

A NOVEL ESBL COLILERT SYSTEM FOR ENVIRONMENTAL SURVEILLANCE OF AMR BACTERIA AT MARKETS IN LMICS



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Background:

- The spread of ESBL-producing bacteria through environmental compartments needs to be quantified to understand the drivers of resistant infections caused by ESBL bacteria, including the examination of water as a possible transmission pathway¹.
- Effective methods to assess environmental contamination by ESBL-producing bacteria are critical to enable rapid and reliable testing in LMIC settings, and ideally, they should be simple, cost effective and utilize current infrastructure.
- We present findings from an adaption of an ESBL IDEXX Colilert system, developed by the Centers for Disease Control and Prevention (CDC)², for the identification and quantification of ESBL contamination in four urban Malawian markets.

Methods:

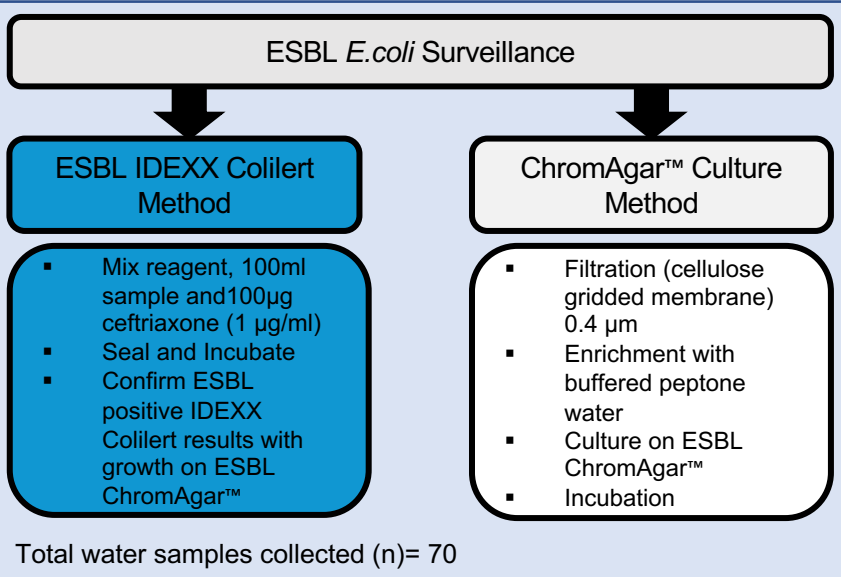


Figure 1 : Laboratory methods used for ESBL identification



Market day



Stored water



Source



River

Results:

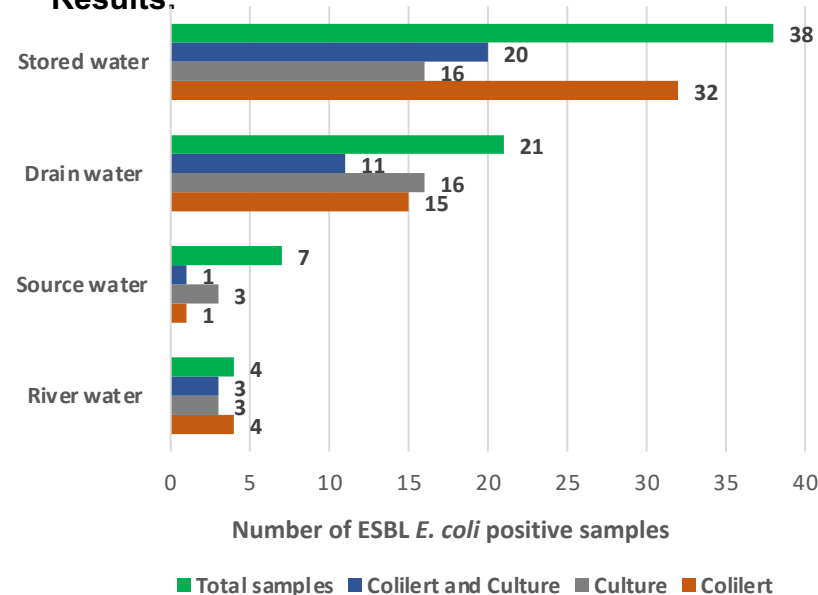


Figure 2: Number of samples which detected ESBL *E. coli* for IDEXX Colilert versus ESBL ChromAgar™

Results:

- n=62 (88%) were ESBL *E. coli* positive** (by either method).
- Variations** in the **sensitivity** of each method for identifying ESBL *E. coli* were seen, with IDEXX Colilert reporting n = 52 (74%) samples, and conventional culture reporting n = 38 (54%) samples.
- There was **discordance** in 27 samples, with 4 out of 70 samples positive on ESBL Chromagar™ culture alone, and 23 of 70 positive on the ESBL IDEXX Colilert

Conclusions:

- The urban markets studied were **heavily contaminated** with ESBL *E. coli*, particularly water used by vendors to keep vegetables looking fresh.
- Markets in LMIC settings** are potential sources of ESBLs where transmission may occur.
- The ESBL IDEXX Colilert method may be a more **sensitive**, and **simpler** method for the identification of ESBL contamination compared to traditional culture techniques on specific sample types (i.e., water) in these settings.
- An additional advantage of the ESBL IDEXX Colilert method is that could allow for the **quantification of resistant bacteria**.
- Further **validation** of the ESBL IDEXX Colilert method is needed in these settings.

References

¹WHO, FAO, OIE. Technical Brief on Water, Sanitation, Hygiene and Wastewater Management to Prevent Infections and Reduce the Spread of Antimicrobial Resistance. 2020. 32. ²CDC Waterborne Disease Prevention Branch Environmental Microbiology Laboratory, Doc. No. WDPB. DR.C.001.T01

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