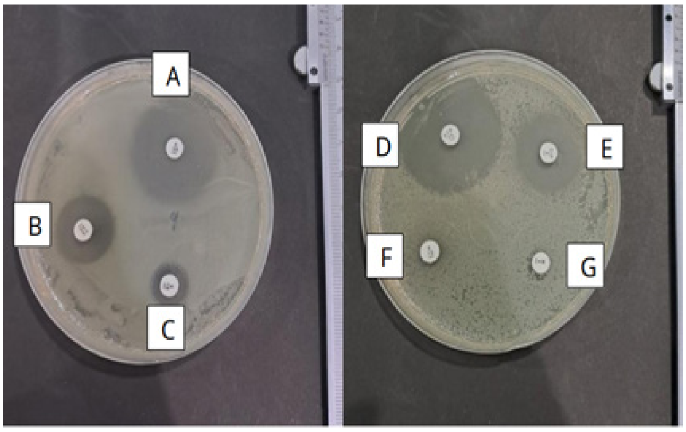

Figure 2: Antibiotic susceptibility test results of *Escherichia coli*.
Note: Disc A (chloramphenicol) showed sensitivity with an inhibition zone diameter of 27.04 mm; Disc B (tetracycline) showed resistance with a zone diameter of 20.71 mm; Disc C (streptomycin) showed resistance with a zone diameter of 8.07 mm; Disc D (aztreonam) showed sensitivity with a zone diameter of 31.60 mm; Disc E (ciprofloxacin) showed resistance with a zone diameter of 17.90 mm; Disc F (erythromycin) showed resistance with a zone diameter of 9.07 mm; and Disc G (trimethoprim) showed resistance with a zone diameter of 17.13 mm.

Table 2: Antimicrobial resistance test results of *E. coli*.

Sample	N	Sensitivity test results																				
		ATM			E			C			CIP			S			TE			W		
		R	I	S	R	I	S	R	I	S	R	I	S	R	I	S	R	I	S	R	I	S
A	3	0	2	1	3	0	0	0	0	3	2	0	1	2	0	1	1	0	2	2	0	1
B	6	0	0	6	6	0	0	0	0	6	3	3	0	4	1	1	2	1	3	3	1	2
Total	9	0	2	7	9	0	0	0	0	9	5	3	1	6	1	2	3	1	5	5	1	3
Resistance %		0%			100%			0%			55.5%			66.6%			33.3%			55.5%		

A = Banyuwangi Market, B = Blambangan Market, R = Resistant, I = Intermediate, S = Sensitive, ATM = aztreonam, E = erythromycin, C = chloramphenicol, CIP = ciprofloxacin, S = streptomycin, TE = tetracycline, W = trimethoprim.

Table 3: Multidrug resistant (MDR) *E. coli* in blambangan and banyuwangi traditional markets.

Market*	N	MDR *E.coli* (n)	%
A	3	2	66.6
B	6	5	83.3
Total	9	7	77.7

* A = Banyuwangi Market, B = Blambangan Market. MDR (Multidrug resistant): Results of *E. coli* resistance to ≥3 classes of antibiotics.

DISCUSSION

Escherichia coli was identified in 45% (9/20) of chicken meat samples from Blambangan and Banyuwangi traditional markets. This prevalence aligns with findings by Febrianti *et al.* (2022), who reported that chicken meat is highly susceptible to *E. coli* contamination. Soepranianondo *et al.* (2019) documented a contamination rate of 32.5% in East Java, while Amalia *et al.* (2020) found 16.66% in Makassar. International studies have reported varying contamination rates, including 83.33% in Bangladesh (Al-Salauddin *et al.*, 2015), 70.4% in Japan (Odoi *et al.*, 2021), 43.93% in Ethiopia (Hagos *et al.*, 2021), 71.2% in China (Wang *et al.*, 2021), and 98.3% in Turkey (Sahin, 2020).

Chicken meat sold in traditional markets often exhibits lower quality and hygiene standards compared to modern markets. Traders' lack of knowledge regarding proper handling practices negatively affects meat safety. Contamination may originate from workers, equipment, waste, insects, rodents, and environmental factors such as air and water (Susilaningrum *et al.*, 2022). Microbial contamination of food sold in markets poses a significant public health concern in developing countries largely due to inadequate hygiene practices and limited awareness among vendors (Gizaw, 2019).

Bacterial contamination in chicken meat can result from unhygienic handling, poor sanitation, open sales areas, stacking of meat without proper separation, storage without refrigeration, and prolonged exposure to open air, which favours bacterial growth (Wibisono *et al.*, 2025). Survival of microbes in the air both within and outside droplets is influenced by environmental factors such as humidity and ambient temperature, influencing the potential for airborne transmission. Air circulation, including ventilation rates, strongly affects the removal and distribution of airborne pathogens indoors (Praja *et al.*, 2021; Argyropoulos *et al.*, 2022). Poor-quality water used in carcass washing may act as a source of microbial contamination, transferring bacteria including enteric pathogens onto meat surfaces and increasing the risk of foodborne illness (Ncoko *et al.*, 2020). Poor water sanitation during carcass cleaning has been identified as an additional source of contamination (Santos *et al.*, 2020).

Antibiotic susceptibility testing revealed that the *E. coli* isolates were completely sensitive to aztreonam and chloramphenicol (100%) but exhibited complete resistance to erythromycin (100%), followed by streptomycin (66.6%), ciprofloxacin (55.5%), trimethoprim (55.5%), and tetracycline (33.3%). Resistance to erythromycin has been widely reported, including 93.33% in Ghana, 78% in Sulawesi, and 100% in Lampung (Adzitey, 2018; Milawarni *et al.*, 2022). Erythromycin, a macrolide antibiotic, has limited ability to penetrate the outer membrane of *E. coli* due to the lipopolysaccharide barrier (Cetuk *et al.*, 2021; Susilo *et al.*, 2022). The resistance mechanism involves inhibition of protein synthesis and genetic alterations in ribosomal protein-coding genes (Peykov *et al.*, 2025).

Resistance to streptomycin was frequently detected with a rate of 53.7%, consistent with other regional studies reporting rates between 47% and 58% (Drugea *et al.*, 2025). Streptomycin exhibits bactericidal activity by binding to the 30S ribosomal subunit, thereby inhibiting bacterial protein synthesis and disrupting peptide chain elongation (StatPearls, 2025). The inappropriate and excessive use of antibiotics, particularly their incorporation in animal feed for growth promotion and disease prevention, is a major contributing factor to the global rise of antimicrobial resistance, posing significant risks to public health (Martin *et al.*, 2015).

Sensitivity to ciprofloxacin among clinical bacterial isolates ranged from 55% to 65%, reflecting a decline compared to earlier reports and emphasizing the persistent challenge posed by the increasing antimicrobial resistance among bacterial pathogens (Reis *et al.*, 2016). Ciprofloxacin acts by inhibiting bacterial enzymes DNA gyrase and topoisomerase IV prevents DNA supercoiling and blocks bacterial replication. and transcription (StatPearls, 2025). Its extensive application has been linked to a higher likelihood of resistance development and reduced treatment effectiveness (Ariyani *et al.*, 2018).

Trimethoprim resistance was found in 41% of *E. coli* blood culture isolates in a cohort study, with previous trimethoprim-resistant urinary tract infections identified as a significant risk factor for resistance, consistent with similar resistance rates reported in other regions (Balfour *et al.*, 2022). Trimethoprim inhibits dihydrofolate reductase, but genetic mutations enable continued production of tetrahydrofolic acid, resulting in resistance (Bhosle *et al.*, 2020).

Tetracycline resistance was observed in 33.3% of isolates, which was lower than the 87.2% reported by Wardhana *et al.* (2021). Excessive use of first-generation tetracyclines as growth promoters in livestock production creates selective pressure that drives the emergence of antimicrobial resistance mechanisms in bacterial populations (Blake *et al.*, 2025). This antibiotic is bacteriostatic, acting by inhibiting protein synthesis through binding to the 30S ribosomal subunit (Simanjuntak *et al.*, 2022).

Chloramphenicol demonstrated complete sensitivity in this study, showing no resistance among the *E. coli* isolates tested. This finding is consistent with other reports indicating chloramphenicol remains effective against *E. coli* despite resistance observed for many other antibiotics (Alobaidallah *et al.*, 2024). Chloramphenicol is bacteriostatic and acts by binding to the 50S ribosomal subunit, specifically at the peptidyl transferase centre, thereby inhibiting peptide bond formation during protein synthesis (Paranos *et al.*, 2022). Its efficacy is maintained when bacterial purine structures remain unchanged, facilitating antibiotic entry (Hernandez *et al.*, 2024).

Aztreonam retained high activity against *E. coli* isolates with susceptibility rates exceeding 95% across most countries (Helio *et al.*, 2021). Monobactams like aztreonam prevent bacterial cell division by binding to penicillin-binding protein 3 (PBP-3), which leads to inhibition of peptidoglycan synthesis and cell death. Their spectrum of activity is largely limited to aerobic Gram-negative organisms, providing an important alternative to aminoglycosides, particularly in cases of resistance or toxicity concerns (Dean *et al.*, 2018).

Multidrug-resistant *E. coli* isolates were identified in 57.3% of samples from pig farms in Kupang city, Indonesia. The high prevalence is marked by resistance to multiple classes of antibiotics, raising serious concerns about the possible transmission of resistant bacteria between animals and humans (Kallau *et al.*, 2018). Multidrug-resistant *E. coli* carriage on chicken farms was highly prevalent, with a studied prevalence of 62.7% among 158 sampled farms in Uganda (Nyolimati *et al.*, 2025). Since 2017, the World Health Organization has classified *E. coli* is recognized as a critical pathogen due to its ability to cause a wide range of infections and its growing resistance to multiple antibiotics highlighting the urgent need for strict antibiotic regulation in humans, animals, and food production (Scheres and Kuszewski, 2019; Mancuso *et al.*, 2021).

E. coli frequently develops antimicrobial resistance through multiple mechanisms such as production of β-lactamases that hydrolyse β-lactam antibiotics, mutations in dihydrofolate reductase (DHFR) and DNA gyrase that alter target sites, increased expression of efflux pumps reducing intracellular drug concentrations, and loss of purine biosynthesis genes that affect metabolic pathways related to susceptibility (Poirel *et al.*, 2018). The production of β-lactamase enzymes is the primary mechanism underlying β-lactam antimicrobial resistance in *E. coli*, leading to hydrolysis of the antibiotic's beta-lactam ring and inactivation. Extended-spectrum β-lactamase (ESBL)-producing *E. coli* strains pose significant challenges in clinical treatment due to their ability to hydrolyse a broad spectrum of β-lactams (González *et al.*, 2025). Antimicrobial resistance arises from genetic mutations and the horizontal transfer of resistance genes between bacteria. Human activities such as inappropriate antibiotic consumption exert selective pressure, prompting the evolution and dissemination of resistant strains via mobile genetic elements (Habboush and Guzman, 2018). The mechanisms of action of antibiotics include inhibition of cell wall biosynthesis, alteration of membrane permeability, and interruption of DNA, RNA, and protein synthesis. By targeting these critical bacterial processes, antibiotics can effectively kill or inhibit bacterial growth. Different antibiotics specialize in one or more of these modes, which form the basis for their selective toxicity against bacteria (Uddin *et al.*, 2021).

The prevalence of multidrug-resistant *E. coli* in poultry meat underscores the urgent need for enhanced hygiene and monitoring systems along the production chain to safeguard public health and ensure meat quality (Ahmed *et al.*, 2025). Foodborne infection caused by *E. coli* can result in abdominal pain, diarrhea, vomiting, fever, and reduced appetite (Febrianti *et al.*, 2022). Severe diarrhea may cause fluid and electrolyte loss, potentially leading to life-threatening complications (Alharbi *et al.*, 2024).

Antibiotic-resistant *E. coli* infections, particularly to erythromycin, streptomycin, ciprofloxacin, tetracycline, and trimethoprim, increase the risk of treatment failure, secondary complications, and systemic spread (Mathew *et al.*, 2019). Broad-spectrum antibiotic therapy may produce adverse effects and limit treatment options, especially in low-income countries with limited healthcare resources. Resistance also elevates treatment costs due to the need for expensive antibiotics and additional medical procedures.

Raising awareness of the dangers of antibiotic misuse is essential for sustainable behavioural change (Mathew *et al.*, 2019). Improvement of food hygiene practices is critical in preventing foodborne diseases and limiting the spread of antibiotic-resistant bacteria within the food supply chain. Proper handling, storage, and preparation of food reduce microbial contamination and cross-contamination risks, which are critical factors in controlling antimicrobial resistance (Farrukh *et al.*, 2025). Training traders in sanitation, hygiene, and food safety practices is essential for ensuring compliance with Good Manufacturing Practices (GMP) and Hazard Analysis Critical Control Points (HACCP) systems, thereby improving the overall safety and quality of food products (Lee *et al*., 2021). Prevention of antimicrobial resistance in *E. coli* can be effectively achieved by enforcing strict sanitation measures, implementing HACCP principles throughout the food production chain, launching public awareness campaigns on judicious antibiotic use, maintaining antimicrobial resistance surveillance systems, and fostering the development of vaccines or alternative therapeutic agents (Khan *et al*., 2024).

CONCLUSIONS

Escherichia coli has been effectively isolated and identified from chicken meat samples in Blambangan and Banyuwangi Traditional Market at a rate of 45% (9/20). The antimicrobial resistance profile of *E. coli* isolated from chicken meat in the Blambangan and Banyuwangi Traditional Markets showed 100% resistance to erythromycin, 66.6% resistance to streptomycin, 55.5% resistance to ciprofloxacin and trimethoprim, and 33.3% resistance to tetracycline, while remaining 100% sensitive to aztreonam and chloramphenicol. These findings highlighting the need for improved food hygiene and antimicrobial resistance monitoring in food supply chain.

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NOVELTY STATEMENT

This study provides the first comprehensive evaluation of antimicrobial resistance profiles in broiler chicken meat from the Blambangan and Banyuwangi traditional markets, highlighting a concerning 77.7% prevalence of multidrug-resistant (MDR) *Escherichia coli*. While previous studies have broadly documented *E. coli* in poultry, this research addresses a critical local data gap by explicitly targeting community-associated wet markets, which present unique contamination risks due to suboptimal sanitation and hygiene infrastructure. Ultimately, these findings deliver crucial epidemiological evidence that underscores the urgent need for targeted food safety management interventions and supports broader One Health initiatives to monitor and mitigate foodborne antimicrobial resistance within developing urban food networks.

AUTHORS CONTRIBUTION

RNP and AY: Designed the study, materials preparation, data analysis, and manuscript preparation. AK, EKP, and RBH: Conducted the surveys and participated in laboratory examinations. DWS, AHS, SHAF, and FK: Contributed to the milk samples collection and field examination. AB, RNP: read, reviewed, and approved the final manuscript.

Ethical approval

Ethical approval was not required for this study because no experimental treatment was administered to the animals.

Generative AI and AI assisted technology statement

The authors declare that no generative AI and AI assisted technology was used in the creation of this manuscript.

Conflicts of interest

The authors declare that they have no conflict of interest.

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