# Detection of class 1 integrase gene and multidrug resistance in *Escherichia coli* isolated from Muscoid Diptera

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**Abstract**

The integrase is a constituent of integrons, important genetic elements to spread antimicrobial resistance. Flies can act as vehicle of resistant bacteria, such that studies this isolates are critical to improve the comprehension this process as well, the public health care.

*Key words: : β-lactams, integrons, flies*

## Introduction

The integrons are genetic elements responsible for integration of cassettes gene cassettes through site-specific recombination and play an important role in the spread of antibiotic resistance among bacteria, once gene cassettes are mainly related to antibiotic resistance. They consist of an integrase gene (enzyme that acts in the integration of gene cassettes), a recombination site and a promoter (1,2). The resistant bacteria can be spread in the environment from different routes as food contamination, and wastewater (3), and recently flies have been identified as resistant bacteria vehicles (4). Therefore, this study aimed the determination of antimicrobial resistance profile and the description of i) the class 1 integrase gene and ii) occurrence antimicrobial resistant genes to β-lactams in *Escherichia coli* isolated from Muscoid Diptera captured in dairy farms.

## Results and Discussion

From the external surface of 57 flies were isolated 135 *E. coli*, of which 10 showed class 1 integrase gene (*intI*), 6/10 had positive genotype for $bla_{TEM}$, 8/10 for $bla_{CTX-M}$, and 5/10 for *ampC*. The results acquired in disc diffusion assays and epsilometric test are exhibited in Table 1. The multidrug resistance observed in all 10 positive strains for the class 1 gene *intI* combined with the propagation by Muscoid Diptera highlight the importance of flies in the spread of resistant bacteria in the environment.

**Table 1.** Relative frequencies of antimicrobial resistant strains and production of extended-spectrum β-lactamase

| | Resistance | ESBL | |
|---|---|---|---|
| | | Disc diffusion | Epsilometric test |
| | n (%) | | |
| AMP | 10(100%) | --- | --- |
| AMC | 10(100%) | --- | --- |
| CFE | 10(100%) | --- | --- |
| CRO | 5(50%) | --- | --- |
| CFP | 5(50%) | --- | --- |
| CTF | 5(50%) | --- | --- |
| CIP | 9(90%) | --- | --- |
| ENR | 9(90%) | --- | --- |
| CLO | 4(40%) | --- | --- |
| SUT | 10(100%) | --- | --- |
| GEN | 5(50%) | --- | --- |
| TET | 10(100%) | --- | --- |
| CAZ | --- | 5(83%) | --- |
| ATM | --- | 5(83%) | --- |
| CRO | --- | 0 | --- |
| CTX | --- | 0 | --- |
| PM/PML | --- | --- | 0 |
| TZ/TZL | --- | --- | 3(50%) |

ESBL: extended-spectrum β-lactamase; n: number of resistant strains; AMP: ampicillin, AMC: amoxicillin/clavulanic acid; CFE: cephalecin; CRO: ceftriaxone; CFP: cefoperazone; CTF: ceftiofur; CIP: ciprofloxacin; ENR: enrofloxacin; CLO: cloramphenicol; SUT: sulfametoxazole/trimetoprim; GEN: gentamicin; TET: tetracycline; CAZ: ceftazidime; ATM: aztreonam; CTX: cefotaxime; PM/PML: cefepime/cefepime + clavulanic acid; TZ/TZL: ceftazidime/ceftazidime + clavulanic acid

## Conclusions

The occurrence of multidrug resistant bacteria is a global concern. In this context, the presence of phenotypic and genotypic multiresistance in *E. coli* strains carried by flies and the detection of genetic elements related to their spread indicate notable risks to public health.

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