Minoritised Life Scientists FUTURE FORUM
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31st March – 2nd April ICC Birmingham

Evaluation of ENVIRO-KIT™, a new device for rapid detection of *Listeria monocytogenes* on food contact surfaces.

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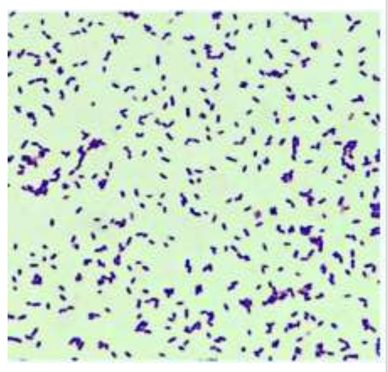
mwe BECAUSE RESULTS MATTER

INTRODUCTION



- Notwithstanding good progress in food safety standards, Listeria continues to pose a significant challenge as a cause of foodborne illness. In 2024 an outbreak in the United States linked to deli meats resulted in 61 confirmed cases with 60 hospitalizations, and 10 deaths.
- *Listeria* are Gram-positive, small rod-shaped, facultative anaerobic and non-spore-forming bacterium. It is catalase-positive and oxidase-negative, and expresses β-hemolysis, which causes destruction of red blood cells.
- *Listeria monocytogenes* is an important human foodborne pathogen causing Listeriosis.
- At-risk groups include pregnant women, elderly and those immunocompromised.
- **Sources:**
  - Raw salads
  - Deli meats and Hot dogs
  - Unpasteurized dairy products
  - Smoked seafood and fish like salmon

Food sources of *Listeria* infection

- Listeria control and prevention within food manufacturing industry is a huge concern.

- Here, we present **ENVIRO-KIT™**, a direct test to detect *Listeria* spp. including the pathogenic *Listeria monocytogenes*.
- The kit includes a **pre-moistened swab** and a **liquid indicator medium**.
- Colour change from straw to black within 24-48 hours of incubation at 37°C.

ENVIRO-KIT™

METHODS

List of isolates used to assess the performance of Enviro-Kit

Positive isolates	Negative isolates
Listeria monocytogenes NCTC 5214 *Listeria monocytogenes* NCTC 11994 *Listeria innocua* NCTC 11288	*Enterococcus faecalis* NCTC 775 *Staphylococcus aureus* NCTC 8532

- For each microorganism, culture suspensions were prepared equivalent to 0.5 McFarland standard and were diluted to 10^5 CFU per ml. An aliquot of 0.5 ml the diluted culture was spread onto a stainless-steel surface.
- A swab was removed from the packaging aseptically and used to rub the surface spread with bacterial culture one at a time.
- The inoculated swab was then placed back into the Enviro-Kit™ vial filled with liquid medium and the shaft broken at the break point. Also, three control vials were included with no bacterial inoculation to exclude any chances of contamination.
- After inoculation, the test and control vials were incubated at 37°C and the results were read at 24h and 48h as per colour change of the medium.

RESULTS & DISCUSSIONS

- By 24h incubation, all Enviro-Kit™ vials inoculated with *Listeria* spp. had started changing the colour of the medium from straw to black.
- By 48 h, all tubes with *Listeria* inoculated turned black while the non-*Listeria* remain unchanged, hence no false positives (Table 1).

Table 1: Colour change of the medium upon incubation with Listeria and non-Listeria species.

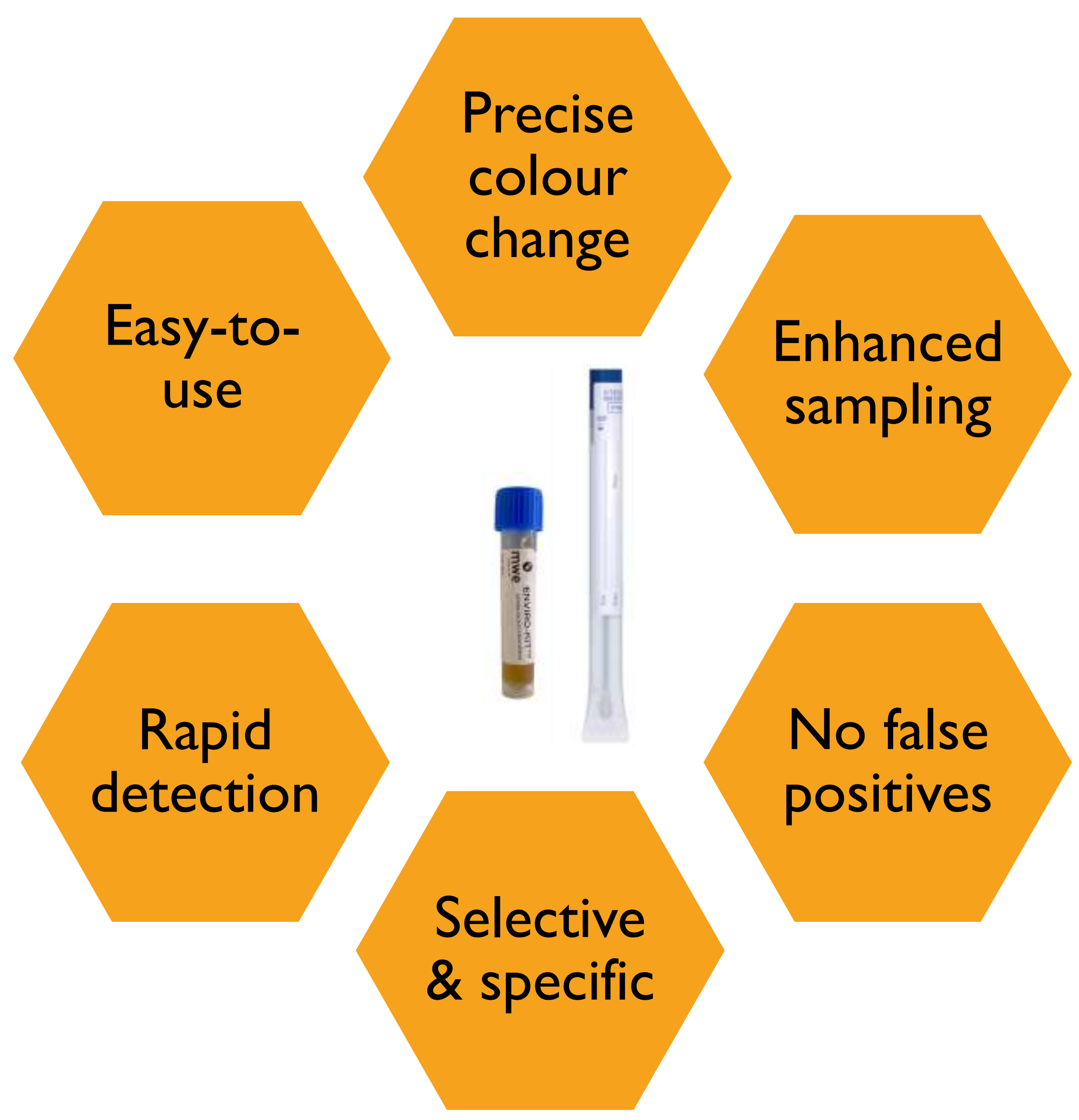
Test organisms	24 h	48 h
L. monocytogenes NCTC 5214	Black	Black
L. monocytogenes NCTC 11994	Brown	Black
Listeria innocua NCTC 11288	Black	Black
Enterococcus faecalis NCTC 775	No change	No change
Staphylococcus aureus NCTC 8535	No change	No change

- The medium itself was tested independently with different other strains of *L. monocytogenes* and *Listeria* spp., together with non-target bacteria including *Enterococcus faecium, Staphylococcus hominis, Leuconostoc mesenteroides and Lactobacillus plantarum. Listeria* spp. tubes changed colour to black while no change of colour for the non-target bacteria.

Positive Negative

- Detect *Listeria* spp. including the pathogenic *Listeria monocytogenes* from environmental samples, providing a reliable tool for pathogen surveillance.
- No colour change for negative background microorganisms.
- The selectivity of the media reduces the risk of false positives from other bacteria which might be present at the sampling site.
- This easy-to-use kit would help prevent the spread of Listeria contamination in food processing settings and maintain safe practice.

CONCLUSIONS



REFERENCES

Listeria infection (Listeriosis) (CDC report; Jan 2025)
(https://www.cdc.gov/listeria/outbreaks/delimeats-7-24/index.html)