

## IMPLEMENTATION OF HACCP SYSTEM IN HOTELS IN THE AREA OF SPLIT-DALMATIA COUNTY

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### Abstract

Food safety legislation prescribes the mandatory establishment of a self-control system based on HACCP principles for all food business operators. The aim of this paper is to analyze the application of the HACCP system in hotel facilities in the area of Split-Dalmatia County.

Cross-sectional study was conducted in five hotels on the Makarska Riviera. The survey conducted data on employees' attitudes about the implementation of the HACCP system, and a retrospective analysis compiled data on compliance of food safety management system with HACCP principles and legal regulations. Statistical methods for data analysis (mean arithmetical value, Spearman's correlation coefficient) were carried out using the Excel.

The results of the research showed that 81% of respondents were satisfied with the implementation of the HACCP plan, while 18% of respondents felt that the condition was acceptable and only 1% of respondents were not satisfied with the implementation of HACCP. The HACCP system auditing in the hotels examined established the conformity of the HACCP study with the prescribed criteria and it was established that it is based on seven principles of the HACCP system. Examined hotels averaged 97.6% of the requirements according to HACCP requirements. Food hygiene and microbiological purity analysis in hotel facilities showed that 3.3% of samples deviated from the regulations in force. Employees' satisfaction and the commitment of the HACCP team to improve and develop the systems in the surveyed hotels is at a high level.

According to the specifics of Croatian gastronomy, which has made this country recognizable in the tourist market, the importance of the HACCP system was recognized in hotel facilities, where the gastronomic offer is one of the foundations of the tourist offer. The application of the HACCP system and the provision of safe food greatly contributes to the quality of the hotel business and to the satisfaction of the service users.

**Key words:** Hotel, HACCP system, Food safety.

### 1. Introduction

Safe food is a food that can not adversely affect human health and is suitable for human consumption according to its intended use. The term "food safety" includes a series of actions and control procedures to achieve the ultimate objective, a healthy and safe food product. Food safety legislation prescribes the mandatory establishment of a self-control system based on HACCP principles for all food business operators [1]. Consequently, the application of these is obligatory in all food service facilities.

HACCP is a food safety management system that is used to prevent or eliminate a hazard or reduce it to an acceptable level. HACCP principles are considered to be a useful tool for food business operators to identify and control hazards that may occur in food and during food processing in their own establishment.

The acronym HACCP stands for Hazard Analysis Critical Control Points which is related to the purpose of this system. HACCP principles lay down the basic requirements for its application and are part of the CODEX Alimentarius standard [2].

In view of the great diversity of food commodities and manufacturing procedures that are applied to food, European Commission has facilitated and harmonised the implementation of the EU requirements on HACCP-based procedures by providing practical guidance on the link between prerequisite programs (PRPs) and HACCP-based procedures within Food Safety Management System (FSMS), and on the flexibility provided for certain food establishments by EU legislation [3].

Food safety is a critical issue of services in hospitality industry [4]. When it comes to food service sector, it is important to emphasize that there is a whole range of differences related to the application of the HACCP system than in the food industry. In the hospitality industry there are a large number of combinations of various technological procedures that take place during food processing, preparation and serving, a large number of foodstuffs are needed to prepare a whole series of ready meals where food comes into contact with different equipment and surfaces, with emphasis on the constant presence of the same food handlers [5]. In relation to given specificity of hospitality activities in terms of ensuring food safety and high frequency of health risks, two guidelines have been developed in Croatia: a Good Hygiene Practice Guide for caterers, and a HACCP Guide - Practical implementation of the principles of HACCP system for caterers. Tourism is an important earner in Croatian economy, hence, the protection of the tourists' health is very important. According to the specifics of Croatian gastronomy, which has made this country recognizable in the tourist market, the importance of the HACCP system was recognized in hotel facilities, where the gastronomic offer is one of the foundations of the tourist offer.

The aim of this paper is to analyze the application of the HACCP system in Croatia hotel facilities in the area of Split-Dalmatia County.

## 2. Materials and Methods

Research was conducted by cross-sectional study in five hotels in the area of Split-Dalmatia County on the Makarska Riviera.

The survey questionnaire method provided data on employees' attitudes about the implementation of the HACCP system. The survey was conducted in the period from April to September 2016. A total of 42 hotel employees were surveyed, which have an different job profile, of which two were HACCP team managers, two members of the HACCP implementation team, five shift managers, eight cooks, nineteen chefs, four assistant chefs and two pastry makers.

Statistical methods for data analysis included mean arithmetical value, and Spearman's correlation coefficient which were applied to examine the deviation from the HACCP plan and its implementation in the examined hotels. Statistical analysis was carried out using the Excel. In this research, a retrospective analysis of the HACCP audit report in the examined hotels compiled data on compliance of food safety management system with HACCP principles and legal regulations is given. Also, a retrospective analysis of the laboratory results of tests of food hygiene and microbiological purity in hotel facilities was carried out for the period from 2014 to September 2016.

## 3. Results and Discussion

### 3.1 Results

Data in Table 1 show the results of the survey questionnaire related to employees' attitudes regarding the

**Table 1. Employees' attitudes about the implementation of the HACCP system in hotels**

Comparative independent variables	R	p value
Convenient surroundings of the facility	0.027	0.001
Using the appropriate material in the object	0.045	0.001
Protection from the insect and rodent	0.022	0.002
Equipment of appropriate material (stainless steel)	0.014	0.001
Cooling equipment meets the capacity and required temperature	0.022	0.01
Appropriate maintenance plan	0.017	0.010
Appropriate water supply for rooms and appliances	0.023	0.011
Water supply system made of the appropriate material	0.048	0.01
Appropriate light bulbs and light intensity in the rooms	0.001	0.001
Appropriate waste disposal method	0.05	0.001
Adequate food reception and food condition	0.012	0.011
Separate storage of materials, raw materials and products	0.085	0.002
Training of employees on food-borne diseases	0.045	0.012
"Sanitary minimum" of employees	0.032	0.011
Respecting good hygiene and good manufacturing practice	0.021	0.001
Prevention of contamination by adequate hand washing	0.019	0.010
Hand washer device compatibility	0.051	0.001
Suitability of wardrobe rooms	0.012	0.002

implementation of the HACCP system in hotels, which included questions about: facility, equipment, water, installations, waste, reception and preparation of food, storage, hygiene procedures, sanitary facilities, good hygiene practice and good manufacturing practice.

Analysis of the obtained data showed that there is no significant deviation from the HACCP plan, the R value is negligible, and the p value of significance is small. The results of the research show that 81% of respondents were satisfied with the implementation of the HACCP plan, while 18% of respondents felt that the condition was acceptable and only 1% of respondents were not satisfied with the implementation of HACCP.

Results about HACCP system auditing results in the hotels are displayed in Table 2.

According to these results in five hotels, whose purpose was to examine whether the food safety management system follows the HACCP principles, it was determined the conformity of the HACCP study with the prescribed criteria and it was established that it is based on sev-

en principles of the HACCP system. In the period from 2014 to 2016 examined hotels averaged 97.6% of the requirements according to HACCP system.

Possible improvements of HACCP systems in hotels that were determined are presented in Table 3.

The audit report consisted of 125 control elements in total, out of which 34 elements were not applicable in hotel facilities, and inconsistent requests were not found. The audit team has determined that the self-control system based on HACCP principles in the examined hotels is appropriate with possible improvements according to the established control elements.

In the period from 2014 to September 2016, a total of 306 microbiological analysis of food samples and swabs were performed in the examined hotels (Table 4).

Food hygiene and microbiological purity analysis in hotel facilities showed that a total of 10 samples (3.3%) deviated from the regulations in force, out of which: two (0.7%) for inadequate food samples and eight (2.6%) for inadequate swabs of hand and food contact materials.

**Table 2. HACCP system auditing results in the hotels**

Facility	*Result of the control elements			
	C	I	NA	IN
Hotel 1	88	3	34	0
Hotel 2	90	1	34	0
Hotel 3	87	4	34	0
Hotel 4	89	2	34	0
Hotel 5	90	1	34	0

Legend: \*C-compliance (requirement fulfilled), I - improvement (partial fulfillment of the requirement, possible improvement), NA - not applicable (request not applicable to subject), IN - inconsistent (request not fulfilled).

**Table 3. Determined possible improvements of HACCP systems in hotels**

Facility	Possible improvements found during HACCP audit
Hotel 1	- Place control thermometers in refrigeration units in which they are not. - Create a new temperature control form. - Introduce the process of defrosting food into the HACCP plan.
Hotel 2	- Determine the dynamics and manner of cleaning the kitchen hood in the cleaning plan.
Hotel 3	- Set protective meshes on the windows in wardrobe room. - Protect lighting fixtures in the reception area and storage hallway against spraying. - Set up the order in the storage room for cleaning agents. - Provide suitable washable storage shelves for storing cutlery.
Hotel 4	- Provide an internal audit of the HACCP plan. - Encrypt critical control points.
Hotel 5	- Provide two-piece wardrobes for employees.

**Table 4. Food hygiene and microbiological purity analysis in hotels**

Facility	Analysed samples	Inadequate food samples	Inadequate swabs
Hotel 1	51	-	2
Hotel 2	76	-	-
Hotel 3	57	-	-
Hotel 4	58	1	3
Hotel 5	64	1	3
<b>Total</b>	<b>306</b>	<b>2</b>	<b>8</b>

### 3.2 Discussion

Conducted research shows that hotel facilities where the analysis of the situation was carried out, fulfill most of the requirements according to the HACCP system. By surveying the employed staff of the examined hotels, it was found that the HACCP plan is relatively well implemented. However, according to the responses of one part of the surveyed employees, the building's protection against insects should be improved. Also, there is a response from one part of the employees that certain lighting fixtures are unprotected, and the problem is also the strength of the light fixtures and the intensity of light. Results of data analysis about food reception and preparation show that there is a deviation related to irregular temperature measurement and that some hotels have a problem of non-compliant wardrobe disposal facilities. The research results show that employees of the examined hotels are well educated about the HACCP system and are sufficiently aware of the deficiencies to explain where they are and bring it into consultations with the management. This study determined the conformity of the HACCP plan with the prescribed criteria and it was established that it is based on seven HACCP system principles. The results of the research show that the hotel inspections are conducted regularly to examine the food safety of ready meals and desserts and the microbiological purity of the hand swabs of food handlers and food contact materials.

Various studies have been conducted with the aim to analyze the implementation of the HACCP system in hospitality industry. Eves and Dervisi, [6], explored experiences of implementation and operation of hazard analysis critical control points in the food service sector. The study included seven food service outlets in the south east of England, and experiences highlighted a number of barriers to the successful implementation and operation of HACCP, and also perceived benefits. Barriers included: difficulties identifying hazards, inadequate knowledge, time-related issues relating to monitoring and recording, excessive documentation, convincing staff of the importance of the system, and increased costs. Perceived benefits included protecting the business from otherwise unforeseen problems and providing evidence of due diligence. Egan *et al.*, [7], reviewed studies conducted worldwide on the effectiveness of food safety and food hygiene training in the commercial sector of the food industry, with focus on those studies that have tried to evaluate the effectiveness of such training. Forty-six studies of food hygiene training were included which used some outcome measure to assess the effectiveness of training. The majority of studies showed that training can be effective in reducing food safety problems. Authors concluded there is a need to develop training methods that are proven to change behaviour as well as impart-

ing knowledge. Bař *et al.*, [8], evaluated food hygiene knowledge, attitudes, and practices of food handlers in food businesses in Turkey. The study included 764 food handlers, and results demonstrated that food handlers in food businesses have lack of food safety knowledge. Similar study about knowledge, attitude and practices regarding food hygiene and sanitation of food handlers working in restaurants in Malaysia involved 64 food handlers, and results showed that the food handlers had excellent knowledge and attitude, and good practices toward food hygiene [9]. Based on the results of the research on knowledge and practices related to food hygiene among food handlers in Nigeria, authors concluded that despite good knowledge of food hygiene and food borne illnesses among the respondents in this study (263 food handlers), they showed poor compliance with food hygiene practices; and the sanitary condition of a substantial proportion of the restaurants was poor [10]. Fletcher *et al.*, [11], examined the food safety systems in Jamaican hotels to find out how comparable they are with the HACCP strategy. The research results were: the majority (75%) of larger hotels used a HACCP strategy; more than two thirds of hotel staff were knowledgeable of HACCP; and significantly smaller hotels (87.5%) received less than 70% in overall score. Seaman and Eves, [12], reviewed the role of food hygiene training in the UK service sector, and they concluded that effective and relevant food hygiene training delivered with the support of the organisation, adequate resources and the peer support of colleagues will have a greater effect on intention and actual behaviour of the food handler, increasing the likelihood of safe working practices. Ababio and Lovatt [13], studied food safety and food hygiene in commercial catering sector in Ghana, and limited use of prerequisites measures and food safety management systems was identified. Another research in Ghana indicated that the institutional food-handlers had satisfactory knowledge in food safety but this did not translate into strict hygienic practices during processing and handling food products [14]. Kumar *et al.*, [15], in their study in Indian hotel industry found that many hotels were ISO 9000 certified but none has gone for ISO 22000 FSMS, which use HACCP as a tool to ensure safety of food products and reduce the risk of food poisoning. Poonam, [16], in the paper on HACCP in hotel kitchens highlights the need of implementation of HACCP system if hotel intends to produce a good quality food, and it will also help in building brand image of hotel industry making them more profitable.

### 4. Conclusions

- HACCP based food safety program in the examined hotels was applied and complied with seven HACCP principles. Employees' satisfaction and the commit-

ment of the HACCP team to improve and develop the systems in the surveyed hotels is at a high level.

- Catering activities are specific in terms of ensuring food safety and quality, so implementation of the HACCP system is an important factor for the survival of a hotel facility in the market, not only in the segment of competitiveness, but also in the segment of legal regulation that imposes the assurance of a high level of protection of human health and consumers' interest in relation to food, taking into account in particular the diversity in the supply of food including traditional products.

- Market demands and a large number of hotel facilities have an impact on the constant improvement of the security process and FSMS, and the offer of safe food greatly contributes to the quality of the hotel business, which ultimately contributes to the fulfillment of the basic goal of any quality business system - a satisfied customer (guest).

- HACCP system in hotel facilities should not only be a prescribed technique of performing certain activities, but also a new way of thinking that develops the habits of everyday responsible business.

## 5. References

- [1] Croatian Food Agency. (2013). *Food Law* (in Croatian). People's Newspaper No. 81/13, 14/14, 30/15.
- [2] Codex Alimentarius. (2003). *Recommended International Code of Practice - General Principles of Food Hygiene CAC/RCP 1-1969, Rev. 4-2003*. Codex Alimentarius Commission/Regulatory Control Points.  
<URL: [https://www.mhlw.go.jp/english/topics/imported\\_foods/guideline/dl/04.pdf](https://www.mhlw.go.jp/english/topics/imported_foods/guideline/dl/04.pdf). Accessed 23 February 2019.
- [3] European Commission. (2016). *Commission Notice on the implementation of food safety management systems covering prerequisite programs (PRPs) and procedures based on the HACCP principles, including the facilitation/flexibility of the implementation in certain food businesses*. Official Journal of the European Union 278.
- [4] Vujačić V., Krešić G., Sušić S., Bodroža S. M. (2017). *Standard Hazard Analysis, Critical Control Point and Hotel Management*. Turističko poslovanje, 19, pp. 45-49.
- [5] Jurčević V., Marković I., Pahor Đ. (2005). *Specificities of implementation HACCP system in catering establishment* (in Croatian). 6<sup>th</sup> Croatian Quality Conference Proceedings, Opatija, Croatia.  
<URL: [http://kvaliteta.inet.hr/e-quality/prethodni/20/Jurcevic\\_V\\_rad.pdf](http://kvaliteta.inet.hr/e-quality/prethodni/20/Jurcevic_V_rad.pdf). Accessed 10 March 2019.
- [6] Eves A., Dervisi P. (2005). *Experiences of the implementation and operation hazard analysis critical control points in the food service sector*. International Journal of Hospitality Management, 24, (1), pp. 3-19.
- [7] Egan M. B., Raats M. M., Grubb S. M., Eves A., Lumbers M. L., Dean M. S., Adams M. R. (2007). *A review of food safety and food hygiene training studies in the commercial sector*. Food Control, 18, pp. 1180-1190.
- [8] Baş M., Ersun A. Ş., Kivanç G. (2006). *The evaluation of food hygiene knowledge, attitudes, and practices of food handlers' in food businesses in Turkey*. Food Control, 17, (4), pp. 317-322.
- [9] Abdul-Mutalib N. A., Abdul-Rashid M. F., Mustafa S., Amin-Nordin S., Hamat R. A., Osman M. (2012). *Knowledge, attitude and practices regarding food hygiene and sanitation of food handlers in Kuala Pilah, Malaysia*. Food Control, 27, (2), pp. 289-293.
- [10] Ezenwoko A. Z., Awosan K. J., Oche M. O., Makusidi M. A., Abubakar B. G., Raji I. A. (2017). *Knowledge and Practices Related to Food Hygiene among Food Handlers in Sokoto, Nigeria*. International Journal of Tropical Disease and Health, 26, (1), pp. 1-16.
- [11] Fletcher S. M., Maharaj S. R., James K. (2009). *Description of the Food Safety System in Hotels and How It Compares With HACCP Standards*. J. Travel Med., 16, (1), pp. 35-41.
- [12] Seaman P., Eves A. (2006). *The management of food safety - The role of food hygiene training in the UK service sector*. International Journal of Hospitality Management, 25, (2), pp. 278-296.
- [13] Ababio P. F., Lovatt P. (2015). *A review on food safety and food hygiene studies in Ghana*. Food Control, 47, pp. 92-97.
- [14] Akabanda F., Hlorts E. H., Owusu-Kwarteng J. (2017). *Food safety knowledge, attitudes and practices of institutional food-handlers in Ghana*. BMC Public Health, 17, (1), pp. 40.
- [15] Kumar A., Sharma R. A., Kumar D. (2009). *HACCP in Hotel Industry - A study on its Application in Food Production*. International Journal of Hospitality and Tourism Systems, 2, (1), pp. 162-180.
- [16] Poonam Y. (2018). *HACCP in hotel industry: A study on its application in food production*. National Journal of Multidisciplinary Research and Development, 3, (2), pp. 75-79.