Methods

STUDY No. 1: Medium specificity and sensitivity

186 well-characterised strains were tested: 70 E. coli, 29 other coliforms and 87 non-coliforms. The inoculum was used to contain 100-10 000 CFU/100 ml. For the detection limit, individual strains of E. coli, coliform and mixtures were tested at different inoculum/replicates. In order to determine the performances of the media, each sample was incubated at room temperature. The media were incubated for 24 hours. In order to determine the performances of the media, each sample was inoculated in 100ml of sterile distilled water and then incubated for 24h at 37°C. Concerning MPN method tests, out of 50 food samples tested, 48 (96.0%) were contaminated with coliform. Both MPN assays used in this study generated similar results. For the detection limit, individual strains of E. coli and coliform mixtures were tested at different inoculum/replicates. In order to determine the performances of the media, each sample was inoculated in 100ml of sterile distilled water and then incubated for 24h at 37°C. Concerning MPN method tests, out of 50 food samples tested, 48 (96.0%) were contaminated with coliform. Both MPN assays used in this study generated similar results.

Conclusion

AquaCHROM™ ECC showed excellent detection performance and its use is suitable for water as well as food quality control. Further evaluations could include studies on the use of AquaCHROM™ ECC for the detection of E. coli in foods with lower contamination levels.

Results

STUDY No. 1: Medium specificity and sensitivity

The results of the study were analysed according to the prevalence of each specific strain (see Table 1). For E. coli, two classification groups were defined: "common" and "rare" (Table 2). For the other coliforms, two classification groups were also defined: "common" and "rare". For non-coliforms, two classification groups were also defined: "common" and "rare".

TABLE 1: Detection performances of Aquachrom for E. coli and other coliforms

<table>
<thead>
<tr>
<th>Strain</th>
<th>E. coli</th>
<th>Other coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sensitivity</td>
<td>Specificity</td>
</tr>
<tr>
<td>E. coli</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Other coliforms</td>
<td>94%</td>
<td>84%</td>
</tr>
</tbody>
</table>

Note: The packaging of Readycult was found not practical because some capsules do not open properly.

Conclusions

- AquaCHROM™ ECC showed excellent specificity and sensitivity (100% for E. coli and 94% for common coliforms).
- AquaCHROM™ ECC, owing to the combination of two chromogens instead of one chromogen and one fluorogen, is easier to read because the colour difference between green (for E. coli) and yellow (for coliforms) is more visible than the difference between the colour with/without fluorescence.
- For "difficult" strains (E. coli with weak β-glucuronidase activity, for instance) there is a clear advantage of the chromogenic over the fluorogenic. The latter is barely detectable (see picture) while the green chromogen on the AquaCHROM™ ECC, although weak, is clearly detectable.

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STUDY No. 2: Limit detection

In pure strains, E. coli were detected from 1 UFC / 100ml and coliforms from 1 UFC / 100ml. At 18h, E. coli were detected in a mixture of 1 UFC / 10³ coliforms. At 24h, E. coli were detected in a mixture of 1 UFC / 10⁴ coliforms.

STUDY No. 3: Comparison with similar commercially available media

Although for "normal" strains (classical phenotypic behaviour), the three media performed similarly. The fluorescence is difficult to read, because it can be hidden by the colour of the medium. The chromogens are easier to read because of the colour difference between green (for E. coli) and yellow (for coliforms) - than the difference between a colour with/without fluorescence.

STUDY No. 5: Results of MPN Test

Out of 50 food samples tested, 48 (96.0%) were contaminated with coliform. Both MPN assays used in this study generated similar prevalence results for coliform, but varied greatly in the detection of E. coli. The MPN assay detected E. coli only 44.0% of the samples; whilst the mMPN assay had found 64.0% of the samples positive for E. coli.

Note: The packaging of Readycult was found not practical because some capsules do not open properly.

Fig. 1: Evaluation Of AquaCHROM™ ECC, A New Chromogenic Culture Broth For The Detection Of E. coli and Other Coliforms

Fig. 2: Comparison Of CHROMagar And AquaCHROM™ ECC (right) In Merck (left)

Table 1: Detection performances of Aquachrom for the different groups

<table>
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