FOOD SAFETY
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Safefood 360°

Determining Control Measure in HACCP
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• BSc in Food Processing & Technology
Overview

• Introduction
• What are control measures?
• Determining control measures
• Questions
HACCP

What is it?

- Risk assessment and management tool
- Identify and control specific hazards
- Widely adopted throughout the industry
- Variation in how the principles are applied e.g. Codex, USDA, retailers...
- Overall its impact has been positive
- Time has challenged the principles and in particular the models...
HACCP

Principles

• HACCP requires the user to identify potential hazards
• Determine the significance of these hazards via risk assessment
• Determine criticality
• Install appropriate control measures
HACCP

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HACCP

Principles

- Identified Hazard
- Risk Assessment
- Appropriate Level of Control
  - CONTROL MEASURE
- Validate Control Measure
Confusion

In identifying control measures

- Various standards have attempted to define how this should be done
- Unique terms, language, scope, methodology
- Main tools are RA models and Decision Trees
- Some good... some not so good
- HACCP, Allergens, VA’s, Food Fraud, Quality, Business etc
- Complicated models created confusion
- What control measure to use? How do I determine it?
What are Control Measure?

International Standards Organisation (ISO) Definition

“an action or activity that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level.”

- General and can be used to describe virtually any action, step, activity, job, task, process or procedure
- Categorised according to their nature, direct relationship with the process, and risk
What are Control Measure?

The emergence of control measures

- Critical Control Point (CCP)
- Prerequisite Programme (PRP)
- Operational Prerequisite Programme (oPRP)
- Control Point (CP)
- Quality Control Point (QCP)
Critical Control Point (CCP)

“Step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level”

• Most commonly known of all the control measures
• Definition similar to other control measures
• CCP differs in the fact that it relates specifically to a step in the process e.g. cooking, cooling, freezing
• Usually relates to a very specific hazard e.g. L mono
• CCP is a step at which control can be applied
Prerequisite Programs (PRP)

“Basic conditions and activities that are necessary to maintain a hygienic environment throughout the food chain suitable for the production, handling and provision of safe end products and safe food for human consumption”

- Wide variety of PRP’s e.g. GAP, GVP, GMP, GHP, GPP
- Usually general to the process and not specific steps
- Examples - cleaning, pest control
- Failure does not necessarily lead to an immediate and imminent food safety risk
Operational Prerequisite Programs (oPRP)

“Identified by the hazard analysis as essential in order to control the likelihood of introducing food safety hazards to and/or the contamination or proliferation of food safety hazards in the product[s] or in the processing environment.”

- Introduced by the ISO. Similar to CCP and PRP.
- Specific action relating to the process while not being critical for food safety
Control Point (CP)

“Any step at which biological, chemical, or physical factors can be controlled”

• A Control Point is used by some standards to describe an oPRP e.g. IFS Food Standard for auditing quality and food
• Similar definition to oPRP found in the ISO 22000.
Quality Control Point (QCP)

“A process step at which control is required to prevent or eliminate a quality defect or reduce it to an acceptable level”

• It is used in various standards including the Woolworths Standard (WQA) for Manufactured Foods V8.
• In this standard, quality risks are provided almost equal importance as food safety.
• Shift to ‘business’ risks
Determining Control Measures?

Control Measure Based on RISK

- GAP
- GMP
- PRP
- CP
- oPRP
- CCP

Risk

- LOW
- MEDIUM
- HIGH
Determining Control Measures?

Control Measure Based on HAZARD CHARACTER

- GAP
- GMP
- PRP
- CP
- oPRP
- CCP

HAZARD CHARACTER

GENERAL

SPECIFIC
Determining Control Measures

- To determine which control measure is appropriate for the identified hazard, you need to employ a specific methodology usually a...
- Risk assessment followed by a decision tree (CCP Determination).
Determining Control Measures

1. Hazard Identification and Analysis
2. Risk Assessment (Significance)
3. Determination of Control Measure
Risk Assessment & ‘Significance’

• Significance - Describes those hazards which present a real risk of impacting on the consumer.
• Separate those hazards which require tight control from those requiring lesser control.
• It may be said that significance is essentially an expression of Risk.
• In food safety, risk \( (R) \) is a measure of the combined severity of impact \( (S) \) from a hazard and its probability of occurrence \( (P) \).
• In its simplest form, risk is expressed as being High, Medium or Low.

\[
\text{Risk} = \text{Severity} \times \text{Probability}
\]
# Risk Assessment & ‘Significance’

## Probability Rating

<table>
<thead>
<tr>
<th>Rating</th>
<th>Food Safety Description</th>
<th>Quality Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unlikely - Would not expect to happen in 5 years</td>
<td>Practically impossible</td>
</tr>
<tr>
<td>2</td>
<td>Improbable - would not expect to happen in 2-3 years</td>
<td>Not expect to occur</td>
</tr>
<tr>
<td>3</td>
<td>Likely - Would be expected to occur once per year</td>
<td>Could occur or “I’ve heard of it happening” (published information)</td>
</tr>
<tr>
<td>4</td>
<td>High Probability - Could occur 2 or 3 times a year</td>
<td>Known to occur or “it has happened at our premises”</td>
</tr>
<tr>
<td>5</td>
<td>A Certainty - Likely to occur at any time</td>
<td>Common occurrence</td>
</tr>
</tbody>
</table>

## Severity Rating

<table>
<thead>
<tr>
<th>No</th>
<th>Food Safety Description</th>
<th>Quality Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mild symptoms - prompt recovery</td>
<td>Not of commercial significance</td>
</tr>
<tr>
<td>2</td>
<td>Mild symptoms for a few days</td>
<td>Warning advice of non-conformance</td>
</tr>
<tr>
<td>3</td>
<td>Generally mild symptoms but some cases of hospitalisation</td>
<td>Rejection of a delivery by the customer</td>
</tr>
<tr>
<td>4</td>
<td>Severe symptoms, hospitalisation, some deaths</td>
<td>Food Recall</td>
</tr>
<tr>
<td>5</td>
<td>Death</td>
<td>Immediate and Final cessation of business</td>
</tr>
</tbody>
</table>
# Risk Assessment & ‘Significance’

<table>
<thead>
<tr>
<th>Risk</th>
<th>From</th>
<th>To</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1</td>
<td></td>
<td>Acceptable or tolerable risk – no specific action required</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
<td>Undesirable risk - evaluation required, specific actions may be required</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>25</td>
<td>Intolerable risk - specific action required</td>
</tr>
</tbody>
</table>
Determination Models (Simple)

Q1: HAZARD ANALYSIS
Is there a hazard at this step?
- Yes
- No
  - Control as a quality issue

Q2: CONDUCT RISK ASSESSMENT
Is the Hazard Significant?
- Yes
- No
  - Control as a PRP, oPRP, CP

Q3: CCP DETERMINATION
Is the step managed as a CCP?
- Yes
- No
  - CRITICAL CONTROL POINT (CCP)
Determination Models (Codex)

1. **C1**: Do Preventive Control Measures Exist?
   - Yes → Continue
   - No → Modify step, process or product

2. **C2**: Is the step specifically designed to eliminate or reduce the likely occurrence of the hazard to an acceptable level?
   - Yes → Continue
   - No → Not a CCP, STOP

3. **C3**: Could contamination with identified hazard(s) occur in excess of acceptable level(s), or could these increase to unacceptable levels?
   - Yes → Continue
   - No → Not a CCP, STOP

4. **C4**: Will a subsequent step eliminate identified hazard(s) or reduce likely occurrence to acceptable level(s)?
   - Yes → Continue
   - No → Not a CCP, STOP

**CRITICAL CONTROL POINT (CCP)**
Determination Models (Codex)

- Codex decision tree focuses on determining whether the hazard should be controlled as a CCP or not.
- It does not assist the user in determining what type of control shall be employed where ‘not a CCP’ is the outcome.
- This makes it limited for most modern food businesses seeking to develop a robust food safety plan.
- A more robust model is required for this.
- Accounts for CCP’s and oPRP’s, PRP’s and QCP’s.
Determination Model (Robust)

• 8 Question Model
• Covers various control measure options
• Builds on CODEX and other models
• Assumes a significant hazard has been identified (RA)
Question 1 - Is there a food safety hazard(s) at this step?

- In this question we are again simply confirming the fact that a hazard has been identified or not.
- Where the answer is NO it is assumed it is a quality issue and is controlled as a QCP.
- If YES, then the user progresses to Q2.

Control as a QCP if relevant
Question 2 - Do control measure(s) exist for the identified hazard(s)?

- In this question the user is asked if control measures have been identified.
- Where NO Q3 is answered which may lead to revisions to the process or product.
- If YES, then the user will progress to Q4.
Question 3 - Is control necessary at this step for food safety?

• If control is required then revision should be made to the process or product.

Modify step, process or product
Question 4 - Is this step specifically designed to eliminate or reduce the likely occurrence of the hazard to an acceptable level?

- In this question the user is asked whether the step is specifically designed to eliminate or reduce the occurrence of the hazard.
- If YES it will be determined as a CCP.
- If NO, Q5 is asked next in the sequence.
Question 5 - Could contamination occur or increase to an unacceptable level?

- If NO, it is deemed not to be a CCP and the process STOPS.
- If YES then the user progressed to Q6.
Question 6 - Will a subsequent step eliminate or reduce the hazard to an acceptable level?

• If YES then the determination is NOT a CCP and the process stops since some control later in the process will address the hazard.
• If NO then the user progresses to Q7.
Question 7 - Will a subsequent action eliminate or reduce the hazard to an acceptable level?

- In this question we now see the shift of the decision tree away from STEPS (which are relevant only for CCPs) to ACTIONS which are more relevant for PRP.
- If NO then this step is deemed to be the controlling step and therefore a CCP.
- If YES then the user will progress to Q 8
Question 8 - Is the action a monitoring or measuring action, specific for this step?

- The decision tree is attempting to determine if the action is general or more specific to the step.
- If YES then it is controlled as an oPRP and No as a general PRP.
Whitepaper

• Available free on website
• http://safefood360.com/company/resources/whitepapers/download-whitepapers/
Any questions?