

This table is an example of a portion of a HACCP plan relating to the control of pathogen growth and toxin formation as a result of time/temperature abuse for a processor of blue crabmeat, using time/temperature control (Version 1). It is provided for illustrative purposes only. Pathogen growth and toxin formation may be only one of several significant hazards for this product.

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(1) Critical Control Point (CCP)	(2) Significant Hazard	(3) Critical Limits for each Preventive Measure	(4) What	(5) Monitoring How	(6) Frequency	(7) Who	(8) Corrective Action(s)	(9) Records	(10) Verification
Cooked crab cooler	Pathogen growth and toxin formation Note: Control is necessary at this step because the processor has not established that the cook step is adequate to kill the spores of <i>Clostridium perfringens</i> <i>Bacillus cereus</i>	Crabs cooled from 140°F to 70°F in 2 hrs and 70°F to 40°F in 4 more hrs.	Cooked crab internal temperature	Dial thermometer in marked batches of cooked crabs	Start marked batch approx. every two hours during cooking	Production supervisor	Move part of load to alternate cooler and/or add ice Hold and evaluate based on total time/temperature exposure	Production record	Check accuracy of data logger once per day Check accuracy of dial thermometer once per day
		Cooler maintained at or below 40°F after cooling completed	Cooler temperature	Digital time/temperature data logger	Continuous with visual check once per day	Production supervisor	Same	Data logger printout	Review monitoring, corrective action and verification records within one week of preparation
Backing	Pathogen growth and toxin formation	No more than 2 hrs. cumulative time during backing, picking and packing Note: This CL is necessary because the crabs are handled at internal temperatures above 70°F during backing	Time of product exposure to unrefrigerated conditions	Visual observation of marked containers	Start marked container approx. every two hours during backing	Production supervisor	Immediately ice product or move to cooler Hold and evaluate based on total time/temperature exposure	Production record	Review monitoring and corrective action records within one week of preparation
Backed crab cooler	Pathogen growth and toxin formation	Cooler maintained at or below 40°F	Cooler temperature	Digital time/temperature data logger	Continuous with visual check once per day	Production supervisor	Move to alternate cooler and/or add ice Hold and evaluate based on total time/temperature exposure	Data logger printout	Check accuracy of data logger once per day; Review monitoring, corrective action, and verification records within one week of preparation

Picking	Pathogen growth and toxin formation	No more than 2 hrs. cumulative time during backing, picking, and packing	Time of product exposure to unrefrigerated conditions	Visual observation of marked containers	Start marked container approx. every two hours during picking	Production supervisor	Immediately ice product or move to cooler Hold and evaluate based on total time/temperature exposure	Production record	Review monitoring and corrective action records within one week of preparation
Packing	Pathogen growth and toxin formation	No more than 2 hrs. cumulative time during backing, picking, and packing	Time of product exposure to unrefrigerated conditions	Visual observation of marked containers	Start marked container approx. every two hours during picking	Production supervisor	Immediately ice product or move to cooler Hold and evaluate based on total time/temperature exposure	Production record	Review monitoring and corrective action records within one week of preparation
Finished product cooler	Pathogen growth and toxin formation	Cooler maintained at or below 40°F	Cooler temperature	Digital time/temperature data logger	Each case immediately before shipping	Production employee	Move to alternate cooler and/or add ice Hold and evaluate based on total time/temperature exposure	Data logger printout	Check accuracy of data logger once per day Review monitoring, corrective action, and verification records within one week of preparation

FDA. 1998. Pathogen Growth & Toxin Formation (Other than *Clostridium botulinum*) as a Result of Time/Temperature Abuse(A Biological Hazard). Ch. 12, In *Fish and Fishery Products Hazards & Controls Guide: Second Edition*. 133-150. Department of Health and Human Services, Public Health Service, Food and Drug Administration, Center for Food Safety and Applied Nutrition, Office of Seafood, Washington, DC.

This table is an example of a portion of a HACCP plan relating to the control of pathogen growth and toxin formation as a result of time/temperature abuse for a processor of blue crabmeat (typical of East coast retort processing method), using time/temperature control (Version 2). It is provided for illustrative purposes only. Pathogen growth and toxin formation may be only one of several significant hazards for this product.

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(1) Critical Control Point (CCP)	(2) Significant Hazard(s)	(3) Critical Limits for each Preventive Measure	(4) What	(5) Monitoring How	(6) Frequency	(7) Who	(8) Corrective Action(s)	(9) Records	(10) Verification
Picking/ boning/ packing	Pathogen growth and toxin formation	No more than 3 1/2 hours cumulative time during picking, boning, and packing (beginning when cooked crabs are first handled in picking room) Note: This critical limit is based on a study that demonstrates that, under ordinary circumstances, the product does not exceed 70°F in 3 1/2 hours exposure to ambient temperature	Time of product exposure to unrefrigerated conditions	Visual observation of time that picking begins for each batch of cooked crabs that is brought into the picking room Visual observation of time that the last container of crabmeat from the batch is packed on ice	Every Batch Every batch	Picking room supervisor Packing room employee	Pasteurize or freeze the product Hold and evaluate based on total time/temperature exposure	Cooked crab cart record Packing record	Review monitoring and corrective action records within one week of preparation Study showing temperature profile of product during processing
Finished product storage	Pathogen growth and toxin formation	Finished product containers completely surrounded with ice	Quantity of ice	Visual observation	Each case immediately before shipping	Shipping employee	Re-ice Hold and evaluate based on total time/temperature exposure	Shipping record	Review monitoring and corrective action records within one week of preparation

FDA. 1998. Pathogen Growth & Toxin Formation (Other than *Clostridium botulinum*) as a Result of Time/Temperature Abuse (A Biological Hazard). Ch. 12, In *Fish and Fishery Products Hazards & Controls Guide: Second Edition*. 133-150. Department of Health and Human Services, Public Health Service, Food and Drug Administration, Center for Food Safety and Applied Nutrition, Office of Seafood, Washington, DC.

This table is an example of a portion of a HACCP plan relating to the control of pathogen growth and toxin formation as a result of inadequate drying for a processor of salmon jerky, using control of drying. It is provided for illustrative purposes only. Pathogen growth and toxin formation as a result of inadequate drying may be only one of several significant hazards for this product.

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(1) Critical Control Point (CCP)	(2) Significant Hazard	(3) Critical Limits for each Preventive Measure	(4) What	(5) Monitoring How Frequency		(7) Who	(8) Corrective Action(s)	(9) Records	(10) Verification
Drying (forced convection oven)	Pathogen growth and toxin formation	Maximum product thickness 1/4"	Product thickness	Preset slicer to just less than 1/4"	Once per day before operations	Slicer operator	Readjust slicer	Processing log	Documentation of drying process establishment
		Minimum drying time 5 hours	Drying time	Digital time/temperature data logger	Continuous, with visual check each batch	Oven operator	Continue drying	Data logger printout	Review monitoring, verification and corrective action records within one week of preparation
		Minimum oven temperature 140°F	Oven air input temperature	Digital time/temperature data logger	Continuous, with visual check each batch	Oven operator	Extend drying process Segregate product and hold for evaluation. Evaluate by Performing water activity analysis on finished product. Re-dry if more than 0.85	Data logger printout	Check the accuracy of the data logger daily. Analyze finished product sample once every 3 months for water activity

Note: The critical limits in this example are for illustrative purposes only, and are not related to any recommended process.

FDA. 1998. Pathogen Growth & Toxin Formation as a Result of Inadequate Drying (A Biological Hazard). Ch. 14, In *Fish and Fishery Products Hazards & Controls Guide: Second Edition*. 175-182. Department of Health and Human Services, Public Health Service, Food and Drug Administration, Center for Food Safety and Applied Nutrition, Office of Seafood, Washington, DC.