R & F® *E. coli* O157:H7 Enrichment Broth

A Selective Enrichment Broth That Promotes The Efficient Repair And Growth Of Heat-And Freeze-Injured *Escherichia coli* O157:H7 Comparable To A Non-Selective Broth.

The primary function of an enrichment broth is to amplify very low levels of a specific bacterium in a sample so it can be more readily identified and isolated by a subsequent methodology. For conditions where cell levels of this bacterium are very low and injury levels are high, however, such cells must undergo repair or risk being missed in selection procedures. If a non-selective enrichment broth is used, repair can occur without any deleterious effects, but the simultaneous propagation of background bacteria can complicate isolation. Thus, a number of enrichment broths containing selective agents to suppress background growth have been developed for *Escherichia coli* O157:H7, but the effects of these agents on repair in these media have not been adequately assessed.

A comparison of heat-and freeze-injury repair by *Escherichia coli* O157:H7 at both 37 and 42°C in R & F® *E. coli* O157:H7 Enrichment Broth (R & F®-ECEB) versus four frequently used selective enrichment broths (buffered peptone water supplemented with vancomycin, cefsulodin, and cefixime {BPW-VCC}; modified EC broth with novobiocin; double-modified Tryptic soy broth; and entero-haemorrhagic *E. coli* O157:H7), showed that only R & F®-ECEB and BPW-VCC supported efficient heat-injury repair in 3 hours comparable to that obtained in unmodified TSB--a non-selective medium. Freeze-injury repair at both temperatures similar to those observed in TSB, however, were apparent only in R & F®-ECEB. Unstressed cells of *E. coli* O157:H7 in R & F®-ECEB, but not in the nutritionally limiting BPW-VCC, attained growth rates at 37 and 42°C, and final cell density after 24 hours at 37°C, similar to those made in TSB.

R & F®-ECEB, therefore, can be used to support both injury repair and selective propagation of *Escherichia coli* O157:H7 before the application of further culturing methods and/or other screening devices such as PCR.
## Selective Enrichment Broth Influence On Heat-And Freeze-Injury Repair In *E. coli* O157:H7

<table>
<thead>
<tr>
<th>Enrichment Broth</th>
<th>Heat Injury (2 logs)</th>
<th>Freeze Injury (1 log)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Cells&lt;sup&gt;a&lt;/sup&gt; Δ Log cfu/ml 3h</td>
<td>Repair&lt;sup&gt;b&lt;/sup&gt; Δ Log cfu/ml 3h</td>
</tr>
<tr>
<td></td>
<td>37°C</td>
<td>42°C</td>
</tr>
<tr>
<td>TSB</td>
<td>+0.3</td>
<td>+0.3</td>
</tr>
<tr>
<td>R&amp;F-EB</td>
<td>0.0</td>
<td>-0.3</td>
</tr>
<tr>
<td>BPW-VCC</td>
<td>0.0</td>
<td>-0.2</td>
</tr>
<tr>
<td>EBB</td>
<td>-1.2</td>
<td>-1.8</td>
</tr>
<tr>
<td>mEC+n</td>
<td>-1.2</td>
<td>-1.5</td>
</tr>
<tr>
<td>dmTSB</td>
<td>-1.8</td>
<td>-1.8</td>
</tr>
</tbody>
</table>

<sup>a</sup>Total=Injured and uninjured cells (plated on BHIA)  
<sup>b</sup>Repair=Increase from 0 time of uninjured cell number (plated on MacConkey's agar + 0.6% bile salts)

## Advantages of R & F<sup>®</sup> *E. coli* O157:H7 Enrichment Broth

- Promotes heat- and freeze- injury repair in *E. coli* O157:H7 comparable to the non-selective broth TSB
- Heat- and freeze-injury repair superior to BPW-VCC
- Highly selective yet supports efficient repair of injured *E. coli* O157:H7
- Supports growth rates and cell densities of unstressed *E. coli* O157:H7 cells comparable to growth in TSB and superior to BPW-VCC
- Can be used as an enrichment broth for *E. coli* O157:H7 in conjunction with subsequent culture methods or other techniques such as PCR
- Allows shorter enrichment times at very low levels (1-2 cells/25 g sample) of *E. coli* O157:H7 than either BPW-VCC or mEC+n before identifying presumptive positives by PCR

## References


## Ordering Information:

**M-0200 R & F<sup>®</sup> *Escherichia coli* 0157: H7 Enrichment Broth**

**M-0210 R & F<sup>®</sup> *Escherichia coli* 0157: H7 Supplement for Enrichment Broth**

**M-0250 R & F<sup>®</sup> *Escherichia coli* 0157: H7 Enrichment Broth Detection System**

R & F Products, Inc.  
2725 Curtiss St.  
Downers Grove, IL 60515

Phone: 630.969.5300  
Fax: 630.969.5303  
E-mail: rf@rf-products.net  
Web Site: www.rf-products.net