

The Implementation of Good Manufacturing Practices (GMP) System in the Poultry Industry: A case study of the hatchery in Saha Farms Co., Ltd, Thailand

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Abstract— The aims of this research were to 1) study employees' attitudes on the implementation of Good Manufacturing Practices (GMP) System, and 2) compare employees' attitudes on the implementation of Good Manufacturing Practices (GMP) System when classified by gender, age, education level, working experience, working position, and GMP training experience. The findings revealed that the arithmetic mean of employees' attitudes on the implementation of Good Manufacturing Practices (GMP) System was at high level. The mean could be arranged in descending order as following; 1) personnel practices, 2) production and process controls, 3) maintenance 4) buildings and facilities, 5) equipment and utensils, 6) and sanitation. According to the comparison of employees' attitudes on the implementation of Good Manufacturing Practices (GMP) System when classified by age and working position, there was statistically significant difference at the .05. There was a significant difference at the .01, when classified by GMP training experience. There was a significant difference at the .001, when classified by working experience.

Keywords— Food standards, Good Manufacturing Practices (GMP), Buildings and facilities, Equipment and utensils, Production and process controls, Sanitation, Maintenance, and Personnel practices.

I. INTRODUCTION

Food safety is an important public health issue for global consumers. The World Health Organization (WHO) concluded food safety activities as 1) the implementing and improving food safety systems, 2) encouraging good manufacturing practices, and 3) educating manufacturers, retailers and consumers about the food handling. In manufacturing operations, food safety management could be accomplished through the application of safe product design, prerequisite programs and the best hygiene practices performing under the framework of the overall operations management system [1]. Food hygiene in food processing and service operations is the responsibility for all employees

because their proper hygienic works make safe food products [2].

Many Thai food manufacturers are known as an important producer and exporter of food products in the worldwide. Thai food firms must perform food safety and quality requirements based on the international Codex Alimentarius Commission standards to reduce the risk of food safety hazards in their products [3]. The poultry industry is a global market. Economic production, favorable meat characteristics, production innovations, and the product safety are essential for the poultry industry's success [4]. Poultry meat consumption has increased continuously in recent decades. Some of important reasons for its popularity could be seen in low production costs, low fat content, high nutritional value, unique flavor, and many various products [5]. Nowadays, food industries must be responsible for producing safe food and for illustrating how food safety has been planned and assured. It is important for all employees in food industries to understand and implement the best hygiene practices such as Hazard Analysis and Critical Control Point (HACCP), and Good Manufacturing Practices (GMP) [6].

Saha Farms Co., Ltd is the biggest Thailand exporter of frozen chicken. It is well known for its high quality of finished poultry products, most of which are exported into the foreign market such as Japan, China, and the European Union. In the hatcheries on an area of 48 acres, the facility has the capacity to produce 60 million chicks annually with 36 hatcheries and 36 incubators. Research and development team utilizes modern technology to create innovative products. All products are strictly examined before distribution to ensure world-class quality such as Food Safety, Q Marks, GMP, HACCP, ISO 9001:2000, and Halal (nationally and internationally) [7].

II. LITERATURE REVIEWS

Good Manufacturing Practices (GMP) was established in 1970s. GMP attainment is the responsibility of senior managers – participation and commitment of employees in all departments and levels, including suppliers [8].

Good Manufacturing Practices (GMP) can be described as the requirements of a food and drink control operations that make safe products to consumers. It is also concerned with

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manufacturing and quality management procedures [9]. Moreover, Good Manufacturing Practices (GMP) is a set of requirements and procedures by which the work methodology takes place under controlled conditions and by which surrounding conditions are created that allow the production of hygienic and safe products [10]. In addition, Good Manufacturing Practices (GMP) is a series of measures that includes the hygiene in the primary production, hygienic design of equipment and facilities, control of operations, maintenance and sanitation practices, personal hygiene, transportation, product information and consumer awareness and training [11].

According to the Codex General Standard for Food Additives, the guidelines of Good Manufacturing Practices (GMP) could be divided in 6 sections as follows [12]:

1. Buildings and facilities refer to the buildings used in the manufacture or storage of food are of suitable size, design and construction to permit unobstructed placement of equipment, orderly storage of materials, sanitary operation, and proper cleaning and maintenance.

2. Equipment and utensils refer to equipment and utensils used in processing, holding, transferring and filling are of appropriate design, material and workmanship to prevent corrosion, buildup of material, or adulteration with lubricants, dirt or sanitizing agent. Moreover, cleaned and sanitized portable equipment and utensils are stored and located in a manner that protects them from splash, dust or other contamination.

3. Production and process controls refer to the equipment for processing, transfer and filling the utensils, and the containers for holding raw and bulk materials are clean, in good repair and in sanitary condition. Raw materials, in-process samples and finished products are tested or examined to verify their identity and determine their compliance with specifications for physical and chemical properties, microbial contamination, and hazardous or other unwanted chemical contaminants.

4. Sanitation refers to cleaning/sanitizing of physical facilities, utensils and equipments, storage of cleaning and sanitizing substances, pest control, sanitation of contact surfaces, storage and handling of cleaned portable equipment and utensils.

5. Maintenance refers to an appropriate state of repair and condition to 1) facilitate all sanitation procedures 2) function as intended, particularly at critical steps to avoid food hazards and 3) prevent contamination of food from metal shards, flaking plaster, debris and chemicals.

6. Personnel practices refer to the personnel supervising or performing the manufacture or control of food has the education, training and/or experience to perform the assigned functions. Persons coming into direct contact with materials, finished products wear appropriate outer garments, gloves, hair restraints, and maintain adequate personal cleanliness.

III. RESEARCH OBJECTIVES AND HYPOTHESIS

A. Research objectives

1. To examine employees' attitudes on the implementation of Good Manufacturing Practices (GMP) System in the hatchery of Saha Farms Co., Ltd, Chaibadan district, Lopburi province, Thailand,

2. To compare employees' attitudes on the implementation of Good Manufacturing Practices (GMP) System when classified by gender, age, education level, working experience, working position, and GMP training experience.

B. Research hypothesis

There are significant differences in employees' attitudes on the implementation of Good Manufacturing Practices (GMP) System when classified by gender, age, education level, working experience, working position, and GMP training experience.

IV. RESEARCH FRAMEWORK

1. The independent variables consist of personal factors such as gender, age, education level, working experience, working position, and GMP training experience.

2. The dependent variables are GMP principles which are buildings and facilities, equipment and utensils, production and process controls, sanitation, maintenance, and personnel practices.

V. RESEARCH METHODOLOGY

A. Sample

The research samples were 168 employees in the hatchery in Saha Farms Co., Ltd, Chaibadan district, Lopburi province, Thailand. The samples were selected by quota sampling technique.

B. Research instrument

The research instrument was a set of questionnaire approved by three experts. The reliability of the questionnaire was 0.961. The questionnaire used in this research consists of two sections. The first section dealt with gathering basic demographic information from respondents, such as gender, age, education level, working experience, working position, and GMP training experience. The second section of the questionnaire illustrated respondents' attitudes on the implementation of Good Manufacturing Practices (GMP) System. This section consisted of 30 questions on a five-point Likert type scale, divided into six aspects (buildings and facilities, equipment and utensils, production and process controls, sanitation, and personnel practices).

C. Analysis method

All data were analyzed in term of percentage, arithmetic means, standard deviation, t-test, one-way ANOVA, and Fisher's least significant difference (LSD).

VI. RESEARCH FINDINGS

The majority of respondents were female (56.55 percent). Most of respondents' ages were between 25 to 35 years old (54.17 percent). Most of them graduated in lower secondary school (55.95 percent). Moreover, the majority of respondents had the working experience 1 year (36.32 percent). Most of respondents' working positions were line production staffs (83.93 percent). Most of them had the GMP training experience only 1 times (51.79 percent).

The arithmetic mean of employees' attitudes on the implementation of Good Manufacturing Practices (GMP) System in the hatchery was at high level. When considering by each aspect, the arithmetic mean could be ranged from maximum to minimum as follows: personnel practices (\bar{x} = 4.06, S.D. = 0.74), production and process controls (\bar{x} = 3.96, S.D. = 0.66), maintenance (\bar{x} = 3.94, S.D. = 0.65), buildings and facilities (\bar{x} = 3.92, S.D. = 0.66), equipment and utensils (\bar{x} = 3.91, S.D. = 0.69), and sanitation (\bar{x} = 3.90, S.D. = 0.75).

According to the comparison of employees' attitudes on the implementation of Good Manufacturing Practices (GMP) System in the hatchery, when classified by gender, and education level, there was no statistically significant difference ($p > .05$). When classified by age and working position, there was statistically significant difference at the level of .05. When classified by GMP training experience, there was statistically significant difference at the level of .01. When classified by working experience, there was statistically significant difference at the level of .001.

VII. DISCUSSION AND CONCLUSION

According to employees' attitudes on the implementation of Good Manufacturing Practices (GMP) System in the hatchery of Saha Farms Co., Ltd, Chaibadan district, Lopburi province, Thailand, the arithmetic mean was at high level because all products were strictly examined to ensure world-class quality such as Food Safety, Q Marks, GMP, HACCP, ISO 9001:2000, and Halal (nationally and internationally). The lowest mean of employees' attitudes on the implementation of Good Manufacturing Practices (GMP) System was the sanitation. Therefore, the top management should provide the training course in the topic of sanitation operations to employees (such as the plant's sanitation program). In addition, it is very important for all employees in different age, working experience, working position, and GMP training experience to learn and practices on Good Manufacturing Practices (GMP) System. To reduce the public health risks increasing from food contamination, manufacturers should have a moral and legal duty to produce food safety products for consumer health. Therefore, manufacturers must understand the regulations and implement the best quality practices that let them to complete this responsibility. Adopting Good Manufacturing Practices (GMP) are important principles of management which guarantee the food safety production and performance with legal requirement. Strict commitment of management practices with high quality

standards of food safety is essential.

VIII. RECOMMENDATIONS FOR FURTHER RESEARCH

There are two significant opportunities to broaden this research. First, as this research concentrated on the hatchery in Saha Farms Co., Ltd, only, future research should study across different companies. Studying in different sectors might emphasize the role of different antecedents. Second, further study is needed to investigate more independent and dependents variables such as, Hazard analysis and critical control points (HACCP), or ISO 18000.

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