Chapter 28: Hard or Sharp Objects

Potential Food Safety Hazard

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Potential Food Safety Hazard

Foreign objects in foods are considered adulteration. Foreign objects can be broadly classified as 1) food safety hazards (e.g., glass) and 2) food nonsafety hazards (e.g., filth). Foreign objects that are physical hazards are referred to as hard or sharp objects. Hard or sharp objects are divided into metallic objects (Tables 28-1 and 28-2) and non-metallic objects (Table 28-3). Metallic objects are further divided into ferrous metals (Table 28-1) and non-ferrous metals (Table 28-2).

Hard or sharp foreign objects in food may cause traumatic injury including laceration and perforation of tissues of the mouth, tongue, throat, stomach and intestine as well as damage to the teeth and gums. From 1972 through 1997, the FDA Health Hazard Evaluation Board evaluated approximately 190 cases of hard or sharp foreign objects in food. These include cases of both injury and non-injury reported to FDA. The Board found that foreign objects that are less than 7 mm, maximum dimension, rarely cause trauma or serious injury except in special risk groups such as infants, surgery patients, and the elderly. The scientific and clinical literature supports this conclusion.
Hard or sharp natural components of a food (e.g. bones in seafood, shell in nut products) are unlikely to cause injury because of awareness on the part of the consumer that the component is a natural and intrinsic component of a particular product. The exception occurs when the food's label represents that the hard or sharp component has been removed from the food, e.g., pitted olives. The presence of the naturally occurring hard or sharp object in those situations (e.g., pit fragments in pitted olives) is unexpected and may cause injury. FDA has established Defect Action Levels for many of these types of unavoidable defects in other Compliance Policy Guides and therefore they are not subject to the guidance in this document (FDA, 1999).

The following tables list examples of the types of hard or sharp objects that pose a potential physical hazard.

### Table 28-1. Ferrous metal objects

<table>
<thead>
<tr>
<th>Ferrous Metal Objects</th>
<th>Potential Hazard</th>
<th>Possible Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hook</td>
<td>Trauma</td>
<td>Raw materials (fish hook)</td>
</tr>
<tr>
<td>Wire</td>
<td>Trauma</td>
<td>Raw materials (e.g., twist tie)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Processing (e.g., screen/sieve)</td>
</tr>
<tr>
<td>Sliver</td>
<td>Trauma</td>
<td>Processing (e.g., container strap)</td>
</tr>
<tr>
<td>Staple</td>
<td>Trauma</td>
<td>Personal effects</td>
</tr>
<tr>
<td>Thumb tack</td>
<td>Trauma</td>
<td>Personal effects</td>
</tr>
<tr>
<td>Nail</td>
<td>Trauma</td>
<td>Maintenance</td>
</tr>
<tr>
<td>Key</td>
<td>Dental</td>
<td>Personal effects</td>
</tr>
<tr>
<td>Hand tool</td>
<td>Dental</td>
<td>Maintenance</td>
</tr>
<tr>
<td>Machinery part</td>
<td>Dental</td>
<td>Processing</td>
</tr>
</tbody>
</table>

### Table 28-2. Nonferrous metal objects

<table>
<thead>
<tr>
<th>Nonferrous Metal Objects</th>
<th>Potential Hazard</th>
<th>Possible Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaving</td>
<td>Trauma</td>
<td>Maintenance (e.g., plumbing repair)</td>
</tr>
<tr>
<td>Wire</td>
<td>Trauma</td>
<td>Maintenance (e.g., electrical wire offcut)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Processing (e.g., screen/sieve)</td>
</tr>
<tr>
<td>Sliver</td>
<td>Trauma</td>
<td>Processing</td>
</tr>
<tr>
<td>Jewelry</td>
<td>Trauma/Dental</td>
<td>Personal Effects</td>
</tr>
</tbody>
</table>
Table 28-3. Nonmetallic objects

<table>
<thead>
<tr>
<th>Nonmetallic Objects</th>
<th>Potential Hazard</th>
<th>Possible Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone (sliver/chip)</td>
<td>Trauma</td>
<td>Processing (e.g., hard/sharp bone pieces separated from flesh)</td>
</tr>
<tr>
<td>Wood splinter</td>
<td>Trauma</td>
<td>Raw materials (e.g., crate)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Processing (e.g., table, tool handle)</td>
</tr>
<tr>
<td>Glass</td>
<td>Trauma</td>
<td>Processing (e.g., light fixture, jar)</td>
</tr>
<tr>
<td>Puncture vine</td>
<td>Trauma</td>
<td>Raw materials</td>
</tr>
<tr>
<td>Hard plastic</td>
<td>Trauma</td>
<td>Processing (e.g., tote bin, packaging)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Personal effects (e.g., false fingernail)</td>
</tr>
<tr>
<td>Insulation</td>
<td>Trauma</td>
<td>Maintenance (e.g., asbestos fiber)</td>
</tr>
<tr>
<td>Insect</td>
<td>Trauma</td>
<td>Raw materials (e.g., sharp spine)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Processing (e.g., dermestid setae)</td>
</tr>
<tr>
<td>Hard shell</td>
<td>Trauma/Dental</td>
<td>Raw materials (Crustaceans)</td>
</tr>
<tr>
<td>Burr</td>
<td>Trauma/dental</td>
<td>Raw materials</td>
</tr>
<tr>
<td>Thorn</td>
<td>Trauma/dental</td>
<td>Raw materials</td>
</tr>
<tr>
<td>Button</td>
<td>Dental</td>
<td>Personal effects</td>
</tr>
<tr>
<td>Stone</td>
<td>Dental</td>
<td>Raw materials</td>
</tr>
</tbody>
</table>

*May also pose a potential chemical hazard*

**Metal Inclusion**

Metal fragments can cause injury to the consumer.
Metal-to-metal contact, especially in mechanical cutting or blending operations, other equipment with metal parts that can break loose, such as moving wire mesh belts, injection needles, screens, portion control equipment, metal ties and can openers are likely sources of metal that may enter food during processing.

FDA's Health Hazard Evaluation Board has supported regulatory action against product with metal fragments of 0.3" (7 mm) to 1.0" (25mm) in length. See FDA Compliance Policy Guide #555.425 (FDA, 2001a).

Glass Inclusion

Glass fragments can cause injury to the consumer. FDA's Health Hazard Evaluation Board has supported regulatory action against products with glass fragments of 0.3" (7 mm) to 1.0" (25 mm) in length. See FDA Compliance Policy Guide #555.425.

Glass inclusion can occur whenever processing involves the use of glass containers. Normal handling and packaging methods, especially mechanized methods, can result in breakage. Most products packed in glass containers are intended as a ready-to-eat commodity.

Glass fragments originating from other sources must be addressed where applicable in a prerequisite sanitation program. The Seafood HACCP Regulation requires such a program (FDA, 2001b).

Control Measures

Metal Inclusion

Control measures for "metal inclusion" can include:

- Periodically checking cutting or blending equipment or wire-mesh belts for damage or missing parts;
- Passing the product through metal detection or separation equipment.

Visually inspecting equipment for damage or missing parts may only be feasible with relatively simple equipment, such as band saws, small orbital blenders, and wire-mesh belts. Other, more complex, equipment may contain to many parts, some of which may not be readily visible, to make such visual inspection reliable in a reasonable time period (FDA, 2001a).

Glass Inclusion

Control measures for "glass inclusion" can include:

- Visual examination of empty glass containers;
- Cleaning (water or compressed air) and inverting empty glass containers;
- Periodically monitoring processing lines for evidence of glass breakage;
- Proper adjustment of capping equipment (not a complete control);
• Visual examination of glass containers containing transparent liquid fishery products;
• Passing the product through x-ray equipment or other defect rejection system (FDA, 2001b).

**Nonmetallic objects**

Control measures for nonmetallic objects can include:

• Passing the product through an X-ray detector.

**FDA Guidelines**

**Hard or sharp objects**

Foods are considered adulterated if:

• The product contains a hard or sharp foreign object that measures 7 mm to 25 mm, in length, and
• The product is ready-to-eat, or according to instructions or other guidance or requirements, it requires only minimal preparation steps, e.g., heating, that would not eliminate, invalidate, or neutralize the hazard prior to consumption (FDA, 1999).

**Metal Inclusion**

• No metal fragments in finished product. (Note: FDA's Health Hazard Evaluation Board has supported regulatory action against product with metal fragments of 0.3" [7 mm] to 1.0" [25mm] in length. See also FDA Compliance Policy Guide #555.425.), or
• No broken or missing metal parts from equipment at the CCPs for "metal inclusion" (FDA, 2001a).

**Glass Inclusion**

• No glass fragments in finished product. (Note: FDA's Health Hazard Evaluation Board has supported regulatory action against products with glass fragments of 0.3" [7 mm] to 1.0" [25 mm] in length. See also FDA Compliance Policy Guide #555.425.)
• No broken glass at the CCPs for "glass inclusion" (FDA, 2001b).

**Critical Aspects of Processes**

**Metal Inclusion**

Critical aspects of processes may include:

• The presence of metal fragments in product passing the CCP.
• The presence of broken or missing metal parts from processing equipment (FDA, 2001a).
Analytical Procedures
Rapid determination of glass in particle-free food products (HC ExFLP-7)

Other analytical procedures

- Bones and scales in grated tuna (Freeman, 1978)
- Glass contamination of food (Gecan et al., 1990)
- Glass in meat scraps (AOAC, 1995a)
- Filth in shrimp (Olsen, 1988)
- Shell in clams and oysters (AOAC, 1995b)
- Shell in crabmeat (AOAC 1995c)

References, Including General Physical Hazard


