UTILIZATION OF HACCP IN SMALL MEAT PROCESSING PLANTS

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Story in Brief

This project was designed to assess the implementation of a hazard analysis critical control point (HACCP) processing system in a small meat processing facility. The program was divided into three phases. Phase I established the current processing procedures, flow diagrams and microbial numbers. The HACCP program was implemented during Phase II and monitored during Phase III. Continuous support and encouragement of employees by plant management was needed to ensure the success of the program. Without management's support, employees lost enthusiasm toward compliance. Because there was no direct relationship between the implementation of the HACCP system and an increase in efficiency, management acceptance of the program was low. For the proper implementation of an HACCP system, it will need to be a part of a total quality control program with commitment from management and employees.

(Key Words: HACCP, Total Quality Control, Total Quality Management.)

Introduction

Food safety is a major concern of regulatory agencies and food processing facilities. While no practical way exists that assures 100% safe food supply, methods can be implemented that will significantly reduce the probability of a microbial outbreak. The objectives of this project were to identify the sources of microbial contamination, identify the factors involved in the system and to assess the success of a HACCP system in small meat processing facilities.

Materials and Methods

To aid in the assessment and implementation of the HACCP concept, this project was comprised of three phases. Phase I was devoted to understanding the current plant operating practices and to establish a baseline for microbial contamination. The processing plant was divided into three general areas based on the major activity occurring in each area. The central cooler is the largest room and the site for various activities, such as carcass holding, boning operations, product storage, shipping and receiving. The retail processing room is used primarily as a cutting, slicing and packaging room for both raw

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and cooked products being prepared for retail sales. The custom processing room is used primarily for the cutting and packaging of products from custom slaughter. This room also housed processing equipment for the manufacture of ground beef and sausage products. During Phase I the processing plant was monitored to determine microbial loads of raw material, finished products, and food contact surfaces. Environmental samples included food contact surfaces, saws, scales, packaging tables and various other equipment used in the processing of products. Upon completion of Phase I, a microbial baseline was established for the environmental food contact surfaces. Microbial analysis was completed using total plate count agar (Speck, 1976).

During Phase II proper sanitation procedures were introduced. During this phase a side-by-side program was developed so that research technicians worked alongside employees. Research technicians provided guidance and assisted in plant sanitation operations throughout this phase. The environmental food contact surfaces were monitored for microbial contamination. During this phase twenty locations throughout the three areas were monitored on a weekly basis, obtaining samples at the end of a day's production and prior to start-up the following morning. Foaming agents and sanitizers were applied to all food contact surfaces throughout this phase.

Phase III was designed to assess the success of the program as implemented. Microbiological data were collected from the same environmental food contact surfaces as before, but with no further guidance to plant employees on plant sanitation. Unannounced inspections and sampling of environmental food contact surfaces were used.

Results and Discussion

During Phase I (week 1 through week 5) microbial levels were at very high levels in each of the three areas of the plant. The central cooler had microbial levels which ranged from 10^4 to 10^5 CFU/cm^2 (Figure 1). The retail processing room and custom room ranged from 10^5 to 10^6 CFU/cm^2 (Figures 2 and 3).

During Phase II (week 6 through week 50), with the implementation of employee guidance and training in plant sanitation, microbial levels within all three areas decreased. In the central cooler microbial levels decreased to 10^1 CFU/cm^2, but ranged up to 10^5 CFU/cm^2. The increase in microbial levels in this area was due to ineffective cleaning of three food contact surfaces: the scale, stainless steel gondola, and plastic lugs. In the retail processing room microbial levels decreased to $<10^1$ CFU/cm^2, but ranged to 10^3 CFU/cm^2. The increase in microbial levels in this area was due to ineffective cleaning of the slicer. In the custom processing room microbial levels also decreased to $<10^1$ CFU/cm^2, but ranged to 10^5 CFU/cm^2. The increase in this area was due to ineffective cleaning of three food contact surfaces: the grinder, bowl chopper and cutting table. The decrease in microbial levels was due to the initiation of

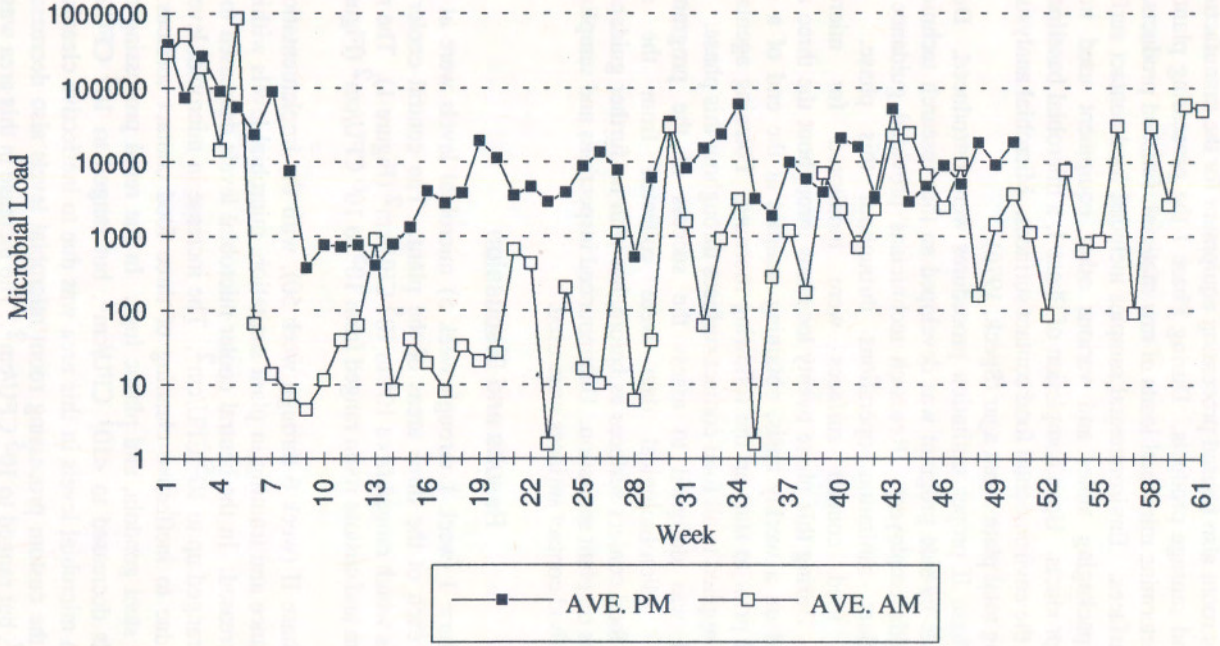

Figure 1. Central cooler total plate count.

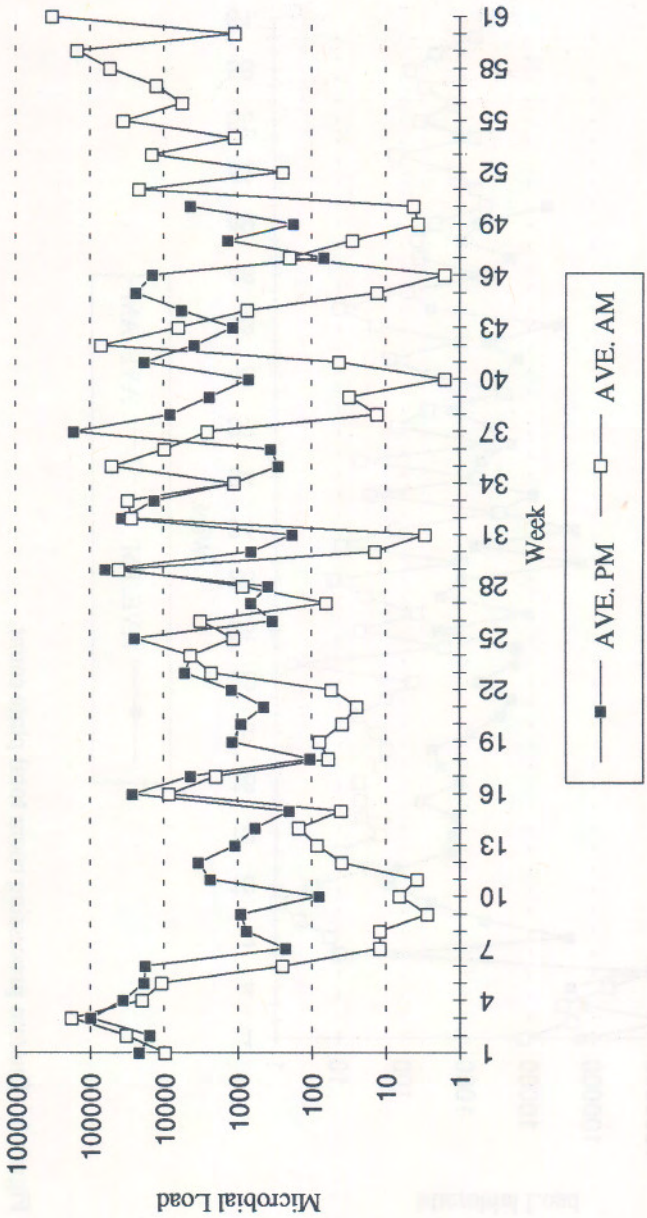

Figure 2. Retail processing room total plate count.

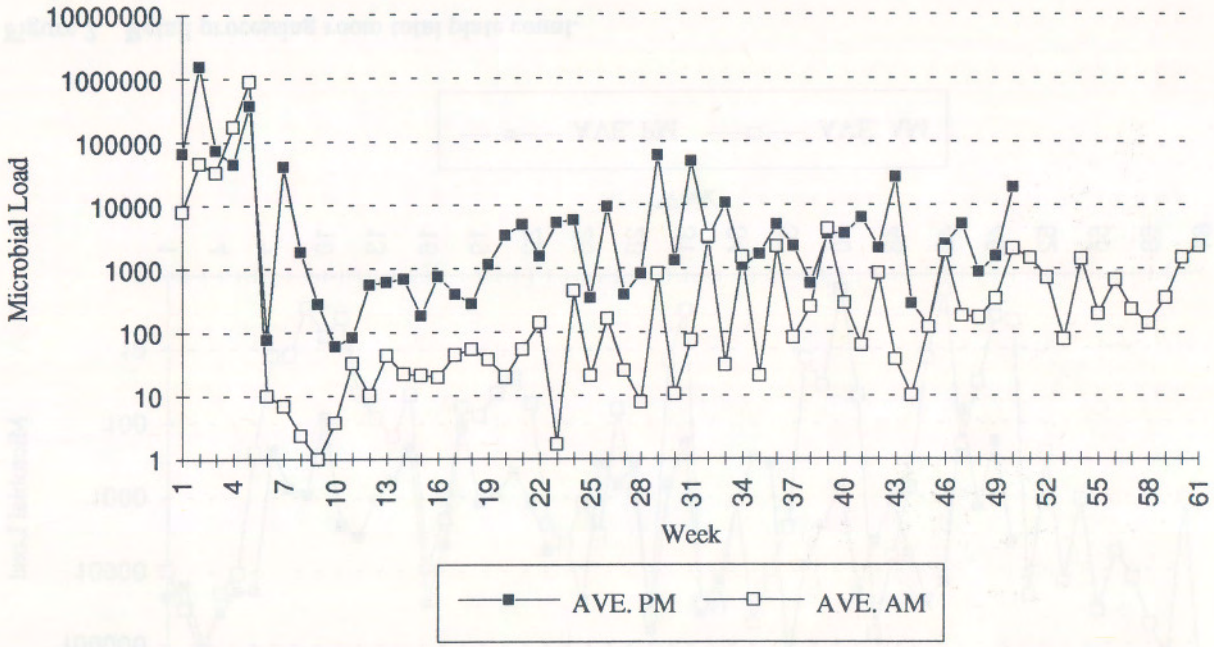

Figure 3. Custom processing room total plate count.

proper plant sanitation. A steady rise and fluctuation in microbial levels was noted throughout Phase II and determined that the cause was improper cleaning and sanitation of food contact surfaces by the plant sanitation crew. Although they were trained and instructed how to perform proper plant sanitation and clean-up duties, if no authoritative person was present clean-up was not completed in proper fashion. This was believed to be because of the lost enthusiasm and plant employee participation in the plant sanitation and clean-up activities.

During Phase III (week 51 thorough week 61) microbiological data were collected from the same twenty environmental food contact surfaces. Unannounced inspections and sampling of environmental food contact surfaces were continued. Microbial analysis indicated that in the central cooler microbial levels ranged from 10^2 CFU/cm^2 to 10^5 CFU/cm^2. The retail processing room ranged from 10^1 CFU/cm^2 to 10^5 CFU/cm^2 and the custom processing room ranged from 10^1 CFU/cm^2 to 10^4 CFU/cm^2. Fluctuation in microbial levels was again noted in Phase III as in Phase II. This was believed to be due to improper sanitation procedures by the plant sanitation crew. Lost enthusiasm and plant employee participation in plant sanitation and clean-up duties were still apparent within the plant. For the HACCP system to be implemented effectively it must be a part of total quality control program with continued support from both plant management and plant employees. This study shows that proper training, enforcement and encouragement of sanitary procedures can result in effective reduction in overall microbial numbers.

Literature Cited

Speck, Marvin L. 1976. Compendium of Methods for the Microbiological Examination of Foods (2nd Ed.). American Public Health Association, pp. 110-111