Prevalence and Antibiogram Profiling of Extended-Spectrum Beta-Lactamase (ESBL) Producing *Escherichia coli* in Raw Vegetables, In Malaysia.

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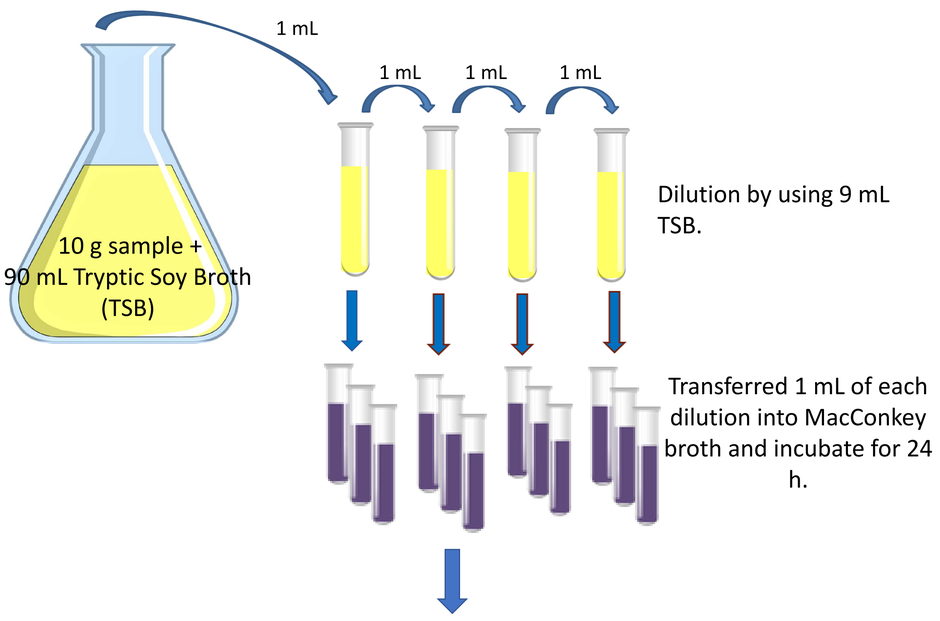
Introduction

The widespread of extended-spectrum beta-lactamase bacteria in food chain has become a global food safety issue. The infections caused by ESBL producing *E.coli* included intra-abdominal abscesses, peritonitis , urinary tract infection (UTI) and more severe may lead to blood poisoning. Nowadays, vegetables served as convenient meals and has become a trend to take over the centre-stage of main meals. However, raw vegetables were identified as the commodity group of the greatest concern from a microbiology safety perspective [1]

The current study was aimed to determine the prevalence rate of ESBL producing *E. coli* in raw vegetables and the antibiogram of the ESBL producing *E. coli* isolates.

Methods and Materials

1. Most Probable Number- Polymerase Chain Reaction (MPN- PCR)



The positive tubes were then carried out DNA extraction and PCR analysis.

2. Antibiotic Susceptibility Test (AST)

A total of 15 ESBL producing *E. coli* strains were isolated by using Chromogenic Brilliance ESBL agar and further confirmed by PCR analysis.

The isolated ESBL producing *E. coli* were tested against the following antibiotics disc:

- Piperacillin/Tazobactam (110 µg)
- Meropenem (10 µg)
- Aztreonam (30 µg)
- Ciprofloxacin (5 µg)
- Cefotaxime (30 µg)
- Ceftazidime (30 µg)
- Ceftriaxone (30 µg)
- Cefepime (30 µg)
- Ampicillin (10 µg)
- Amoxicillin/Clavulanic acid (30µg)

All plates were incubated for 24 h. The susceptibility range of selected antibiotic was measured based on CLSI (2007).

Results and Discussion

- ESBL producing *E. coli* was detected in 59 out of 95 samples (62.11%) in lettuce and 54 out of 85 in bean sprouts with microbial load range from <3 to >1100 MPN/g.
- The prevalence rate of ESBL producing *E. coli* in lettuce in wet markets (74.09%) is higher than hypermarkets (48.98%) and showed a significant difference (p<0.05).
- The prevalence rate of ESBL producing *E. coli* in bean sprouts showed 48.98% and 57.14% in wet market and hypermarket respectively.

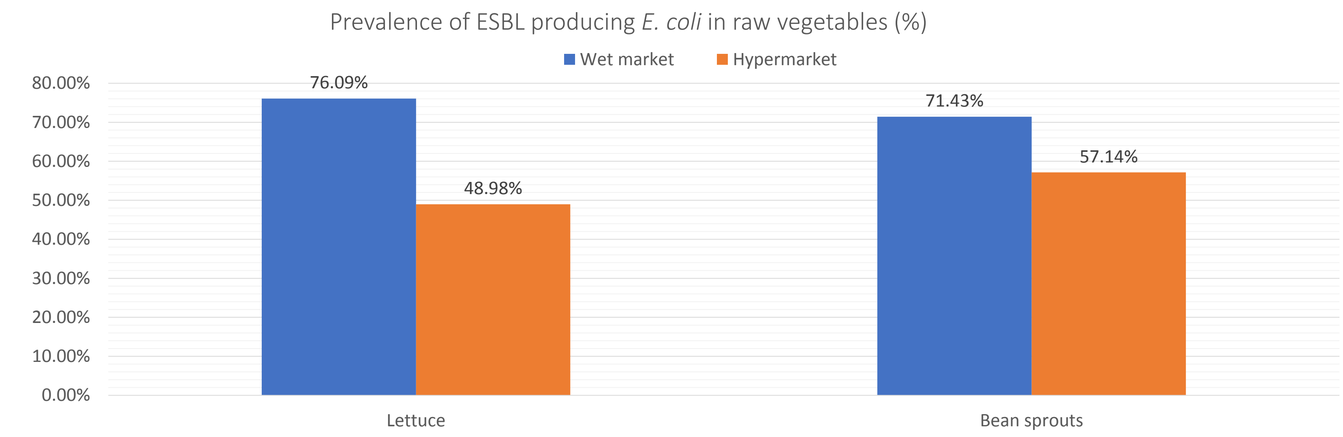


Figure 1: The prevalence rate of ESBL producing *E. coli* in raw vegetables from wet markets and hypermarket.

- The contamination of raw vegetables can happen via different pathways including pre-harvest (fertilizer, irrigation water and soil) and post-harvest process (improper handling and storage)[3].
- The different prevalence rate of ESBL producing *E. coli* in raw vegetables from hypermarket and wet market may due to the displayed and storage method, and improper handling by the food handlers.

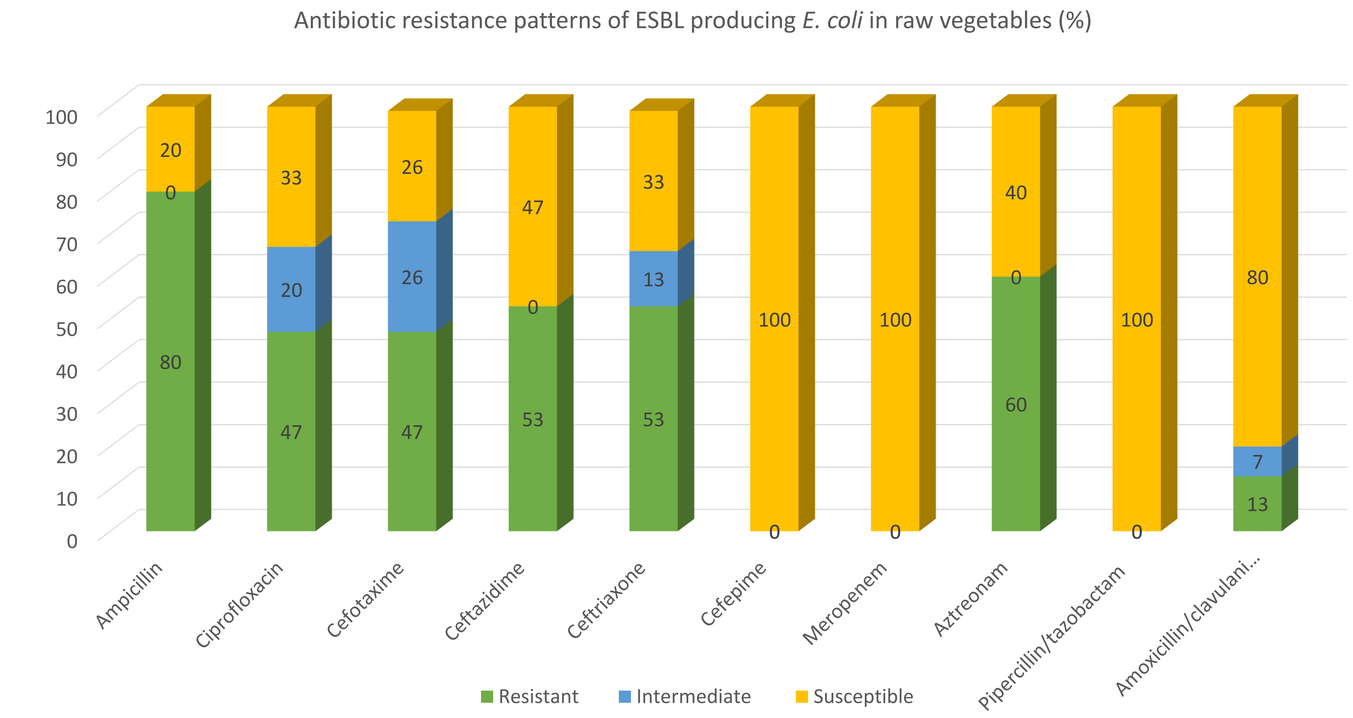


Figure 2: The antibiotic resistance patterns of ESBL producing *E. coli* in raw vegetables

- 60% of the isolated ESBL producing *E. coli* strains showed multidrug resistance (resistance more than three class antibiotics).
- Ampicillin is known as one of the regular traditional antibiotic treatments, however, 80% of the ESBL producing *E. coli* strains in this study showed resistant to ampicillin.
- The antibiotic resistance patterns may vary across geographical location due to the guidelines of antibiotics usage are varies from country to country [4-5].

Conclusions

- The high prevalence rate of ESBL producing *E. coli* in raw vegetables indicated that raw vegetables may act as a potential vehicle to transmit ESBL producing *E. coli* and ESBL genes to humans.
- The antibiotic resistance pattern of isolated ESBL producing *E. coli* showed 60% of the ESBL producing *E. coli* are multidrug resistant.

References

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