

## **VEGETABLE PRODUCTS AS HACCP SYSTEM SUBJECT IN MODERN GASTRONOMY**

Anna Gramza-Michałowska, Józef Korczak

Poznań University of Life Sciences

**Abstract.** The intention of HACCP system is focusing to control at points in the operation, critical to the food safety. It is mandatory, preventative, and easy for monitoring food quality control system. Preventing the problems is the major direction of the HACCP system currently considered as one of the most efficient tools provided. Present research aimed at HACCP system adaptation and verification in production of vegetable food. The correctness of introduction and implementation of HACCP was also verified in practice. Research involved the description of selected vegetable grocery product groups and their production schemes, designation of critical control points (CCP) in the processes, the danger and identification analysis sheet. Also monitoring system, prevention and correction efforts were planned. On the basis of the obtained results chapters of HACCP book for gastronomy vegetable products were created.

**Key words:** HACCP, food, critical control point, vegetable product, gastronomy

### **INTRODUCTION**

Hazard Analysis Critical Control Point HACCP is proven management system providing consumers confidence of food safety. The system is based on focusing control at operation points, which could be critical to the food safety [Barendsz et al. 2003, Kijowski and Maleszka 2005, Kołożyn-Krajewska and Sikora 1999, Bryan 1990]. Advantage of the HACCP is preventativeness and easiness to monitor. Another positive aspect of this system is managing the resources, food hygiene, productivity and profitability improvement and production costs decreasing [Wieland 2006, Worsfold and Griffith 2003, Witkowska 2000]. The European Union regulations require that all food chain sectors have adopted full HACCP system. Despite the benefits, also negative aspects of HACCP implementation in gastronomy must be identified. Most important are: no business and customers demand, constrains of financial and human resources and legal requirements absence [Ziajka and Dzwolak 1997, WHO 1999].

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Corresponding author – Adres do korespondencji: Dr inż. Anna Gramza-Michałowska, Department of Food Service and Catering of Poznań University of Life Sciences, Wojska Polskiego 31, 60-624 Poznań, Poland, e-mail: angramza@up.poznan.pl

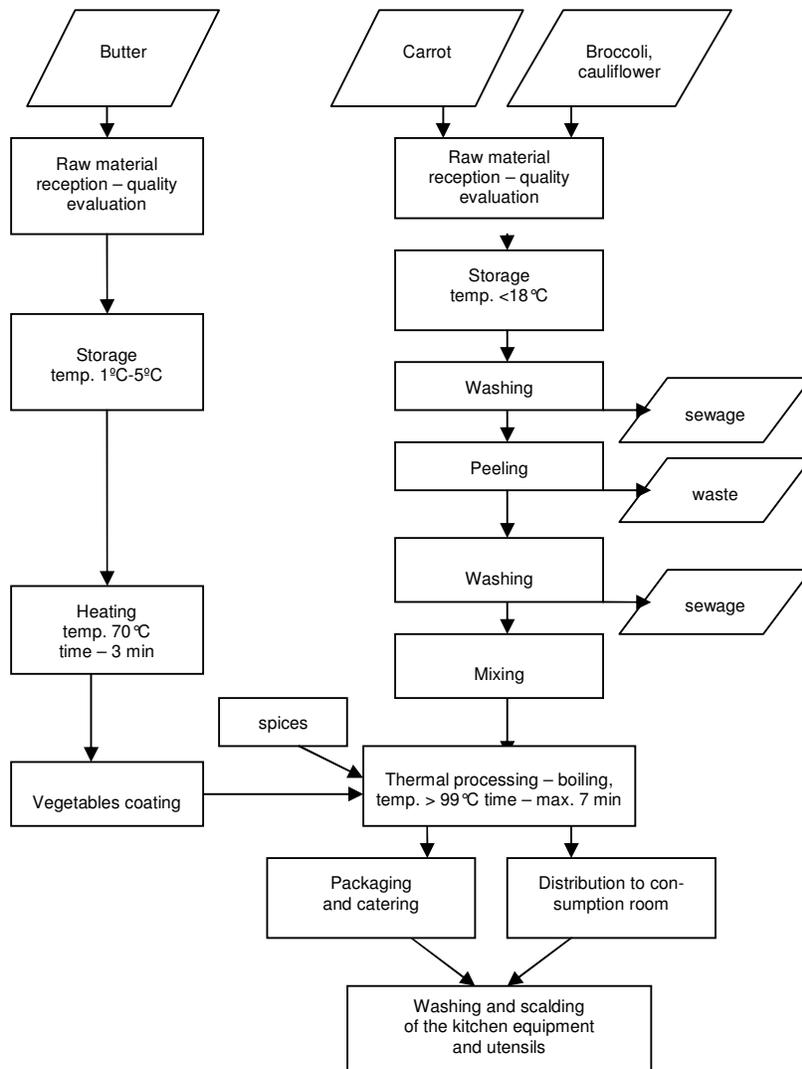


Fig. 1. Technological process description of “Vegetable with butter”

Restaurant meals have been implicated in foodborne disease outbreaks [Barendsz et al. 2003, Wieneke et al. 1993]. Main contributors to general outbreaks are *Clostridium*

*perfringens*, *Salmonella*, *Staphylococcus aureus*, *Listeria monocytogenes* and *Bacillus cereus*. It was proven that microbiological meals quality was considerably better after HACCP system introduction [Walker and Jones 2002, Martinez-Tome et al. 2000, Little et al. 2002, Soriano et al. 2002].

The objective of this study was to elaborate chosen books of HACCP system for vegetable products. The research involved the description of selected vegetable grocery products and their production schemes, designation of critical control points (CCP) in the processes, the danger and the identification analysis sheet. On the basis of the obtained results chapters of HACCP book for gastronomy vegetable products were created.

## EXPERIMENTAL PROCEDURES

The research involved typical restaurants in Wielkopolska region. Restaurants menu was checked and corrected according to the real technological process; all the HACCP system procedures were presented and adapted. Boiled vegetables with butter were chosen as the food product representative, than the technological processing and its schemes were elaborated. Production schemes were corrected and verified according to its daily utilization (Fig. 1). Another step was implication of seven steps HACCP initiation. The threats identification, controlling procedures, critical control point identification on the basis of decisive tree, were evaluated. The next step was assignment of parameters and control characteristics critical limits, CCP monitoring and controlling manner, and correcting actions. Then the documentation of HACCP system implementation, procedure and HACCP systems verification settlement was elaborated.

## RESULTS

The examined restaurants possess initial condition to implicate the HACCP system, which are GHP (Good Hygiene Practice) and GMP (Good Manufacture Practice), creating accurate and safe environment for correct production process realization. System HACCP include vegetable meals production starting with raw material reception, ending with client's consumption and catering (Table 1). System formulated biological (pathogenes), physical and chemical threats (cleaning liquids remains). Evaluation of critical control points helped to propose adequate procedures and actions for food quality maintaining (Table 2). Selected chapters of HACCP book were elaborated.

HACCP system is based on danger identification in technological process, before or during food chain process to minimalize the contamination risk. Problems prevention is the main goal of the system, helping to eliminate the threats originated in raw materials, accessories, equipment and human resources. Today's European market demands high quality products, which would assure the safety of consumed food.

Table 1. Product description “Vegetables with butter”

Products description	
Vegetables	
Safety/product's cleanness/organoleptic and analytical requirements	
Basic requirements	
Raw material and technological processes during the production should be in agreement with obligatory Polish Food Law regulations and Good Manufacturing Practice (GMP) principles	
Product's name	Receipe
“Vegetables with butter”	<p>Quantity of the individual meal portion: 320 g</p> <p>Raw material constituents: 100 g carrot, 100 g broccoli, 100 g cauliflower, 20 g butter, 10 g spice – vegetta</p> <p>Preparation method: Vegetables should be washed, peeled, washed again and crumbled. Afterwards boiled at 100°C for 7-10 minutes in spiced water (vegetta 10 g). Cooked vegetables should be strained and put on the dishes. Next step is butter warming and vegetables coating. Last step is decorating and distribution directly to the consumers room or catering</p>
Consumers assignment	Product ready to eat for all people, accepted for health contraindications and infants
Distribution to the consumer	Served directly after preparation
Storage conditions	Meal for direct serving, not appropriate for repeated warming Keep in cold storage 0°C-4°C
Consumption period	No longer than 12 hours, including thermal processing and consumption time
Organoleptic requirements	
Overall appearance	Typical for adequate vegetables and butter
Consistency	Vegetables should be tender after boiling process
Colour	Characteristic for adequate vegetables, butter with no colour changes
Taste and aroma	Characteristic for adequate vegetables, butter with no rancid aftertaste
Physicochemical and microbiological requirements	
According to the Ministry of Health decree, 30 April 2004 L.B. 120 position 1257	

Table 2. Threats identification and inspection methods – “Vegetables with butter”

Individual process stage	Threats identification			Precaution and threats inspection medium		CCP
	threats	description	reasons	procedures	direct preventive / remedy actions	
1	2	3	4	5	6	7
Raw materials and accessories						
Raw material reception						
vegetables	P	sand	inadequate transport and storage conditions	raw material reception and suppliers inspection procedures	contaminated portion elimination	–
	M	muld and rot presence	inadequate transport and storage conditions – too high temperature	raw material reception and suppliers inspection procedures	deteriorated portion elimination, visual supplies inspection	CCP 1
butter	M	microflora growth and rancidity	inadequate transport and storage conditions – too high temperature	raw material reception and suppliers inspection procedures	visual supplies inspection	–
spice – vegetta	M	microflora presence	suppliers equipment contamination	raw material reception and suppliers specification procedures	visual supply and store portions inspection	–
Storage						
vegetables	P	sand	inadequate transport and storage conditions	raw material reception and storage procedures	visual supply and store portions inspection (contaminated portions elimination)	CCP 2
	M	muld and rot presence, pests	inadequate transport and storage conditions – too high temperature	raw material reception and suppliers inspection procedures	deteriorated portion elimination, visual supplies inspection store temperature inspections	–
butter	M	microflora growth and rancidity, pests	inadequate storage conditions – too high temperature	raw material reception and storage procedures	visual supply and store portions inspection cold room temperature inspection	–
spice – vegetta	M	microflora presence	suppliers equipment contamination	raw material reception and suppliers specification procedures	visual supply and store portions inspection	–
Vegetables washing						
	P	sand and stones residue	inefficient washing process	vegetables washing procedure	completed washing process inspection	–
	M	water microflora contamination	no water cleanness inspection	water cleanness inspection procedure	water cleanness inspections guarding	–
Peeling and crumbling of vegetables						
	M	previous assortment residues	multifunctional kitchen machine	washing instruction	visual supply and store portions inspection, equipment inspections	–
Vegetable washing						
	P	sand and stones residue	inefficient cleaning process	vegetables washing procedure	completed washing process inspection	–
	M	water microflora contamination	no water cleanness inspection	water cleanness inspection procedure	water cleanness inspections guarding	–

Table 2 – cont.

1	2	3	4	5	6	7
Thermal processing						
vegetables	P	boiling temperature and process time	thermal processing process maladjustment	thermal processing procedure	products internal temperature inspection	–
butter	P	frying temperature	thermal processing process maladjustment	thermal processing procedure	visual inspection	–
Meal's packaging	P	package	no certificate	everyday package stage inspection procedure (certificate, cleanness, mechanic damage)	removal of packages not facile with the procedure needs	–
Washing and scalding of the kitchen equipment and utensils	CH	washing and disinfection resources residue	inefficient washing and scalding process	washing, scalding kitchen equipment and utensils procedure	water temperature inspections before washing process, visual inspection of kitchen equipment and utensils cleanness	–
	M	microflora growth	inefficient washing process	washing, scalding kitchen equipment and utensils procedure	water temperature inspections before washing process, visual inspection of kitchen equipment and utensils cleanness	–
Transport	M	suppliers equipment contamination, inefficient temperature and time	no hygiene abidance, transport's contamination, inefficient transport temperature in adequate time	food products transport procedure	visual inspection of transport, its technical condition, hygiene abidance, periodical medical examinations inspection	–

CH – chemical threats, P – physical threats, M – microbiological threats.

## CONCLUSIONS

On the basis of the received informations HACCP system was specified and qualified as a powerful tool in safe food production. The correctness of the designed technological process was verified and accepted in production of typical vegetable grocery product.

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## PRODUKTY WARZYWNE W ŚWIETLE HACCP W NOWOCZESNEJ GASTRONOMII

**Streszczenie.** Główne założenia systemu HACCP są skierowane na kontrolę punktów procesu technologicznego krytycznych dla bezpieczeństwa żywności. Jest to system obowiązujący, zapobiegawczy oraz łatwy do monitorowania jakości żywności. Głównym jednak celem systemu HACCP jest zapobieganie powstawaniu zagrożeń podczas produkcji żywności. Badania obejmowały przystosowanie i zweryfikowanie procesów technologicznych w produkcji wyrobów warzywnych. Analizie zostały poddane także poprawność wdrażania oraz zastosowania systemu HACCP w zakładzie gastronomicznym. Opracowano wybrane fragmenty księgi HACCP dla reprezentacyjnego produktu warzywnego – warzywa z masłem. Analiza obejmowała opis grupy produktów spożywczych, schemat cyklu produkcyjnego, wyznaczenie krytycznych punktów kontroli (CCP) w procesie technologicznym oraz identyfikację zagrożeń. Zaplanowano także sposób monitorowania, zapobiegania oraz działania naprawcze.

**Słowa kluczowe:** HACCP, żywność, krytyczne punkty kontrolne, produkty warzywne, gastronomia

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