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Establish Central Kitchen under HACCP Control in Food and Beverage Industry to Ensure Food Safety and Hygiene

Qi Cuihua
Department of Food Science and Nutrition, University of Jinan, 250022 Jinan Shandong, China

Abstract. In recent years, food safety and hygiene have been a social problem. So，it is worth studying in-depth that how to control the safety and hygiene of food and beverage. This paper proposes to establish central kitchens under HACCP control to ensure food safety and hygiene in the food and beverage industry. Considering the practical difficulties in the application of HACCP ，this paper introduces the establishment of dishes HACCP system with some examples to give the reference of the food and beverage industry. Central kitchens have many advantages while HACCP is the golden standard to ensure food safety and hygiene, hence，it will ensure food safety and hygiene if both can be combined with in the use of food and beverage industry.

Keywords. the food and beverage industry; central kitchen; HACCP; food safety and hygiene

1 Introduction

Food safety is one of the fundamental requirements in food area. How to improve the safety and hygiene of food in catering industry has long been a hot topic which attracts great efforts and explorations of administrators as well as practitioners in catering industry under the nowadays background that food and hygiene are showing increasingly problematic issues. It can provide a powerful support with food safety and hygiene by establishing center kitchens and implementing HACCP administrating system in catering enterprises.

2 Concept and advantages of center kitchen

2.1 Concept of center kitchen

Center kitchen (CK), also known as distribution center (delivery center) is the department in which its core mission is to process raw materials into the required semi-products and/or products according to orders and deliver them to the point-of-sale terminals (POS terminals) in a form of cold chain for the final sale facing customers via steps of reheating and rearrangement [1]. It is the basic function of CK to process raw food materials purchased in bulk into semi-products and/or products under the dictation of unified requirements on classified material and product qualities. Considering the fast-growing emphasis on food safety and hygiene in society and service standard in catering industry, it has become a tendency to introduce the CK system into the industry.

2.2 Advantages of center kitchen

CK system is to exhibit a robust development in the near future in catering industry, for many benefits could be realized through the introduction of it: (1) Making the producing procedures effectively simplified, product quality more guaranteed and thus be contributing to the product hygiene management. In this scenario, well-trained kitchen staff who concentrated on cooking processes and product quality control can be concentrated in CK for co-working. Every catering product is produced in accordance with the standardized producing procedures, materials for cooking and seasoning, producing processes and conditions, packaging and storage can altogether be managed in a uniform way. Product quality and uniformity can thus be well guaranteed. It is beneficial for the administration of producing processes, especially for the product hygiene management and the improvement of product safety via implementing the standardized production. (2) Being more economical in both purchase and human costs. By making the material procurement and stock control procedures in charge of CK, a unified purchasing and delivering can be established. This will empower the enterprise more possibility of price negotiation in purchases and make the purchasing processes simplified so as to save more cost. On the other hand, suppliers would in turn improve their product quality and service for the sake of their selling and its amount can be thus comparatively stabilized. As a result, food materials can be effectively used, wastes can be lowered, stock control and operation efficiency will be improved. The producing processes of all operating departments, processing wastes and human costs can sequentially be diminished. (3) Cutting down idle equipments, increasing profitability. Equipments and devices can be gotten in the utmost simplified for CK will make a collective utilization upon them. As the result, developing funds that the newly built operating spots needed would be decreased, yet the profits be enlarged. With respect to spaces, all operating units can therefore get more stocking spaces free to enable the catering service part expanded.

CK system has a tremendously promising prospect in view of its many advantages which particularly fit for the development of chain catering units, food service center in communities, dining halls in large-scale enterprises and public institutions. For instance, products of chain catering units can be readily unified in quality and flavor, thus it would be helpful for brand establishing and service improvement and for lowering the operating costs. In community food service centers, CK system has also an unpredictable bullish future.

As a population-concentrated living region, community is in great need to have a food service center that can provide high quality catering products and services in order to meet the need of the food and beverage with its local residents, especially the breakfasts. Furthermore, China is fast stepping into a society of aging and most of its elders would adopt the home-based form in settling their caring issues. This in turn requires the community to establish a public catering service department which is able to offer preparing and delivering services of nutritious food. Undoubtedly CK will be the optimal choice for addressing this problem. And meanwhile, the issue of lunch supply for public institutions, kindergartens and primarily schools within the community could also be readily solved.

3 Concept of HACCP and its applications

Before you begin to format your paper, first write and save the content as a separate text file. Keep your text and graphic files separate until after the text has been formatted and styled. Do not use hard tabs, and limit use of hard returns to only one return at the end of a paragraph. Do not add any kind of pagination anywhere in the paper. Do not number text heads-the template will do that for you. Many countries all around the world adopted the HACCP system and make it legitimated have obtained satisfactory effects in food and catering product safety administration. HACCP system had also been introduced into China early in 1990, however mainly found its way in some larger food companies. For catering enterprises side, either the practices were poorly given or its effect is not sufficiently satisfying. There are enormous amount of catering corporations in China, the majority of them are of smaller-scale and did not very well in the overall hygiene. Based on this reality, endless

problems in food hygiene were emerging. Hence it is of pivotal importance to get the effective food safety control system HACCP introduce into China's catering industry.

HACCP is the abbreviation of Hazard Analysis Critical Control Point, Which was developed by the Natick Army Laboratory of the National Aeronautics and Space Administration of USA in collaboration with a private operating food company Pillsbury for establishing a food producing administration system in order to ensure the food safety of astronauts. The concept was acknowledged and recommended among experts in food safety on its proposal in 1960. Form 1960s, HACCP had become the gold standard in estimating food safeties[3]. HACCP system features strict control from farm to table. There are three advantages in carrying out the HACCP system: 1. To make a precaution that will effectively prevent food from contaminations and other hazards. 2. To realize an effective use of man force, materials so as to reach a more economical production mode. 3. To obtain a proper safety and quality of food to elevate the hygiene managing level of practitioners.

4 The Schematization of CK under HACCP Administration in Catering Industry

It has not be a new story of adopting CK as producing and administrating pattern in China's catering industry, yet it lacks the instances of the ones established under the HACCP administration. In order to exploit the many advantages of CK, in particular in ensuring the safety of catering products, to erect the CK administrated under HACCP system will be the most effective way. For reaching this goal, namely to begin with the schematization of CK under HACCP administration, the most fundamental task is to carry out the functional partition of CK according to the contaminating extent and divide CK into three sections, namely contaminating area, quasi-clean area and clean area. This can also be taken as an implementing modularization in CK.

CK in different catering enterprises present divers characteristics corresponding to their various products, producing abilities, yet the prudent working area partition is an invariable principle. Via fulfilling this, the fundamentals of ensuring product safety and hygiene in catering industry can be underpinned. Hence, a reference schematizing graph is attached to this report (figure1). The catering units can make proper adjustments, i.e. production scale, product species, producing requirements in accordance with their own specific conditions in order to meet the need of production and safety and hygiene administrations.

5 Establish HACCP system in CK for ensuring food safety and hygiene

HACCP had very early been introduced into their catering industry in many countries except China. In China, efforts have also been invested in explorations of it. Based on this, a fundamental mode of its application have been funded and in some large-scale activities, chain catering enterprises, HACCP system have found its way either. Nevertheless for many reasons, there are still many problems need to be settled in its operation, this can be seen overall from the application inefficiencies of HACCP system in catering industry. Either the system did not be strictly funded, or at bottom there is no way to get it into the on-the-spot implementation in many catering enterprises which claimed they have made the system been established. Even though there are many problems can be found by analysis, the core problem for HACCP system is it per se is one that includes many aspects need to be considered, the lack of professionals, any reluctant comprehensions may lead it hard to be carried out in its practical application. Therefore, it is in great need to erect a specific model of the HACCP system establishing and application so as to offer a more comprehensible and practical guidance for the whole industry.

In order to make a specific and detailed illustration, here in an example of the funding of HACCP system in a community food service center have been taken. In the scenario, a nutritional food recipe suitable for the residents who this community food service center will serve is established. Then,

HACCP system is funded to make sure a standardized production with food safety and hygiene can be well guaranteed except for the nutritionality of the catering products.

The funding procedures of HACCP system in this model are shown as follow: Step 1, HACCP working group is organised. List of name (encompass the chief management superior, the food safety group and its leader), responsibilities and specialities of each member is included in the scheme. Step 2, characterization on products and their methodologies for storage is made. Step 3, flow diagram of products' characteristics is established and approved on the working spot. Step 4, hazard analysis is made. Step 5, judgement and determination on CCPs of the scheme are made. Step 6, key points of management is funded. Step7, HACCP schedule on products is given (include precautions, limit of control, measures of supervision and rectification, recording and affirmation making).

Living example illustration:

The recipe schedule of weekly nutritional lunch set up for a community food service center is presented here: staple, rice; entree, sauced chicken legs; side dishes, stir fried rape, stir fried cucumber with sliced meat; soup, tomato soup with egg. Build the HACCP system for the aforementioned dishes as well as staple, respectively. In this report, sauced chicken legs is taken for instance to illustrate the practicality of the third step of HACCP scheduling and the administration procedures of it. (figure 2 and 3, table 1 to 3)

Producing Procedures of Sauced Chicken legs: Chicken legs

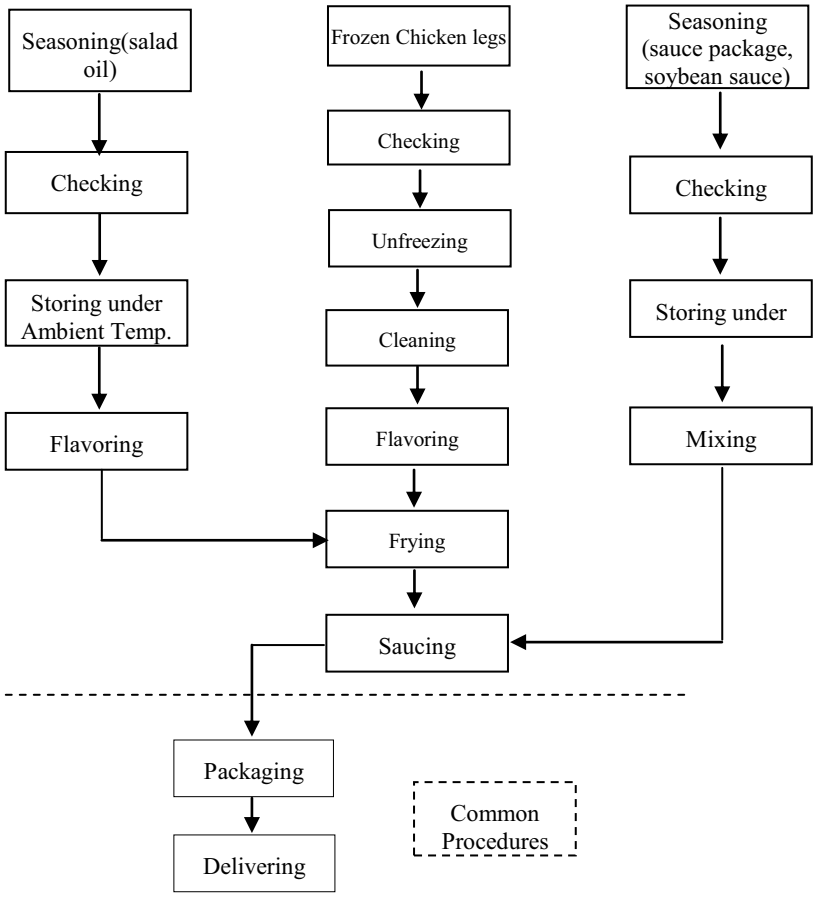

Figure2. The process of chicken legs cooking with sauce

Table2. Critical contral point

Processing Procedures	Q1	Q2	Q3	Q4	CCP
Boiling with Sauces	Y	Y			Y

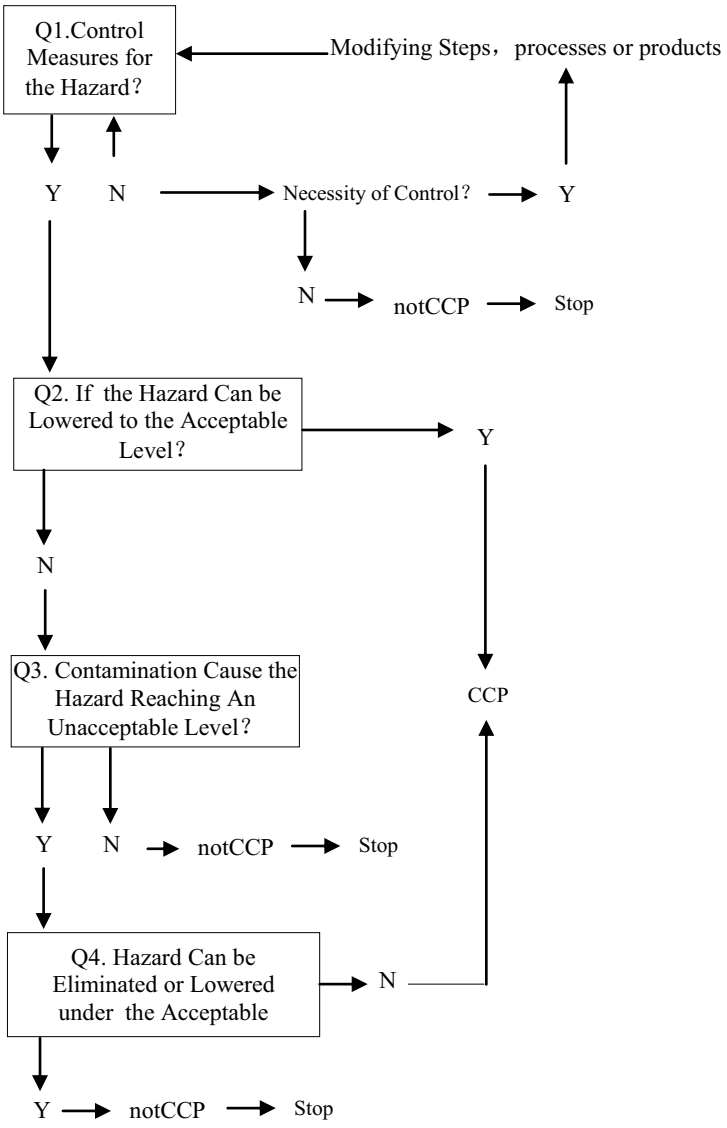

Figure3. CCP decision tree

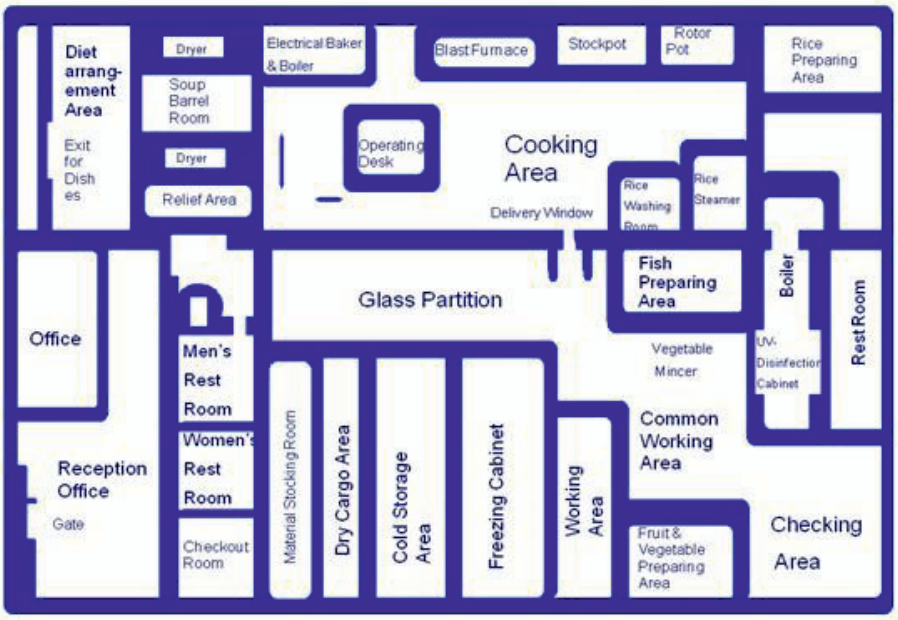

Figure 1. The working area schematic of center kitchen

Table1. Hazard nanlysis of chicken legs cooking with sauce

Material Processing Procedures	Potential Hazards of Safety	If the Hazard Significantly Effect on Product Safety? (YES/NO)	Reasons for Determination of Whether be Significant Hazardous	Precaution Measures for Significant Hazard	Is This Step a CCP? (YES/ NO)
Checking (frozen chicken legs)	Physical Properties None				
	Chemical Properties Antibiotic Residual	NO	Determine as non-significant hazardous for our company have chosen qualified poultry supplier		
	Biological Properties Parasite Trichina & Pathogenic Bacteria	YES	Trichina and its eggs inactivated during freezing, yet introduction of pathogenic bacteria may cause poisoning	Hazard can be eliminated via sequential heating procedure	NO
Unfreezing	Physical Properties None				
	Chemical Properties None				
	Biological Properties Breeding of Pathogenic Bacteria	NO	Can be controlled by GMP		
Seasoning Material Checking(salad oil,	Physical Properties None				
	Chemical Properties None				

sauce package, soybean sauce)	Biological Properties Additives	YES	Over-does in additives	Require the supplier of providing inspection certificate files	NO
Seasoning Material Storage	Physical Properties None				
	Chemical Properties None				
	Biological Properties None				
Cleaning	Physical Properties None				
	Chemical Properties None				
	Biological Properties None				
Seasoning	Physical Properties None				
	Chemical Properties Antibiotic Residual				
	Biological Properties Breeding of Pathogenic Bacteria	NO	Control the seasoning period within 3h, deep frying procedure can also eliminate pathogenic bacteria, thus determine as non-significantly hazardous		

Table2. Hazard nanlysis of chicken legs cooking with sauce(continue)

Material Processing Procedures	**Potential Hazards of Safety**	**If the Hazard Significantly Effect on Product Safety? (YES/NO)**	**Reasons for Determination of Whether be Significant Hazardous**	**Precaution Measures for Significant Hazard**	**Is This Step a CCP? (YES/ NO)**
Frying	Physical Properties None				
	Chemical Properties Antibiotic Residual				
	Biological Properties Pathogenic Bacteria Residual	YES	Ill-heated products may cause poisoning hazard by residually pathogenic bacteria	Can be eliminated by sequential heating process of the sauce	NO
Sauce Stewing	Physical Properties None				
	Chemical Properties Antibiotic Residual				

	Biological Properties Pathogenic Bacteria Residual	YES	Ill-heated products may cause poisoning hazard by residually pathogenic bacteria	Ensure the core Temp. of products in stewing reach at least 80℃ and make regular record	YES
Waiting for Diet Arrangement	Physical Properties None				
	Chemical Properties Antibiotic Residual				
	Biological Properties Pathogenic Bacteria Residual	NO	Pathogenic bacteria may breed for lowered Temp. caused by long waiting period	Practice the as-prepare-as-use mode to the best extent	NO

Table3. Critical control point monitoring

CCP	Hazard	Precaution Measures and Its Limit of Control	Supervision				Rectifying Measures	Record	Approval
			How to Do	What to Do	Frequency	Who to Do			
sauce stewing	Pathogenic bacteria residual	core Temp. of products in stewing reach at least 80℃	temperature	measure the core Temp. of food with probe-thermometer	the first batch of every meal	kitchen staff	ensure the core Temp. of products in stewing reach at least 80℃ by prolonging the heating Period	record of product core Temp. control measuring device maintaining & calibration record	random measurement by hygiene management staff once per day calibration of thermometer twice per tow months by hygiene management staff

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