

Application of HACCP Concepts to Meat Products in Japan

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Keywords: HACCP, meat products, accreditation system,

In Japan, meat products are legally divided according to the characteristic and manufacturing process of the product into 4 types, dry products, unheated products, specified heated products and heated products. Depending of these type of meat products, detailed regulations concerning the contents of the product, manufacturing and storage standards are established in order to prevent the contamination with pathogenic and spoilage microorganisms, the propagation and elimination of such organisms.

In 1996, HACCP system were introduced as accreditation system, meat manufacturer have to select either usual manufacturing standard or HACCP-based meat production operations. In this system, development and implementation of SSOP showing maintenance and sanitation of establishment (facility, equipment) for the purpose of insuring sanitary environment of manufacturing process, general operations of food, personal hygiene, and assembly of HACCP team, making HACCP plan by team and record keeping of sanitary control by plan based on Codex guideline for the application of the HACCP system have to be kept. For the purpose of popularization of this system, studygroup consisting of industry, goverment and academia is assembled, general hygienic control manual during meat manufacturing process and generic HACCP models consisting of products of 9 categorys are arranged in one book and CD-ROM.

Nowadays, Japanese establishments of meat products are planning induction of HACCP system refering to the manual maked by studygroup but a dilfficulty of induction to small manufacturer is indicated.

Following tables showed the overview of the manufacturing standards of meat products in Japan, and examples of a hazard list and a CCP worksheet of heat treated meat product based on HACCP concept.

1. Overview of individual standards for the manufacturing of meat products in Japan

Type of product	Primary meat	Thawing and structuring temperature	Salting				Smoking/dehydration	Pasteurization
			Method	Temp.	Aw	Additives used		
Dry products							$\leq 20^{\circ}\text{C}/\geq 50^{\circ}\text{C}$ $< \text{Aw } 0.87$	
Unheated products	Single nugget, $\leq 4^{\circ}\text{C}$, $\leq \text{pH}6.0$	$\leq 10^{\circ}\text{C}$	• Dry • Brine • Injection	$\leq 5^{\circ}\text{C}$	< 0.97	• Dry : $\geq 200\text{ppm Nitrite}$ $\geq 6\% \text{ NaCl}$ • Brine & injection $\geq 200\text{ppm Nitrite}$ $\geq 15\% \text{ NaCl}$	$\leq 20^{\circ}\text{C}/\geq 50^{\circ}\text{C}$ $< \text{Aw } 0.95$ (products with $\geq \text{Aw}0.95$ excluded)	
			Dry	$\leq 5^{\circ}\text{C}$		• Nitrite not used $\geq 6\% \text{ NaCl}$ $\geq 40 \text{ days}$	$\leq 20^{\circ}\text{C}$ $\geq 53 \text{ days}$ $< \text{Aw } 0.95$	
	Non-nugget (chopped to $< 20\text{mm}$)	$\leq 10^{\circ}\text{C}$				$\geq 200\text{ppm Nitrite}$ $\geq 3.3\% \text{ NaCl}$	$\leq 20^{\circ}\text{C}$ $\geq 20 \text{ days}$ $< \text{pH}5.0$ $< \text{Aw } 0.91$ $< \text{pH}5.3 \text{ \&}$ $< \text{Aw } 0.96$	
Specified heated products		$\leq 10^{\circ}\text{C}$	• Dry • Brine					$55^{\circ}\text{C}(97\text{min.})$ to 63°C (instantaneous) $35 \rightarrow 52^{\circ}\text{C} \leq 170\text{min.}$ $54 \rightarrow 25^{\circ}\text{C} \leq 200\text{min.}$ $\geq 63^{\circ}\text{C}(30\text{min.})$
Heated products								

2. The HACCP-based manufacturing method for meat products

1) Example of microbiological hazard list and CCP/GMP for meat products

Process step	Hazards	Causes of hazard	Control measures	CCP / GMP
Receiving raw materials	Contamination of pathogens Growth	Inappropriate sanitation control in slaughter houses and processing plants	• Ascertain supplier handling • Prevent contamination, and storage at low temperature	CCP-1
Structuring	Contamination Growth	Insufficient cleaning of utilities and equipment, and temperature/duration	Cleaning and disinfection of utilities and equipment	GMP
Salting	Contamination Growth	Insufficient salt, nitrite and additives, and inadequate sanitation control	Use species amounts of salt and nitrite, prevent contamination, and storage at low temperature	CCP-2
Chopping/ mixing	Contamination	Insufficient cleaning of utilities and equipment	Cleaning and disinfection of utilities and equipment	GMP
Stuffing	Contamination	Insufficient cleaning of utilities and equipment	Cleaning and disinfection of utilities and equipment	GMP
Smoking/ dehydration	Growth	Insufficient temperature /duration	Adhere to specified temperature and Aw	GMP (CCP)
Pasteurization	Survival	Insufficient temperature /duration	Adhere to specified temperature/duration	CCP-3
Cooling	Contamination Growth	Slow cooling, contamination of water used	Speedy cooling, use of appropriate water	CCP-4
Packaging	Contamination	Insufficient cleaning of utilities and equipment, air-borne microorganisms	Cleaning and disinfection of utilities and equipment, elimination of dust from the packaging room	GMP
Strage	Growth	Insufficient temperature /duration	Adhere to specified temperature/duration	CCP-5

3) Example of the CCP worksheet model

Product name: Heat treated meat Product(Vienna sausage)

CCP No.	CCP-4
Process step	Pasteurization
Hazard	Survival of microorganisms(pathogens)
Cause of hazard	Insufficient temperature/duration
Control measures	Adhere to specified temperature/duration
Critical limits	Greater than or equal to the proper meat temperature/duration: 63 ° C/30min.
Monitoring	<ul style="list-style-type: none"> • Observation of self recording thermometer • Random checks of each lot taken daily • Heat production employee
Corrective action	<ul style="list-style-type: none"> • Evaluate significance and utilize established procedure • Evaluate the cause of deviation and take action to prevent reoccurrence • Repeat heat treatment • Heat production employee
Verification	<ul style="list-style-type: none"> • Periodic calibration of thermometer : monthly • Periodic observation and temperature checks : weekly • Daily review of relevant records • Heat production manager
Records	<ul style="list-style-type: none"> • Pasteurization log • Thermometer calibration log • Deviation/corrective action log