

Retail HACCP

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Introduction

The goal of HACCP is to focus industry's attention on the process of reducing the pathogens (microbiological, chemical, physical) on the food from the farms and seas to a tolerable level. "Zero" contamination is not a goal of HACCP.

Retail HACCP starts at the food source and continues to the consumer—"farm to fork." There are many foods offered to consumers in retail systems for which the cook has introduced no controls. For example, people might eat berries they purchased right out of the box, unwashed. They eat raw beef, raw oysters, and raw fish; they drink raw milk and consume many other raw food items. There is no intent on the part of HACCP to eliminate raw food from consumers. Consumers should be warned that they need to build up their immune systems in order to handle the hazards associated with raw food. For instance, farmers and their families who are constantly exposed to foodborne illness pathogens, have the immunity to survive in the farm environment without problems. On the other hand, people who live in very clean environments such as in a city apartment are likely to have more sensitive immune systems and need to be cautious about eating raw foods containing low levels of pathogenic substances.

In the retail environment, the cook—in the home, the restaurant, the commissary, the small production plant—is the critical control point. Management simply makes it possible for the cook to produce food with tolerable levels of pathogenic substances. The cook removes the hard foreign objects from the wholesale product; washes fruits and vegetables to reduce the chemicals to a safe level; pasteurizes or sterilizes the food depending on the cooking process; or perhaps adds sufficient acid to make the food shelf stable.

The cook's responsibility really starts with food purchasing and knowledge of the hazards in order to demand adequate information of the supplier. This way, the cook knows what is necessary to make the food safe. If the supplier can guarantee that the microbiological, chemical, and hard foreign object levels are tolerable, the food can be served

unprocessed. If the cook buys from an unknown source that provides no guarantee of safety, the cook assumes the responsibility for making the food safe through adequate cooking, washing, and following recipes that have been "HACCP'd" with food times and temperatures to make the food safe.

How to set up a retail HACCP system.

The National Advisory Committee on Microbiological Criteria for Foods' documents describing HACCP should be used as a basis, because its HACCP interpretation is most reliable (NACMCF, 1998). There are two fundamental components of the NACMCF's HACCP document: 1) prerequisite programs and 2) process control programs based on the seven principles of HACCP.

I have categorized the prerequisite programs into a twelve-section HACCP manual, which I find works equally well for all types and sizes of food operations, to include vending carts, restaurants, chilled food facilities, etc. The sections are as follows.

- I. Food Safety Policy
- II. Organization for HACCP-based TQM
- III. System Description
- IV. Good Manufacturing Practices
- V. Supplier HACCP
- VI. Recipe HACCP
- VII. Cleaning and Sanitizing Schedule and Instructions
- VIII. Maintenance Schedule and Instructions
- IX. Pest Control Schedule and Instructions
- X. HACCP-TQM Employee Training Program and Record
- XI. Self-inspection, Continuous Quality Improvement
- XII. Food Safety Program Verification and Certification

With the prerequisite programs in place, one can complete Section VI (Recipe HACCP). The USDA requires a format similar to Table 1 (Snyder, 1993).

The rules for completing the hazard analysis and critical limits and the monitoring procedures for critical steps are as follows.

GMPs

- Lock up concentrated chemicals.
- Get hard foreign objects out of food. Keep out.
- Wash fingertips, 100,000-to-1 reduction of microorganisms.
- Wash food contact surfaces, 100,000-to-1 reduction of microorganisms.

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Process Controls (for food pH 6 to 7, a_w 0.99, no inhibitors)

- Process before 10 generations of *Listeria monocytogenes* growth.
- Heat 50° to 130°F <6 hours to control multiplication of *Clostridium perfringens*.
- Wash fruits and vegetables, 100-to-1 reduction of *L. monocytogenes*.
- Pasteurize 5D (100,000-to-1) *Salmonella*
OR
- Sterilize 12D *Clostridium botulinum*.
- Hold >130°F, Rh >90%.
- Cool <15 hours, 130 to 45°F with 38°F driving force.
- Transport, serve, leftovers, >130°F or <41°F.
- Cold hold <10 multiplications (1 to 1,024) *Bacillus cereus*.
- Do not use reheating as a safety control.

Actually, the five-column HACCP control plan (Table 1) is not intended to be used by the cook. The cook follows the recipe. One innovation that must be brought to the government's understanding of HACCP is how to write and read a HACCP'd recipe. This is what cooks use to assure the quality and safety of food. Table 2 is an example of a HACCP'd recipe for chicken cacciatore (Snyder, 1994).

What makes this a HACCP'd recipe?

There are food times and temperatures at each step in the procedure. Once one understands bacterial growth and death, it is easy to determine that there were less than 10 multiplications of *Listeria monocytogenes*; that *Salmonella* was reduced by 7D; that during cooling, there was less than 1 log growth

of *Clostridium perfringens*, and that after cooking, there was no spore outgrowth. That is really all one needs to know to do process HACCP.

In order to do retail HACCP, the following is necessary.

1. There must be top management commitment. This means they must be the first ones to get HACCP training in order to learn the process cooking controls and the management HACCP control process.
2. Then they need to develop a HACCP team that begins to write the twelve-section HACCP operations manual. This operations manual describes how every task associated with food processing will be done to either prevent the hazards getting into the food or to control the hazards to a tolerable level.
3. Each employee then needs to be taught to mastery.
4. Finally, there needs to be a program for continuous improvement of the HACCP program.

When operators establish operating systems in which the prerequisites are complete and recipes are written to include times and temperatures, we will be able to deal with the natural contamination of the food coming from the wholesale system.

References

- National Advisory Committee on Microbiological Criteria for Foods (NACMCF). 1998. Hazard analysis and critical control point principles and application guidelines. *Journal of Food Protection*. 61(6):762-775.
- Snyder, O.P. HACCP-based Safety and Quality Assured Retail Food Systems. Hospitality Institute of Technology and Management. St. Paul, MN. 1994. (February 1998 ed). 11.19-20.
- Snyder, O.P. HACCP-TQM Food Manufacturing Operations Manual. Hospitality Institute of Technology and Management. St. Paul, MN. 1993. (March 1999 ed). VI.A.-B.-3.

TABLE 1. Example of HACCP Process Control Plan

1. Processes Flow and Steps Description and Control	2. Hazard Analysis and Critical Limit	3. Monitoring Procedure; Frequency; Person Responsible	4. Corrective Action; Person Responsible; How to Record	5. Verification Procedure; Person Responsible
Describes each step in the process and the controls used.	When the step is a hazard control step, this is identified in Column 2, along with the critical limit of the hazard.	When there is a hazard control, Column 3 describes the monitoring procedure, frequency, and person responsible. When recording monitoring, the person's initials and time will be recorded.	When there is a hazard control, Column 4 describes the corrective action, the person responsible, and how it is recorded.	When there is a hazard control, Column 5 describes the verification procedure and person responsible. When completing the verification of records, the verifier will record his/her initials and the clock time.

TABLE 2. Chicken Cacciatore

Recipe Name: Chicken Cacciatore Portion size (vol./wt.): 1/4 (6 oz.) chicken + 3 oz. sauce Preparation time: 2 hours
 Production style: Combination Number of portions: 100 Prepared by: S. P.
 Written by: O. P. S. Date: 10/95 Final yield (AS): 100 Supervisor:
 SA/QA by: J. Bell Date: 12/95 Final yield:

Gp. #	Ingred. #	Ingredients and Specifications	EP Weight %	Edible Portion (EP) (weight or volume)	As served (weight)	Nutrition Ref. #
I	1	Onions, chopped (1/2" x 1")	13.26	3.0 lb.	1,360.00 g	633
	2	Mushrooms, cut (1/2", both caps & stems)	13.26	3.0 lb.	1,360.00 g	630
	3	Peppers, green, cut (1/2" x 1")	8.84	2.0 lb.	907.20 g	643
	4	Garlic, chopped	0.83	6 Tbsp.	85.05 g	1,067
	5	Tomatoes, canned, crushed (2 - #10 cans)	58.58	13.25 lb.	6,010.00 g	12,320
	6	Oil, vegetable	0.53	1/4 cup	54.00 g	122
	7	Wine, Marsala or Madeira	4.60	2 cups	472.00 g	1,481
	8	Oregano, crushed	0.03	2 tsp.	3.00 g	815
	9	Salt	0.05	1 tsp.	5.50 g	822
	10	Pepper	0.02	1 tsp.	2.10 g	818
		Total	100.00	22.6 lb.	10,258.85 g	
		Approx. gallons		2.5 gal.		
II	11	Chickens, whole (25 - 21/4 to 21/2 lb.)		62 lb.	40 lbs.	

Preparation

1. Prepare sauce. Get chopped onions, mushrooms, green peppers and garlic (40°F) from refrigerator. Get large heavy container. Sauté the vegetables in vegetable oil for about 10 minutes (212°F, 20 min.).
2. Add crushed tomatoes with juice, wine, and seasonings (72°F). Bring sauce to a simmering temperature (205°F, 10 min.). Hold sauce in bain marie (165°F, 20 min.).
3. Prepare chicken. Get chicken quarters (40°F) from meat and poultry refrigerated storage area. Remove rib bones (45°F, 10 min.).
4. Place quarters, one layer deep in shallow roasting pans. Brown chicken by baking it in a convection oven at 350°F for 30 min. (>160°F).
5. Remove pans of chicken from oven (145°F, 15 min.). Pour off excess liquid. Cool (40°F, <4 hours).
6. Cover the chicken quarters with sauce (145°F, <10 min.).
7. Return the pans of chicken and sauce to convection ovens at 300°F and continue baking until all parts of the chicken reach a temperature of 175°F (about 45 min.). Cover, transfer to 150°F hot holding unit, and serve within <2 hours.

Serve

8. Serve 1/4 chicken for each portion, using either white or dark meat. Chicken should be accompanied by 3 ounces of sauce (about 3 tablespoons).

Leftovers

9. Discard, if not used within < 2 hours, or cool to <45°F in <15 hours. Reheat to 165°F in <6 hours.

Ingredients that could produce possible allergic reactions

Tomatoes, wine

Process step #	Start Food ctr. temp., °F	Thickest food dimension (in.)	Container size H x W x L (in.)	Cover Yes/No	Temp. on/around food	End Food ctr. temp., °F	Process step time, hr./min.