Food Defense – A New Consideration for Inclusion in Food Safety Curriculum

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Introduction

• Food Defense is the “effort to protect food from acts of intentional adulteration” (FDA, 2017).
• The factors to be controlled in Food Safety are called “Hazards” while in Food Defense they are “Threats”.
• The U.S. Food and Drug Administration (FDA) has recognized the importance of Food Defense, and, accordingly, has included Mitigation Strategies to Protect Food Against Intentional Adulteration as one of the rules in the Food Safety Modernization Act (FSMA).
• There is now a need for knowledgeable and trained individuals in Food Defense within the food industry.
• As educators in Food Science and Poultry Science, it is our job to ensure that our students receive the appropriate training in Food Defense.
• Although Food Safety has traditionally been taught as part of the curriculum, and there are various similarities between the two subjects, the unique nature of the threats and adversaries that need to be assessed in Food Defense requires exploring the necessary approach to teaching this subject.

Objective

• First, to address the types of adversaries and related counter strategies and techniques unique to intentional food adulteration
• Assess the need for a course in Food Defense as well as student interest and current knowledge of the topic area

Analysis of Current Situation

• Threats unique to Food Defense
  • Intentional public health risk, or economic harm
  • Targets vary:
    • Company
    • General Public or a specific community
  • Individual
  • Common adversaries
    • Disgruntled employee – seeking to disrupt production, or to harm the company brand, or customers of the company.
  • Terrorist – seeking to hurt the community or nation. The Criticality and Shock Attributes (Table 2) are of import to these groups.
• Certification in Food Defense
  • Relatively few courses are available.
  • Most third-party courses that are available are too expensive for students.
• The FDA has online “Food Defense 101” training that has been updated to include FSMA and offers a certificate of completion once participants have finished the modules.
• Students are looking for more certification courses; 81% of the responders to the student questionnaire indicated a certification opportunity would increase their likelihood to enroll in a Food Defense course.

Table 1: Similarities and Differences between Food Defense and Food Safety

<table>
<thead>
<tr>
<th>Category of Hazards/Threats</th>
<th>Food Defense</th>
<th>Food Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires a good traceability and control program</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Awareness throughout the production and transportation phases</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Writing plan required</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Mitigation Local</td>
<td>Vulnerability</td>
<td>Control of hazards</td>
</tr>
<tr>
<td>Identification of hazards</td>
<td>Intentional</td>
<td>Intentional</td>
</tr>
<tr>
<td>Assessor vulnerability due to potential for enemies</td>
<td>Manage security</td>
<td>Manage security</td>
</tr>
<tr>
<td>Risk assessment tools</td>
<td>HACCP – Hazard Analysis and Critical Control</td>
<td>HACCP – Hazard Analysis and Critical Control</td>
</tr>
<tr>
<td>Human element</td>
<td>Intentional harm by employee, competitor, or outside source, control of hazards by employees</td>
<td>Ensures employees, control of hazards by employees</td>
</tr>
<tr>
<td>Ease of detection</td>
<td>Limited detection methods and many unknown agents</td>
<td>Limited detection methods and many unknown agents</td>
</tr>
</tbody>
</table>

Questionnaire results

• There were 18 students enrolled in a Food Safety class who responded to the questionnaire, 38% of whom plan to work in Food Safety or Quality Control after graduating.

Discussion

• Students in Food Safety do not feel they currently have an adequate group of Food Defense, but most feel it would be useful to them in their future careers and wish to expand that knowledge.
• Student interest in Food Defense would be increased if they could receive certification that they could leverage upon entering the work force.
• The similarities of Food Safety mean the existing teaching framework can be used, but requires the integration of information and tools unique to Food Safety.

Conclusions

• Both Food Safety and Food Defense require assessing the current situation, hazards/threats, and determining control or mitigation strategies.
• Students require training in this area considering the current climate in the food industry and regulatory agencies, and their current lack of knowledge.
• Students DESIRE more education in Food Safety.
• FDA provides several online tools that can be integrated into a university course on Food Safety.

Tools for Food Defense

• Similar to the HACCP (Hazard Analysis and Critical Control) Plan students construct in Food Safety, students would create a Food Defense plan for a hypothetical food facility
• Tools need to be address the differences (Table 1) from Food Safety
• FDA Food Defense Plan Builder is a useful tool – takes them through the process step by step

Table 2: CARVER Shock Attributes (adapted from Mitrani et al., 2004)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Clear, or unambiguous in its message</td>
</tr>
<tr>
<td>R</td>
<td>Relevancy</td>
</tr>
<tr>
<td>V</td>
<td>Verifiability</td>
</tr>
<tr>
<td>E</td>
<td>Effect</td>
</tr>
<tr>
<td>F</td>
<td>Feedback</td>
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References