

Effects of HACCP System Implementation on Domestic Livestock Product Plants

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Abstract

The objective of this study was to investigate the problems and benefits associated with the implementation of HACCP on livestock product of plants in Korea. The survey was carried out by randomly selecting 115 HACCP accredited meat processing plants, all across the country. A total of 105 complete responses were selected for analysis. The results were as follows: approximately 60% of the respondents employed less than twenty workers. The average period of operating HACCP system was 3.4 years. The respondents replied that the major incentive to implement the HACCP system was to improve hygiene management ability. More than half of the respondents (59.05%) claimed that the implementation of the HACCP system cost less than 400 million won, and the highest investment in terms of cost was the freezer/refrigerator. In the preparation period taken to implement the HACCP system, the 6-12 mon category had the highest percentage (55.24%). Most respondents replied that there was an increase in the customer satisfaction, plant image and turnover, after HACCP implementation ($p < 0.05$). A total of 98.09% of respondents had the opinion that their plant workers had improved in their understanding of food hygiene by HACCP implementation ($p < 0.05$). Approximately 79% of respondents indicated that customer complaints decreased, as a result of HACCP implementation.

Key words: HACCP, implementation, livestock product plants, survey

Introduction

Hazard Analysis Critical Control Point (HACCP) is a management system to control biological, chemical, and physical risks that may result from growing, harvesting, processing, manufacturing, transporting and distributing, or preparation and consumption of manufactured food. The goal of implementing HACCP is to manage potential hazards through risk assessment during food production with a focus on prevention rather than end product testing (Kwak, 1999; Unnevehr and Jenson, 1996). The HACCP becomes one of the best tools for preventing and reducing biological, physical and chemical hazards from food or foodstuffs to acceptable levels (Lee *et al.*, 2010, Lee *et al.*, 2011; Nam *et al.*, 2008).

In Korea, the hygiene and safety of livestock products has become a major issue of concern. In several countries, including Korea, HACCP system has been introduced with regard to product hygiene and safety.

The HACCP system including Sanitary Standard Operation Procedure (SSOP), and Good Manufacturing Practice (GMP) was established to comply with the Livestock Products Processing Act (LPPA) in 1997 (Lee, 2007). It was first introduced to slaughterhouses and livestock product plants. After that the system was extended, according to the plan of Ministry for Food, Agriculture, Forestry and Fisheries (MIFAFF) in Korea, to raw milk collection, the keeping and transportation of livestock products, meat retailers and animal farms by yearly plan. In 2006, Korea Livestock Products HACCP Accreditation Service (KOLPHAS) was established to activate HACCP system implementation in livestock industry. The roles of KOLPHAS are designation and control of HACCP from the farm to the consumption stage, namely farm, feed factory, milk depot, processing, transport, keeping, and retailer.

Total number of livestock product plants in 2009 is approximately 2,757 plants in Korea. In the area of livestock product plants, most developed countries including USA (1998), EU (1996) and Australia (1997) are implementing HACCP system as an obligation. In Korea, HACCP implementation of the slaughter house is only

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compulsory. The HACCP system was implemented on meat processing plant in 1997, slaughter house in 2000, livestock product plant in 2001, milk processing plant, meat sale and distribution in 2004, feed mill in 2005, and animal farm in 2006 (Animal, Plant and Fisheries Quarantine and Inspection Agency, 2010)

The studies on HACCP have recently focused on evaluation of sanitation management performance, benefits of HACCP implementation, and employees' knowledge and performance degree of HACCP in school foodservice sector (Kim and Lee, 2008; Moon and Ryu, 2004; Park and Park, 2009).

In the livestock products sector, economic feasibility of HACCP at slaughter house (Kwak *et al.*, 2002), productivity analysis of HACCP implemented pig farms (Nam *et al.*, 2008), and comparative analysis of the prerequisite items for HACCP in livestock product plants (Hong and Cho, 2008) have been reported. However, there have not yet been studied about the basic information for implementation and advantages of HACCP in the livestock products sector.

Therefore, the aims of this study were to determine factors affecting HACCP implementation, and to investigate the effect of HACCP implementation on domestic livestock product plants.

Material and methods

Survey

In this study, a survey was conducted with subjects to operate HACCP in livestock product plants during the period July 1 to December 5, 2008. A self-administered questionnaire was distributed in person by the researchers. The survey was carried out at 115 livestock product plants located in all around of Korea (Table 1). Most of the respondents were heads of quality control departments, and all of respondents claimed that they operated HACCP system in plants.

Questionnaire

The survey questionnaire was prepared and modified according to the results of related studies (Bai *et al.*, 2007; George and George, 1999; Spencer *et al.*, 1999). The questionnaire sought information about the general characteristics of the subjects and effect of the HACCP system implementation. A total of 115 questionnaires were distributed, and 105 respondents completed the survey with an overall response rate of 91.34%. The survey instrument consisted of 3 parts. In part 1 (4 of 16 questions),

Table 1. Location of respondents participated in the survey of livestock product plants that implemented HACCP system

Location	N ¹⁾	%
Seoul	7	6.09
Gyeonggi	21	18.26
Kangwon	9	7.82
Gyeongbuk	15	13.05
Gyeongnam	18	15.65
Chungbuk	7	6.09
Chungnam	11	9.56
Jeonbuk	11	9.56
Jeonnam	9	7.83
Jeju	7	6.09

¹⁾N=115

we asked the general characteristics of subjects' plant, such as period of HACCP operating, number of employees, annual turnover, and whether other accreditations had been adopted (Table 2). Part 2 contained 6 questions related to factors that may affect HACCP implementation (Table 3-Table 7). In part 3, 105 respondents were divided into four groups according to the number of employees as shown in Table 2. This part consisted of 6 questions related to benefits and effects of HACCP implementation (Table 8-Table 13).

Statistical analysis

The questionnaire responses were analyzed using SPSS 12.0 for Windows (Version 12.0 software, 2004, SPSS, Inc., Chicago, IL). To examine the relationship among the variables, the chi-square test was used, and the level of statistical significance was $p < 0.05$.

Results and Discussion

General characteristics

Table 2 shows the general information of each subdivided livestock product plants. The average years of operating HACCP system was 3.4 years. The highest was 3-4 years (34.29%), whereas less than 1 year was the lowest (8.57%). Approximately 60% of the respondents employed less than twenty workers and/or had a turnover of less than 7 billion won. We also asked respondents whether they had implemented any other accreditation. A total of 25 (23.81%) among the 105 respondents claimed that they had other quality management systems such as Korea Food & Drug Administration (KFDA) HACCP, Good Manufacturing Practice (GMP), International Standardization Organization (ISO) series, and domestic quality