Foodborne Illness Outbreaks Linked to Commodity

Tomatoes are a common produce to suffer from microbial contamination, often causing foodborne illness outbreaks. Salmonella is a particularly common pathogen to contaminate tomatoes, with 15 multistate outbreaks reported 1973 and 2010; these outbreaks resulted in 2,000 sickenesses and 3 deaths. In 2005 and 2006, tomatoes from a farm in Virginia were linked to foodborne illness in 21 states.

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Year</th>
<th>Food Vehicle</th>
<th>Location</th>
<th>States Affected</th>
<th>Illnesses</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmonella</td>
<td>2009</td>
<td>Tomatoes</td>
<td>Michigan</td>
<td>1</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td>Salmonella</td>
<td>2008</td>
<td>Tomatoes</td>
<td>California</td>
<td>1</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Salmonella</td>
<td>2008</td>
<td>Tomatoes</td>
<td>US</td>
<td>Unknown</td>
<td>61</td>
<td>0</td>
</tr>
<tr>
<td>Salmonella</td>
<td>2008</td>
<td>Tomatoes</td>
<td>Iowa</td>
<td>Unknown</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Salmonella</td>
<td>2007</td>
<td>Tomatoes</td>
<td>Minnesota</td>
<td>1</td>
<td>23</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 1. Selected Foodborne Illness Outbreaks Attributed to Tomatoes, 2007-2009 (Outbreak Database, 2015)
Cooling and Storage Conditions:

Tomatoes harvested when ripe maintain well under cool conditions, with 4° - 10°C being ideal. Tomatoes harvested before ripening (green) must be stored above 12°C to prevent injuries from chilling. Ripe tomatoes prefer high humidity in storage. Green tomatoes are sensitive to ethylene and will begin ripening if exposed; however, ripe tomatoes are not highly sensitive to ethylene.

<table>
<thead>
<tr>
<th>Produce</th>
<th>Optimal Storage Temp., °C</th>
<th>Optimal Humidity (%)</th>
<th>Cooling with top ice acceptable</th>
<th>Cooling with water sprinkle acceptable</th>
<th>Ethylene Production</th>
<th>Ethylene Sensitivity to</th>
<th>Storage Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomatoes, ripe</td>
<td>4-10</td>
<td>90-95</td>
<td>No</td>
<td>No</td>
<td>Medium</td>
<td>No</td>
<td>4-7 Days</td>
</tr>
</tbody>
</table>

Table 2. Storage and Cooling Conditions for Tomatoes (Fellow, 2000)

Good Agriculture Practices (FDA, 2008)

- Remove dirt, stems, and leaves from tomatoes to the degree practicable in the field, in a manner that does not pose a risk of contamination.
- Ensure that containers used for field packing are not stored in the field unless protected from potential contamination.
- Apply extra care to cull and remove any damaged tomatoes during field packing because such packing of tomatoes generally occurs with mature ripe tomatoes.
- Prohibit the reuse of single-use containers, e.g., corrugated boxes, for the field packing of tomatoes.
- Protect containers from direct contact with the ground.

Pathogenic Behavior in Commodity

The vectors of contamination in tomatoes are still largely unknown. When washing tomatoes, it is inadvisable to use detergent or soap. Fresh fruit should be washed with clean potable water which is changed between every batch of produce, and washing water should be 10°F warmer than the temperature of the fruit being washed. Any surface which has direct contact with tomatoes should be regarded as a food contact surface, and cleaned and sanitized.

References


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This food safety factsheet can be downloaded at http://www.wku.edu/agriculture/index.php