

# Hazard Analysis Critical Control Point Program

## Overview

Hazard Analysis Critical Control Point (HACCP) is the final stage of an integrated, proactive food safety program targeting the handler and designed to prevent contamination before it occurs. For HACCP to be a fully functional part of overall product safety management, well-established, comprehensive prerequisite programs must be in place; an integrated HACCP program is of no benefit without such programs.

Good Agricultural Practices (GAPs) provide guidelines to growers on how to minimize potential biological hazards during production and harvesting of almonds. Good Manufacturing Practices (GMPs) define procedures to be used by handlers to allow almonds to be processed, packed and sold under sanitary conditions. Sanitation Standard Operating Procedures (SSOPs) ensure a clean and sanitary environment in the facility. Together, these programs provide a framework for an HACCP program by proactively eliminating or minimizing potential sources of contamination.

HACCP provides a systematic approach to identify, assess and control the risk of biological, chemical and physical hazards that can be reduced, prevented or eliminated. The idea is to develop a plan that anticipates and identifies places in the production process—known as critical control points (CCPs)—where contaminants might be introduced or other food safety concerns can be identified. When critical limits are exceeded, corrective action must be taken and documented. An independent third party should be used to verify or validate the effectiveness of an HACCP plan.

At the moment, almond handlers are not re-

quired under U.S. law to implement HACCP procedures in their operations. However, as food safety awareness continues to increase among the general public and the individual consumer, handlers should recognize the benefits of HACCP practices to their customers and integrate them into their production routines.

The recommendations and guidelines included in this section are based on scientific principles and a review of required HACCP programs implemented in many other industries. They are intended to raise the awareness of the elements of an HACCP program. An HACCP program is unique and specific to each processing facility and requires a thorough analysis of each phase of processing at that facility. The use of an individual trained in developing HACCP programs is recommended.

## Definitions

**Control point**—Any step at which biological, chemical, or physical factors can be identified.

**Critical control point (CCP)**—A point, step or procedure in a food process at which control can be applied, and as a result, a food safety hazard can be prevented, eliminated or reduced to acceptable levels.

**CCP Decision Tree**—A sequence of questions to assist in determining whether a control point is a CCP.

**Critical limit**—The maximum or minimum value to which a physical, biological or chemical parameter must be controlled at a critical control point to prevent, eliminate or reduce to an acceptable level the occurrence of the identified food safety hazard.

Food safety hazard—Any biological, chemical or physical property that may cause a food to be unsafe for human consumption by rendering it reasonably likely to cause illness or injury in the absence of its control.

Preventive measure—Physical, chemical or other factor that can be used to control an identified food safety hazard.

Process-monitoring instrument—An instrument or device used to indicate conditions during processing at a critical control point.

Handling—With respect to almonds or almond products: processing, storing, preparing, changing into different marketable forms, manufacturing, packing, and/or labeling.

Processor—With respect to almonds or almond products: any person engaged in commercial, custom or institutional processing. A processor includes any person engaged in the production of foods used in market or consumer tests.

Shall—Used to state mandatory requirements.

Should—Used to state recommended or advisory procedures or to identify recommended equipment.

### Developing an HACCP plan

HACCP plans are specific to each facility and the products it produces. A series of steps must be completed before an HACCP plan can be developed.

- Assemble your HACCP Team—the HACCP team should be multidisciplinary in nature and should draw upon the expertise and talents of each department in your operation, all the way from management to, most important, your line

supervisors and employees.

- Complete a finished product profile—Finished product profiles must be developed for each finished product your facility produces and should contain the following information:
  - General product information, including a detailed description, methods of storage and distribution, intended use and consumer use, and shelf life and traceability information.
  - Technical product Information, including preservatives, water activity (aw) and any packaging requirements.
  - Food safety information, including potential opportunities for consumer misuse, and any hazards inherent in the finished product.
- Develop a process flow diagram describing steps involved in production of each product—A sample Plant Flow Chart is located later in this section. Please note that this is an example of a process flow diagram and that the process flow diagram developed for your organization should be specific to your individual processes.
- Verify the flow diagram on site via the HACCP team.

### The seven principles of HACCP

1. Conduct a hazard analysis—Assess the food safety hazards that are reasonably likely to occur and that must be controlled for almonds or almond products. Based upon experience, illness data, scientific reports or other information, a prudent handler should identify food safety hazards that are reasonably likely to occur to a particular almond or almond product being processed. Controls should be established to eliminate such a hazard. Food safety hazards can be introduced from within and from outside the facility, and can include food safety hazards that occur before, during and after harvest. Hazards can be biological, chemical or physical. An HACCP Hazard Analysis Worksheet may be referenced in Appendix A.

2. Determine critical control points—All hazards identified by the Hazard Analysis must be controlled at some point in the process. Decision trees can be used to identify CCPs. Sample Decision Tree Flow Chart is located in Appendix A. The number of CCPs identified depends on the product being produced, the ingredients (if any) used, the processing methods employed, and the effectiveness of and extent to which prerequisite programs are implemented.
3. Establish critical limits—Critical limits are tolerances beyond which the related CCP is out of control and a potential hazard can exist. A critical limit is a maximum and/or minimum value at which control must be maintained for the CCP. CCP limits cannot be average values or ranges of values. Critical limits must be validated by the processor or be supported by scientific data or literature.
4. Establish Monitoring Procedures—Monitoring is a scheduled observation of a CCP and its limits. The procedure must be reliable enough and performed often enough to ensure that the hazard is under control. Testing is not an acceptable substitute for monitoring a CCP. Determine what will be monitored how it will be monitored, when it will be monitored and who will perform the monitoring. A sample HACCP Plan form is provided in Appendix A.
5. Establish corrective actions—When there is deviation from an established CCP, corrective actions must be taken to prevent a product that may be unsafe from reaching consumers. Corrective action must include correcting the problem and putting the process back in control, and placing the product on hold pending evaluation of safety. Corrective action steps taken must be documented.
6. Establish verification procedures—Every HACCP plan should be examined to validate its ability to control food safety hazards that are reasonably likely to occur, and to show that the plan is being effectively implemented. Verification should include, at a minimum:
  - a. Reassessment of the HACCP plan: Reassess the adequacy of the HACCP plan whenever any changes occur (or at least annually) that could affect the hazard analysis or alter the HACCP plan in any way. Changes may include raw materials or sourcing of raw materials, handling methods or systems, finished-product distribution systems, or the intended use by consumers of the finished product. The HACCP plan must be modified whenever a reassessment reveals that the plan is no longer adequate.
  - b. Ongoing verification activities: Ongoing verification activities include a review of any consumer complaints that have been received by the handler to determine whether they relate to the performance of CCPs or reveal the existence of unidentified CCPs; the calibration of process-monitoring instruments; and the performance of periodic end-product or in-process testing.
  - c. Records review: A review, including signing and dating, by an individual who has been trained in accordance with appropriate HACCP practices, including:
    - The monitoring of critical control points.
    - Ensuring that the records are complete and that documented values are within the critical limits.
    - The taking of corrective actions.
7. Establish recordkeeping and documentation Procedures—The HACCP plan must be on file at the handling facility. It must include documentation relating to CCPs and any action taken on deviations or disposition of product. Types of records could include:
  - a. Processing: Records of all monitored CCPs.

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- b. Deviation: Records of any deviations from the HACCP plan.
- c. Ingredients: Supplier qualification, ingredient certification and audit records.
- d. Product safety: Records on safe shelf-life, microbiological testing and microbiological challenge studies.
- e. Storage and distribution: Traceability data.
- f. Validation studies.

Resources (A copy of this document can be found under Appendix D “Regulations and Guidelines”)

- HACCP Principles and Application Guidelines

# Hazard Analysis CCP Determination

Products: Almonds

Process: Almond Harvest and Processing

HACCP Plan No: ABC1106

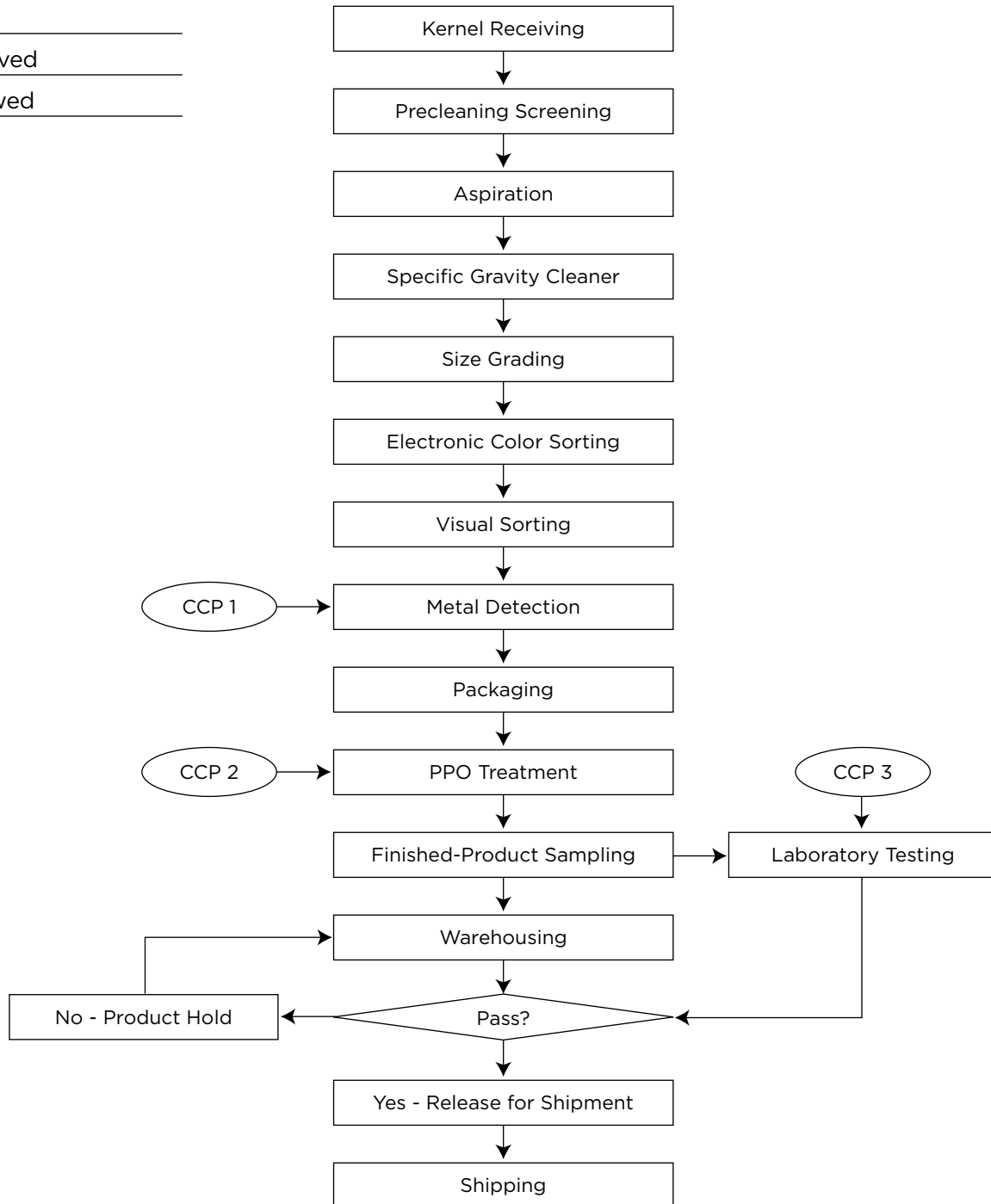
Process Step	Hazards: M - Microbiological C - Chemical P - Physical Hazard Description	Q1. Do preventive measures exist for the identified hazard(s)? - If no, not a CCP. Identify how and where this hazard will be controlled. - If yes, move to next question.	Q2. Does this step eliminate or reduce the likely occurrence of a hazard(s) to an acceptable level? - If no, move on to next question. - If yes, a CCP.	Q3. Could contamination with identified hazard(s) occur in excess of acceptable level or could these increase to unacceptable levels? - If no, not a CCP. - If yes, move to the next question	Q4. Will a subsequent step eliminate hazard(s) or reduce the likely occurrence to an acceptable level? - If no, a CCP. - If yes, not a CCP.	Identify as CCP or CP and list preventive measure(s) or prerequisite program(s) to control hazard(s).
Orchard Practices	Chemical/ Physical, Aflatoxin, Glass, Metal	Y	N	Y	Y	Prerequisite Program (PP), GAP, GMP
Huller/Sheller	Physical, Glass, Metal	Y	N	Y	Y	Handler PP
Grower Delivery	Chemical/ Physical Aflatoxin Glass, Metal	N	→	→	→	CP, Handler PP
Fumigation	Chemical, Chemical Residue	Y	Y	→	→	CCP*
Mechanical Sizing	Physical Glass, Metal	Y	N	Y	Y	Handler Procedures
Internal Storage Cold /Ambient	Chemical Aflatoxin	N	→	→	→	Handler PP, Monitor Temp, % RH
Mechanical /Optical Sorting	Chemical Aflatoxin	Y	Y	→	→	CCP
Manual Sorting	Chemical Aflatoxin	Y	Y	→	→	CCP
Finished-Product Testing	Chemical Aflatoxin>2B1, 4ppb Total	Y	N	Y	Y	CCP
Finished-Product Storage/Cold Ambient	Chemical Aflatoxin	N	→	→	→	CP Handler PP, Monitor temp, % RH
Shipment	Chemical, Potential aflatoxin increase during shipment	N	→	→	→	Control moisture prior to shipment; research is needed to verify potential risk

\*This CCP will be addressed by another handler HACCP plan or PP related to receiving. This CCP is not part of the aflatoxin HACCP plan and will not be addressed by ABC1106.

This form is only a sample and should be modified to meet the needs of your particular operation.

# HACCP Process Flow Chart

Date \_\_\_\_\_  
 Approved \_\_\_\_\_  
 Reviewed \_\_\_\_\_



This form is only a sample and should be modified to meet the needs of your particular operation.

# Hazard Analysis Critical Control Point

## Almond Kernel Processing

Date	Approved	Reviewed				
CCP	Operational Step on Flow Chart & Hazard Control	Monitoring Activity & Frequency	Critical Limits	Specific Action Required If Limits Are Exceeded	Employee Responsible & Records Required	Verification Activity & Frequency
CCP #1	Metal Detection	Continuous monitoring Machine calibration every 8 hours Test probe check every 2 hours	Ferrous detection 1 mm & larger Nonferrous detection 1.5 mm & larger	When metal detector rejects material, immediately capture the rejected material and place product from last test probe check on quality hold. Rerun the rejected almonds through the detector to locate the metal that set off the detector. If the metal likely came from processing machinery, stop line and locate the machine losing the metal. Inspect, then make appropriate line repairs before returning to production. If metal is field metal or shotgun BBs, then perform test probe check of detector. Once detector is performing as designed, resume production.	Electronic technician. Record daily calibrations and 2-hour test probe checks in metal detector log sheet. Whenever metal detector rejects product, make entry in metal detector log book of incident.	Shelled almond processing supervisor to review and sign all entries on metal detector log sheet at midshift and at shift's end. When metal detector rejects product, the supervisor must sign the log before production resumes.
CCP #2	PPO Treatment	Monitor PPO dosage, product temperature, exposure and ventilation times	1/2 oz PPO/1000 cubic feet 117-125° F minimum temp. 4-hour minimum exposure time Post-ventilation 100-110° F for 2 days or 59° F for 5 days	Deviation from any of the critical limits requires all products in the chamber to be placed on hold. Call technician to troubleshoot the cause of the deviation. Product on hold is to be either PPO treated or processed through another lethal process.	PPO chamber operator. PPO log and operational process control forms.	Plant manager to review and sign off on all logs and process control forms daily.
CCP #3	Laboratory Analysis & Clearance for aflatoxin and <i>Salmonella</i>	Performance of appropriate chemical and microanalysis as specified by the product specification, and customer and product destination	All product negative for <i>Salmonella</i> All products must meet the aflatoxin tolerance set for the specific destination; for example, product destined for the EU must be less than 4 ppb total aflatoxin	Any product testing positive for <i>Salmonella</i> must remain on quality hold and be reported immediately to the QA Manager. QA manager will direct product for further lethal treatment. Any product exceeding the aflatoxin limits as defined in the product specification must remain on QC hold and be redirected to a market appropriate for the aflatoxin level found or reprocessed and retested.	Laboratory manager. See laboratory procedures and records manual for appropriate recordkeeping.	Plant manager immediate reviews pathogen and/or aflatoxin failure. Daily review of routine lab records.

Please note that this is an example of critical control point matrix. When developing this type of document for a facility it should be specific to individual processes and address critical factors that may affect the safety of the product.

This form is only a sample and should be modified to meet the needs of your particular operation.

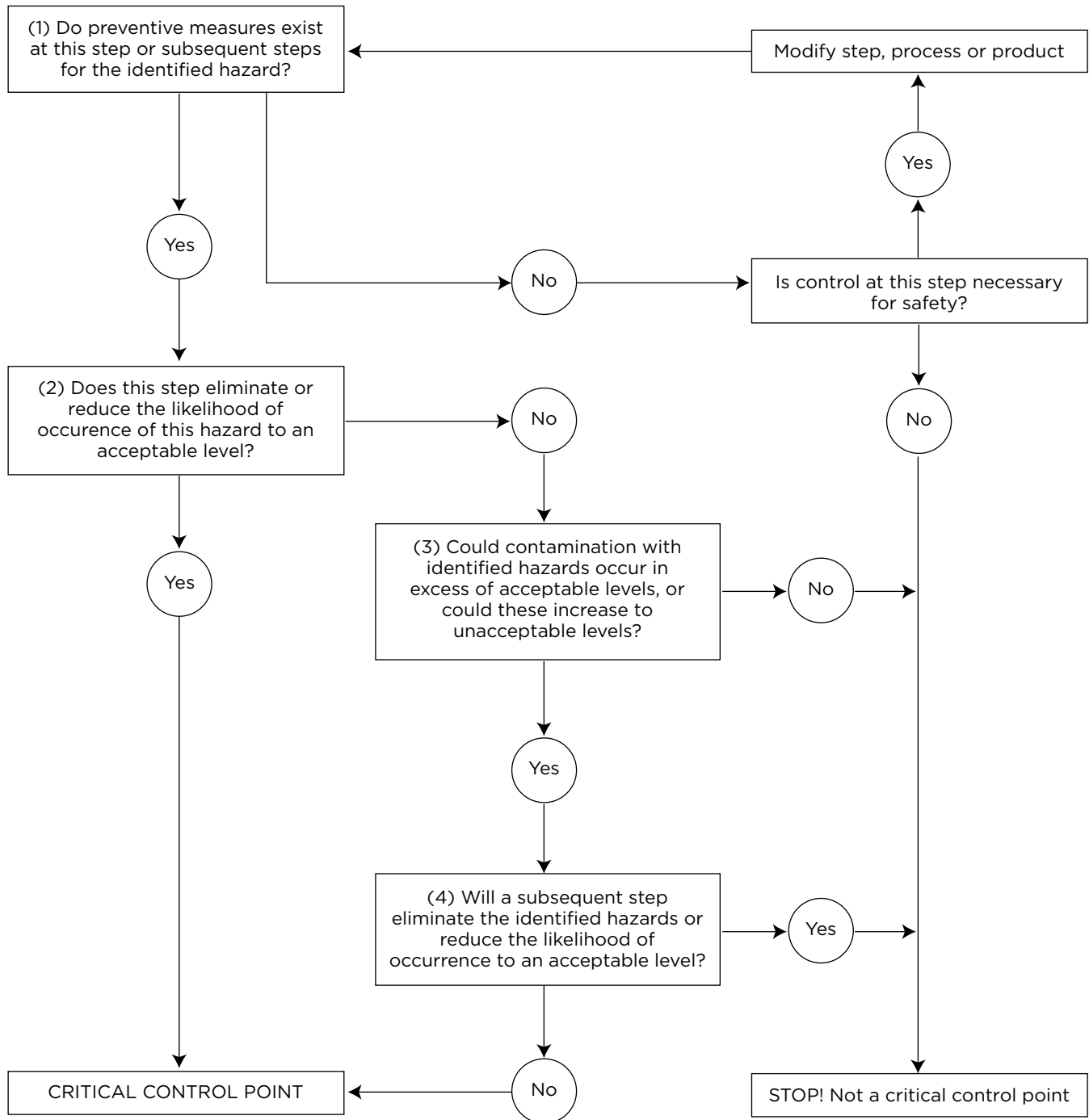
# HACCP Hazard Analysis Worksheet

Firm Name		Product Description (each product must have its own hazard analysis)			
Firm Address		Methods of Distribution and Storage			
Date of Analysis		Intended Use and Consumer			
		Typical Consumer			
Processing Step	Identify potential hazards introduced, controlled or enhanced at this step	Are any potential food safety hazards significant? (y or n)	Justify your determination of hazard significance	What control measures can be applied to the significant hazard?	Is this step a critical control point? (y or n)
Receiving	Biological				
	Chemical				
	Physical				
Fumigation	Biological				
	Chemical				
	Physical				
Hulling/Shelling	Biological				
	Chemical				
	Physical				
Sizing	Biological				
	Chemical				
	Physical				
Packing	Biological				
	Chemical				
	Physical				
Storage	Biological				
	Chemical				
	Physical				
Shipping	Biological				
	Chemical				
	Physical				

This form is only a sample and should be modified to meet the needs of your particular operation.



# HACCP Decision Tree Flow Chart



This form is only a sample and should be modified to meet the needs of your particular operation.

# HACCP Plan

Firm Name			Product Description						
Firm Address			Methods of Distribution and Storage						
			Intended Use and Consumer						
CCP	Significant Hazard	Critical Limits	Monitoring				Corrective Action(s)	Records	Verification
			What	How	Frequency	Who			

Signature of responsible individual \_\_\_\_\_ Date \_\_\_\_\_

This form is only a sample and should be modified to meet the needs of your particular operation.