Master of Public Health

Integrative Learning Experience Report

INTEGRATIVE LEARNING EXPERIENCE WITH THE DIVISION OF FOOD SAFETY AND LODGING AT THE KANSAS DEPARTMENT OF AGRICULTURE AND THE INTERNATIONAL MOBILITY OF VETERINARY STUDENTS PROGRAM IN ITALY

by

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submitted in partial fulfillment of the requirements for the degree

MASTER OF PUBLIC HEALTH

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2019

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Abstract

This report summarizes the Integrative Learning Experience (ILE) that the student pursued at the University of Padova (UNIPD) in Italy, and the Kansas Department of Agriculture (KDA) in Manhattan, Kansas. The two-week **I**nternational **Mo**bility of **Ve**terinary **S**tudents (i-MOVES) program was organized by professors at the UNIPD. The students attended practicums, lectures, and field trips in the Food Safety, Public Health and Animal Welfare realm. During the i-MOVES program, the student visited the headquarters of an international seafood processing company, a commercial poultry farm, and a modern beef slaughter facility. The trip to Italy gave the student an opportunity to explore beyond the i-MOVES program to observe distinctive items that were prominent to the ILE experience.

In the span of six months, a KDA Division of Food Safety and Lodging internship gave the student the opportunity to work as a Hazard Analysis and Critical Control Points (HACCP) Specialist Intern. Her role involved the development of HACCP plans, the documentation of food complaints, and sanitarian assignments for investigations of food establishments. In addition to the internship, she participated in the annual Emergency Preparedness Exercise, RAMPART, as the Database Technical Specialist at the KDA. Participating members of the RAMPART exercise included KDA professionals, the U.S. Department of Agriculture (USDA), the U.S. Department of Homeland Security (DHS), the USDA Animal and Plant Health Inspection Service-Veterinary Services (APHIS-VS), and several state departments of agriculture.

This ILE report describes the knowledge and skills gained throughout the Master of Public Health program and how it was applied during the student's field experience in Italy and at the KDA.

Subject Keywords: Food Safety, HACCP, KDA, Italy, RAMPART, i-MOVES

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List of Acronyms

AFDO	Association of Food and Drug Officials
APHIS-VS	Animal and Plant Health Inspection Service-Veterinary Services
BCA	Department of Comparative Biomedicine and Food Science
CDC	Centers for Disease Control and Prevention
CSU	Colorado State University
DHS	Department of Homeland Security
ESF	Emergency Support Function
ECDC	European Centre for Disease Prevention Control
EFSA	European Food Safety Authority
EU	European Union
FAD	Foreign Animal Disease
FADD	Foreign Animal Disease Diagnostician
FDA	Food and Drug Administration
FMD	Foot and Mouth Disease
HACCP	Hazard Analysis and Critical Control Points
ILE	Integrative Learning Experience
IMT	Incident Management Team
KDA	Kansas Department of Agriculture
KSU	Kansas State University
MAPS	Department of Animal Medicine, Production and Health
MPH	Master of Public Health
PCQI	Preventive Control Qualified Individual
PHS	Public Health Services
PSU	Pennsylvania State University
PPE	Personal Protective Equipment
TAMU	Texas A&M University
UNIPD	University of Padova
USDA	United States Department of Agriculture

Chapter 1 - Overview of Field Experience Sites

The Integrative Learning Experience (ILE) was conducted at the University of Padova (UNIPD) in Padova, Italy and the Kansas Department of Agriculture (KDA) in Manhattan, Kansas. The UNIPD was established in 1222 and is one of Europe's oldest and prestigious seats of learning (The University of Padova, n.d.). The University houses the first permanent anatomical theatre and became the first institution in the world to award a university degree to a woman (The University of Padova, n.d.). The UNIPD administrated a two-week program called the International Mobility of Veterinary Students (i-MOVES). This extraordinary program was organized through the Department of Comparative Biomedicine and Food Science (BCA) and the Department of Animal Medicine, Production and Health (MAPS). The activities of the i-MOVES program primarily focused on problems regarding Food Safety, Public Health and Animal Welfare. Students came from Texas A&M University (TAMU), Colorado State University (CSU), Kansas State University (KSU), Pennsylvania State University (PSU), and the UNIPD. The veterinary, public health and food safety graduate students attended lectures, practicums, and field trips taught by the participating universities, the veterinarian from the European Commission, and other professionals.

The second part of the ILE took place at the KDA. The Kansas State Board of Agriculture became the KDA in 1995 and is recognized as the nation's first state department of agriculture (National Agricultures Statistics Service, 2016). One of the KDA's missions is to help ensure a safe food supply, protect natural resources, promote public health and safety, protect animal health, and provide consumer protection to the best of their ability (Kansas Department of Agriculture, n.d.). This mission is executed through eight programs including Food Safety and Lodging. The Food Safety and Lodging program is responsible for the safety of eggs and inspections of restaurants, grocery stores, and food processes and manufacturers (Kansas Department of Agriculture, n.d.). One of my ILE roles at the KDA was serving as a Hazard Analysis and Critical Control Points (HACCP) Specialist Intern. In the span of eight months, I interned under the direction of Steve Moris, the Program Manager and the Assistant Program Manager Adam Inman. Steve Moris received his bachelors from KSU in Business Administration and has been the Program Manager at the KDA for thirteen years. Mr. Moris is also the president of the Association of Food and Drug Officials (AFDO). The corresponding preceptor Adam Inman received his bachelor's in biology from KSU and has worked as the

assistant program manager for ten years. In addition, Mr. Inman serves as the co-chair for the retail Food Committee and the Package Labeling Ad-hoc Committee of AFDO.

During my internship at the KDA, I participated in the Emergency Preparedness Exercise (RAMPART). The four-day exercise, RAMPART, was sponsored by the KDA with resources from the United States Department of Homeland Security (DHS) State Homeland Security Grant Program (Kansas Department of Agriculture, 2018). The exercise consisted of several participating organizations such as the KDA Incident Management Team (IMT), the state level Emergency Support Function (ESF) partners, the private industry, the United States Department of Agriculture (USDA) Incident Coordination Group, the DHS, the USDA Animal and Plant Health Inspection Service - Veterinary Services (APHIS-VS), and several state departments of agriculture. Subsequent to my role as an intern, I acted as the Database Technical Specialist in the RAMPART exercise. I worked under the Disease Support Branch, specifically the Permitting Branch played a significant role in this exercise. The implementation of the secure food supply plans emphasized the importance of the permitting branch, which will be explained later in this report.

Although my ILE involved a number of roles and sites, I was presented a multitude of opportunities to broaden my Master of Public Health (MPH) experience. After completing several courses in the MPH program, I was more skilled and equipped to make executive decisions and complete projects to fulfill my internship responsibilities. The i-MOVES program in Italy introduced me to a unique cultural experience from the organization of their government to their social norms. This field experience demonstrates how I applied my prior knowledge from an academic setting to two on-site non-academic settings.

Chapter 2 - Learning Objectives

As alluded to above, the ILE occurred at the i-MOVES program in Italy, as well as the HACCP internship, and the RAMPART exercise at the KDA. I participated in the i-MOVES program in summer of 2018. The following internship with the KDA began July 16, 2018 and ended February 6, 2019. During December 2018, while interning at the KDA, I was involved in the RAMPART exercise. The learning objectives are presented in section 2.1, and the aforementioned project activities appear in section 2.2.

2.1 Learning Objectives:

1. To physically observe how food products are processed at a poultry farm, a beef slaughterhouse, and a seafood processing company.
2. To integrate prior knowledge from coursework and apply it to governmental projects authorized by the KDA.
3. To understand the permitted movement process during a Foreign Animal Disease (FAD) outbreak event, and learn about biosecurity controls relevant to both animal and human health.

2.2 Field Experience Activities:

1. Participated in the i-MOVES program and the exploration of Italy.
2. Assisted food establishment owners in the development of their HACCP plans, documentation of public food safety complaints, and sanitarian assignments for investigations of restaurants.
3. Practiced biosecurity protocols during an emergency preparedness exercise while responding to public inquiry.

Chapter 3 - i-MOVES Narrative Visualization at the UNIPD

Seafood Processing in Italy

The first visit was conducted at the seafood processing headquarters located in Venice, Italy. This trip focused on the Food Safety, Public Health and the Animal Welfare sector. The processing facility imports and exports shipments of a large variety of fish including Sea Bass, Squid, Atlantic Snapper, Mussels and Tuna. Although the European Union (EU) has a history of selling economically motivated adulterated (EMA) products, the European Food Safety Authority (EFSA) implemented a framework to educate competent authorities in the EU and decrease the occurrence of food fraud. Most food fraud cases involve the substitution of a high-value product with a less expensive or lower quality alternative (Johnson, 2014). Since the products bought from the supplier could potentially be economically adulterated, the company selects their partners with caution. As shown in Figure 3.1, products without proper labeling can easily be mistaken for another seafood product. After the EU new fish and aquaculture products rule was established, the traceability of the food will increase, and the consumers will be more knowledgeable of its source. This particular seafood company implemented a protocol to control the safety and quality of their product called dypfrozen (DYP). DYP fish is frozen using nitrogen to quickly reduce the temperature range from -60℃ to -120℃, this method lowers the damage rate of the product resulting in the freshness in terms of turgidity, nutritional content, and organoleptic value (Fiorital, 2019).

Figure 3.1 Unknown Food Product

The handling of food products is important in the safety of consumer health. Harmful chemical compounds develop in certain fish products, such as histamine. Histamine is a substance that forms when marine fish are not properly refrigerated before being cooked or processed (EFSA, 2015). According to the EFSA, histamine poisoning is one of the most common illnesses caused by fish and fishery products. In 2013, there were 42 reported outbreaks of histamine poisoning which involved 231 people in the EU (2015). By introducing

the DYP protocols and maintaining the temperature of the products in -50℃ storage, along with the 8,812 annual histamine analysis demonstrates how this organization has taken advantage of every strategy to prevent scromboid poisoning (Fiorital, 2019).

Figure 3.3 Final Processed Seafood Products

The EU adopted the Hazard Analysis Critical Control Points (HACCP) system. HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw meat production, procurement and handling, to manufacturing, distribution and consumption of the finished product (FDA, 2018). This system highlights the biological, chemical and physical hazards of food products throughout the process. During the last packaging procedure of the product (as shown in Figure 3.2), the food is conveyed through a metal detector (as shown in Figure 3.3), to validate if metal was unintentionally left inside of the product during the process. When fresh fish and seafood is imported and processed, the product is skinned and sliced with knives and placed into machines that could deposit foreign objects in the item causing a deviation. The metal detector is positioned at the end of the process to check the food for any physical hazards.

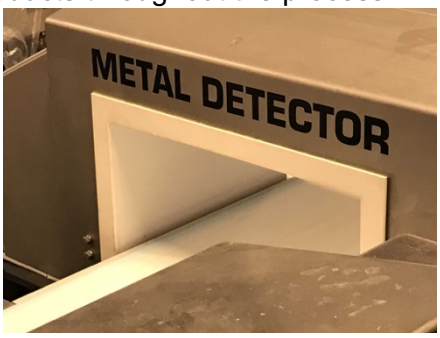


Figure 3.2 Metal Detector

Commercial Poultry Farm

Following the fish and seafood company, we visited the commercial poultry farm. The farm veterinarian informed us about the Personal Protective Equipment (PPE) that we will have to wear to have access to the farm. PPE is designed to protect individuals from hazards and in this case protect the poultry from hazards that we could have brought in. The farm's biosecurity efforts are demonstrated in Figure 3.4**.** After we were properly equipped the farm veterinarian gave us a tour of the

Figure 3.4 Personal Protective Equipment

poultry farm, which focused on Animal Welfare. The male and female broilers were separated and are administered drugs in the early stages of their development to prevent them from being infected by parasites and other bacterial pathogens. As shown in Figure 3.5, all of the broilers are in the same house sharing the same source of water and environmental conditions. The broiler house is ventilated and is not housed with heavy machinery with loud noises for the welfare of the animals. In Figure 3.6, the flooring is appropriate and easy to clean for the broilers; they have access to water along with space to roam around the facility. The farm veterinarian demonstrated how they performed necropsy on the broilers to determine the cause of their death. Necropsies are executed on site; some causes originate from the consumption of physical objects, infectious diseases or sudden death syndrome from their fast growth rate.

Figure 3.6 Broiler House

Figure 3.5 Environmental Conditions

Figure 3.7 Necropsy Practicum

Necropsy Practicum

After the trip to the broiler farm, we went back to the UNIPD to perform a necropsy on the broilers. The practicum was taught by Dr. Alessandra Piccirillo, as shown in Figure 3.7. Dr. Piccirillo informed us on how to properly dissect the broiler and perform an organoleptic evaluation of the product. The evaluation included observation of the pectoral muscle up to the neck for adhesions, and the air sacs all the way down to the digestive track for abnormalities. The process took time but from a food safety perspective having this experience gave me the opportunity to understand the intensity of the work of veterinarians.

Modern Beef Slaughter Facility

The last field trip was concluded at the modern beef slaughter facility in Moriago della Battaglia (TV), Italy. The focus of this trip was based on all three sectors of Food Safety, Public Health, and Animal Welfare. As in the previous field trips, PPE attire was required for biosecurity and safety protocols. The tour started at the last step of the meat process (shown in Figure 3.8) by going through the cleanest part of the facility to the least clean area to decrease the risk of contamination. The processing facility had high technology, which enhanced the sanitation levels of the slaughterhouse and decreased the physical hazards of the employees. As we continued the tour, every person had their own duty in the processing of the meat. Along with those distinct duties, they have their own PPE (shown in Figure 3.9). The figure also demonstrates how the labels are sectioned to trace every part of the product. Therefore, if the product does not pass inspection by the veterinarians, all of the product portions will be located and disposed. The system incorporates loud devices to shoot, cut, and shave the product as shown in Figure 3.10. In addition, this figure displays the employee wearing ear protection along with face protection to perform his job. The beef cattle are shot with a captive bolt in the middle of the skull to ensure instant

Figure 3.10 Meat Processing Step

Figure 3.9 Meat separation and Traceability

Figure 3.8 Slaughter Process and PPE

death with minimum suffering. To speed up the process the beef cattle are stuck with a knife and exsanguinated to complete the slaughtering process.

Distinctive Items in Italy

The author is from the United States with prior experience with regulatory systems; during the learning experience in Italy, I was afforded the opportunity to compare U.S. organizational structures with those of Europe. Throughout my stay in Italy, I was introduced to social and culinary norms that I have never experienced in America. Although I knew that the culture and the surroundings would be different, I cannot help but expound on a few items from a public health aspect. A colleague and I went grocery shopping a few items and it was my first time seeing eggs not being refrigerated as shown in Figure 3.11.

Figure 3.12 Non-refrigerated eggs

In the United States, eggs are always refrigerated to reduce the growth of *Salmonella* and any other bacteria. During Professor Valerio Giaccone's lecture, he stated that Salmonellosis is the second most relevant foodborne illness in EU but the first in Italy. According to an opinion from the Scientific Committee on Veterinary Measures relating to Public Health on *Salmonella* in Foodstuffs (2003), eggs and products containing raw eggs are among the food categories most likely to pose the greatest risk to public health in relation to salmonellosis (Scientific Opinion of the Panel on Biological Hazards, 2009). After researching articles on this subject matter, the findings resulted in mixed views. The EFSA and the European Centre for Disease Prevention Control (ECDC) stated that *Salmonella* was most frequently detected in broiler meat and rarely found in table eggs (2016). It is also noted that cooling does not reduce existing *Salmonella* contamination inside the egg and can prolong the survival of *Salmonella* spp. on the egg-shell (Scientific Opinion of the Panel on Biological Hazards, 2009). Until more research is done on the cooling of eggs, the EU will continue to process non-refrigerated eggs. The last finding was the drinking fountain (nasoni) (see Figure 3.12). In the U.S., we have water fountains in a few public locations, but

Figure 3.11 A drink form the nasoni

the nasoni fountains can be found in various locations besides public parks. The internet indicates Americans announcing their concerns about the nasoni water being safe to drink. The drinking water supplied by Vertas S.p.A comes mainly from groundwater and does not require to be subjected to a forced purification process, but only to a disinfection to guarantee it potability up to the point of delivery (Integrated Water Service, 2018). Accessibility to free public water was something that captured my attention from a public safety perspective. After researching, I was not able to find any known epidemics with pathogens in the public water system since the 1990s. Indeed, I had a safe nasoni experience in Italy.

Chapter 4 - Experiences at the KDA

HACCP plans at the KDA

Hazard Analysis and Critical Control Points (HACCP) has been adopted internationally within the food industry. According to the FDA, HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product (2018). HACCP originated in the 1960's when the National Aeronautics and Space Administration (NASA), the Pillsbury Company, and the U.S. Army Laboratories collaborated together to provide safe food for upcoming space expeditions (Safe Food Alliance, 2019). Although this regulatory system is not perfect, it is truly effective when restaurants commit to following the guidelines. HACCP Plans consists of 5 preliminary tasks that are listed in Figure 4.1.

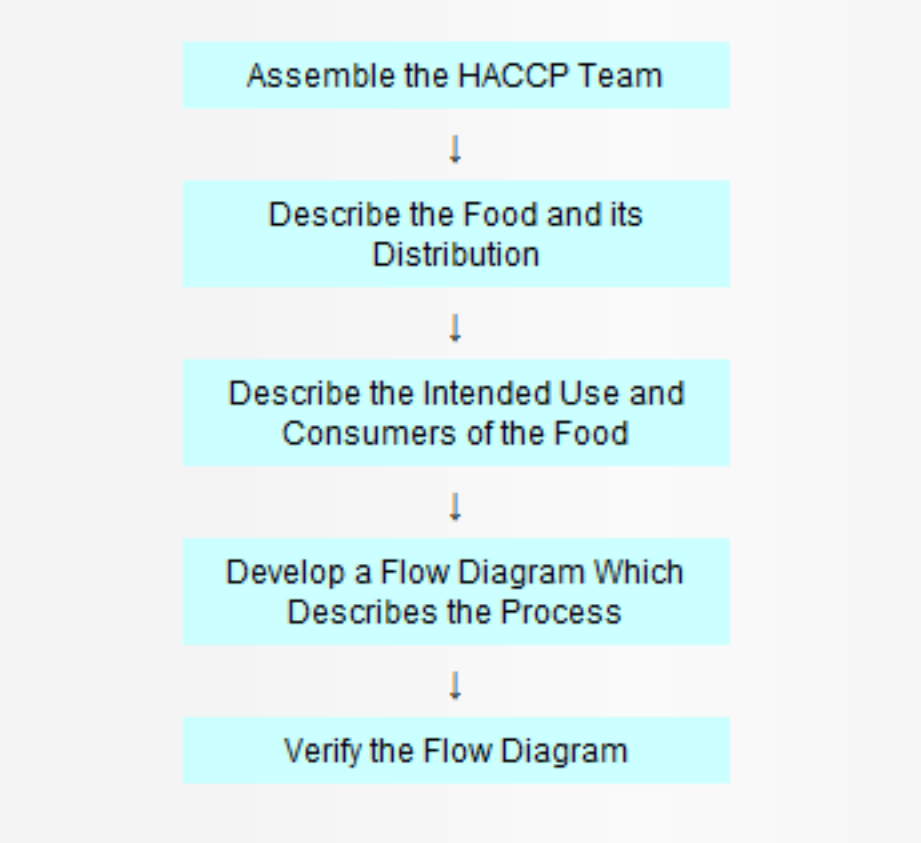


Figure 4.1 HACCP Preliminary Steps (FDA, 2018)

After these steps are completed the establishment would follow the 7 Principles to control the food safety hazards (FDA, 2018):

Principle 1: Conduct a hazard analysis.

Principle 2: Determine the critical control points (CCPs).

Principle 3: Establish critical limits.

Principle 4: Establish monitoring procedures.

Principle 5: Establish corrective actions.

Principle 6: Establish verification procedures.

Principle 7: Establish record keeping and documentation procedures.

As a HACCP Specialist Intern at the Kansas Department of Agriculture (KDA), I assisted the food establishment owners with the development of their HACCP plan according the Kansas Food Code. The Kansas Food Code is largely based upon the United States Public Health Services (PHS) 2009 Model Food Code (KDA, 2012). These plans were composed of different types of food products and methods which are demonstrated through the Kansas Food Code. Although HACCP is not a perfect system, it allows the owners to have an understanding of where a deviation possibly occurred in the course of the process. The food safety plan is orchestrated to help the owners be more aware of possible hazards that could formulate before the food is administered to the public. By incorporating a HACCP plan, the majority of these biological, chemical, and physical hazards will be prevented to decrease the likelihood of a foodborne illness outbreak. A template of the Kombucha Tea was created to establish critical control limits of the fermentation process to prevent high acidity levels from harming the consumers. The Raw Meat Vacuum HACCP plan was a requirement of a food establishment because of the reduced oxygen packaging and temperature control process. The Kombucha HACCP template can be found in Appendix I and the Raw Meat Vacuum HACCP plan can be found in Appendix II in this report.

RAMPART Narrative Visualization

The KDA sponsored the Emergency Preparedness Exercise to allow professionals in the agriculture industry to understand how to operate if a foreign animal disease (FAD) were to occur. The exercise was based on fictitious events that involved real locations like the KDA, governmental agencies and animal processing facilities. The scope of this exercise involved an initial state response to keep the disease out, the progression of a response within the states and county-level coordination, and the actions to control the foot and mouth disease (FMD) infected premises within county borders (KDA, 2018). In order to control the FAD, animal

processing facilities must have an approved secure food supply plan to receive permits to move animals and some commodities into or within the state of Kansas during an outbreak of FMD (KDA, 2018). The secure food supply plans are similar to HACCP plans but are implemented for live animals that will be used for food or food products. This exercise contained approximately six sections, one of the sections consisted of the Disease Support branch. The Disease Support Branch, specifically the Permitting branch, prepared and implemented permitted movement systems for dairy, feeders, swine operations and processing plants (KDA, 2018). We also determined the ability of the operations to activate the appropriate secure food supply plans and request required permits.

Figure 4.2 Database Technical Specialist

Figure 4.3 Incident Briefing

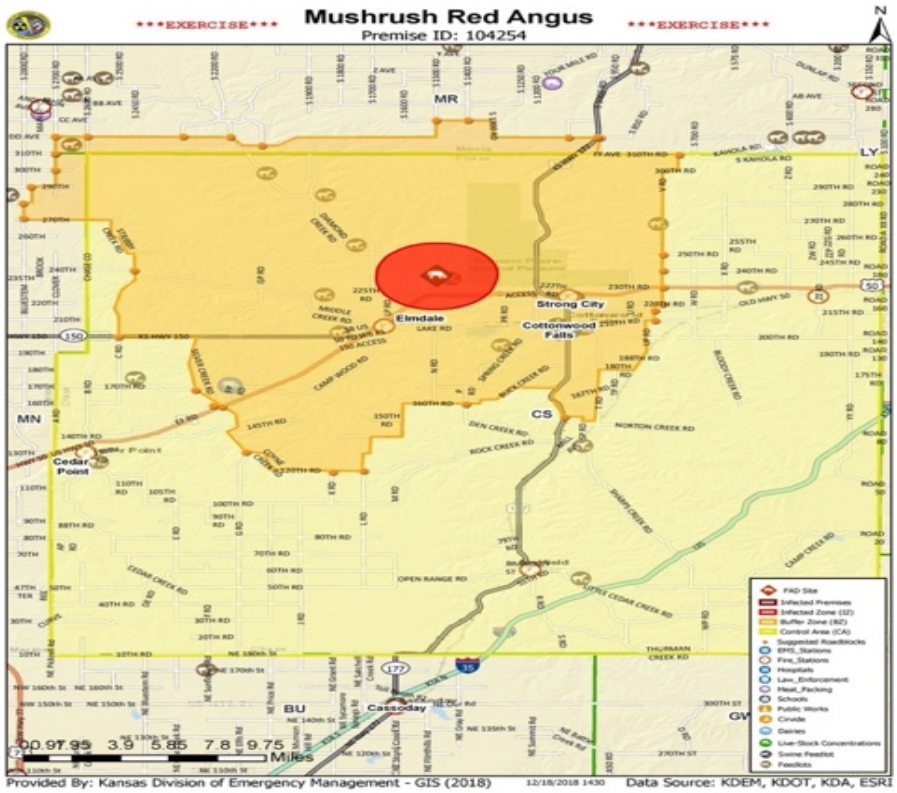
I acted as the Database Technical Specialist during the four-day exercise (see Figure 4.2). All of the branches would come together for a breiefing at the beginning and at the end of the day to keep everyone updated on what was occuring. These meetings are essential to the organization as a whole because we have to all work together despite our specialties (see Figure 4.3). In the photo the Planning Section Chief, Kellen Liebsch was informing all of the sections about the Stop Movement order given and where the Foreign Animal Disease Diagnostician (FADD) were conducting investigations. FADD visits animal production facilites to examine the herd, as well as interview the owner and take samples to complete the investigation.

Following the morning briefing the participants went to their perspective branches to implement a plan and make decisions accordingly. The duties of the permitting branch consisted of determining which

Figure 4.4 Route Mapping of Infected Premises

processing facilites will be authorized to move within the state and answering incoming inquries regarding the secure food supply plans. Being in the position to authorize movement is not an easy task. Once the FMD was in the state of Kansas, we had to inform the permitted indiviuduals what routes to take to avoid the risk of contamination from infected animal production sites (see Figure 4.4). During the FMD outbreak a layout of the premises were reflected on the map representing the infected, contact, at risk, monitored, free, and vaccinated areas (shown in Figure 4.5) (Department of Homeland Security, 2018).

Figure 4.5 Map of Infected Premises in the RAMPART exercise



At the end of the RAMPART exercise the Permitting Branch approved a total of 12 Interstate permits and reviewed 48 of those plans. The four major types of permits included milk, hog, cattle, and dairy cattle. The majority of the Interstate permits involved milk that came from facilities that had an approved food supply plan prior to the RAMPART exercise. During the stop movement the facilities that processed food products without a secure food supply plan were asked to create one, although the animal or animal products could not be permitted to move.

Chapter 5 - Competencies

Student Attainment of MPH Foundational Competencies

The five MPH Foundational Competencies that I practically applied during the APE at the Kansas Department of Agriculture (KDA) as well as the i-MOVES program at the University of Padova, Italy are described in this chapter. The competencies listed in Table 5.1 were applied while participating in the Emergency Preparedness Exercise (RAMPART) and working as a Hazard Analysis and Critical Control Points (HACCP) Specialist Intern at the KDA, and during the Italy-based practicums, lectures, and food-system field trips. Following the table, I have provided a detailed explanation of how I executed the competencies in a practical way.

Table 5.1 Summary of MPH Foundational Competencies

Number and Competency		Description
1	Apply epidemiological methods to the breadth of settings and situations in public health practice	As the Database Technical Specialist during the (RAMPART) exercise several epidemiological methods had to be applied in order to contain the control of the Foreign Animal Disease (FAD).
5	Compare the organization, structure and function of public health and regulatory systems across national and international settings	By comparing public health regulatory systems in Europe and the United States, I was able to learn about different methods used to keep the population safe.
8	Apply awareness of cultural values and practices to implement public health policies	As the HACCP Specialist Intern, I was able to create a template that complied with the Kansas Food Code while demonstrating cultural sensitivity.
17	Apply negotiation and mediation skills to address organizational challenges	As the HACCP Specialist Intern, I conversed with food establishment owners to gain clarification about procedures used in the owner's facility. By making sure their HACCP Plan was in compliance, multiple conversations and understanding occurred.
21	Perform effectively on interprofessional teams	As the Database Technical Specialist, I had to correspond and reach an agreement with KDA professionals as well as organization leaders from Department of Homeland Security (DHS), local veterinarians and several state departments of agriculture offices during the RAMPART exercise.

Detailed explanation of the MPH Foundational Competencies

The first competency that was used during the RAMPART exercise was **(1) applying epidemiological methods to the breadth of settings and situations in a public health practice.** The FAD that was used for the RAMPART exercise was Foot and Mouth Disease (FMD). Even though FMD has not been identified in the U.S. since 1929, it is a highly contagious virus that affects cattle, sheep, swine, goats, deer, and other cloven hooved animals (Centers for Disease Control and Prevention, 2015). By practicing how to effectively control FMD, the state of Kansas will be more prepared to deal with other FADs that could spread throughout the state. Although FMD is not an expressly human health issue, I learned through the exercise how evidence-based approaches are used in public health exercises. As the Data Specialist Technician, I worked in the Disease Support branch, specifically the Permitting subdivision. The Permitting Branch was composed of the decision makers that approved or denied animal facilities secure food supply plans in order to receive permits to move animals and some commodities into or within the states of Kansas during the FMD outbreak (Kansas Department of Agriculture, 2018). If these professionals allowed a contaminated facility to move during this emergency, this disease could spread to other facilities and cause owners a huge economic loss. This exercise highlights how important the Permitting Branch role was in making these crucial decisions while applying epidemiological methods.

Being from the United States with prior federal and state government experience equipped me with the necessary tools and knowledge in the public health field. Traveling to another country provided me the opportunity to **(5) compare the organization, structure and function of public health and regulatory systems across national and international settings.** Participating in the i-MOVES program and exploring Italy introduced me to social and culinary norms that I have never experienced in America. A couple of items that caught my attention included the public drinking fountains called (nasoni), and the non-refrigerated eggs in the market. Because these products are not seen in the United States, I was curious about the regulatory systems that kept the population safe from bacteria and conducted some research. Indeed, I learned about public health and health-related systems.

As the HACCP Specialist Intern, it is important to be **(8) aware of cultural values and practice implementing public health policies** while developing HACCP plans for food establishments. Although I did not have the same cultural background as the food establishment's owners, I practiced cultural sensitivity while working with these individuals. The

main objective was to successfully process the owners' HACCP plans with the goal of approval. Certain methods in the owners' process involved procedures that I was not technically familiar with. Therefore, asking for clarification without being culturally insensitive was executed throughout the duration of my internship. Being culturally aware and implementing changes allowed me to be more experienced in this realm of work, while promoting the public health objective of food safety.

The **(17) application of negotiation and mediation skills to address organizational challenges** were necessary in conducting the HACCP plans as well. HACCP plans are needed for every process that occurs in each restaurant. This time-consuming process is sometimes frustrating for the food establishment owner and they do not have much time to spare. Leadership is required. I had to negotiate the terms and the policies in a strategic manner. Most of these individuals are not knowledgeable about HACCP planning; therefore, if changes are made to the document after approval, they will have to contact me and update their records. Having sustainable communication between KDA and the owners is vital and allows the Food Sanitarians to inspect without going "in blind." The Food Sanitarians are also the eyes for the KDA by being physically present and assisting the owners if they have any problems or concerns with the process. The work of Food Sanitarians is critical in maintaining the safety of the Kansas population.

As the Technical Database Specialist, I deliberated with various employees in different fields during the RAMPART exercise. The participants consisted of veterinarians, government officials, along with KDA employees in emergency management, animal health, dairy, feed and food safety divisions. I had to **(21) perform effectively on these interpersonal teams** to assist in making executive decisions about which production companies should be authorized to move products within the Kansas premises. Performing on these interdisciplinary teams involved expertise from different backgrounds to decide on the best outcome for the state of Kansas. Various approaches were thought of with this interdisciplinary team. Although this was a fast-paced environment, these individuals were able to communicate on an audience appropriate level. Within the duration of the four-day event, the petition support branch was able to perform in an efficient and effective manner.

Student Attainment of MPH Emphasis Area Competencies

My concentration is in Food Safety and Biosecurity in the Master of Public Health (MPH) program. The ILE expanded the food safety and biosecurity field and advanced me both academically and professionally. The emphasis area competencies that were accomplished in this project are listed in Table 5.2.

Table 5.2 Summary of MPH Emphasis Area Competencies

MPH Emphasis Area: Food Safety and Biosecurity		
Number and Competency		**Description**
1	Food Safety and Biosecurity	At the KDA I was presented the opportunity to implement HACCP plans and participate in the Emergency Preparedness Exercise. Throughout the development of the HACCP plan, I had to evaluate the plans and make solutions to prevent hazards from occurring in the food process. With the RAMPART exercise, I had to come up with solutions and strategies to control the spread of Foot and Mouth Disease (FMD) in the state of Kansas; I learned about disease control efforts in an animal health context, but the principles are relevant to human disease control efforts, too.
2	Threats to the food system	In the RAMPART exercise, I assessed the risk of FMD and practiced biosecurity measures to keep the animals disease free. Biological, chemical, and physical hazards were examined in food establishments during the implementation of HACCP plans.
3	Food safety laws and regulations	The HACCP plans are approved if they are in compliance with the Kansas Food Code. The Kansas Food Code is based on the United

		States Public Health Services (PHS) 2009 Model Food Code. The state level has authority over the entire states of Kansas and is organized under the FDA regulations.
4	Food safety policy and the global food system	The HACCP system is not only performed in the U.S., but in other countries as well. Following similar systems makes it easier to trade internationally for food safety and biosecurity purposes. From a global health perspective, when diseases are eradicated or reduced in number, it allows other countries to adopt related protocols to increase the health of the public.
5	Multidisciplinary leadership	The food industry has regulatory systems to improve the safety of the public. A better way to encourage food safety is to instruct the food establishment owners and employees on HACCP and Good Manufacturing Practices (GMPS).

Chapter 6 - Conclusion

The Integrated Learning Experience played an important part in my Master of Public Health (MPH) degree program. Without the intensive coursework from the MPH program, I would not have the ability to complete the projects for my field experience. For instance, I was certified in HACCP through the *FDSCI 690 Principles of HACCP and Hazard Analysis Risk-based Preventive Controls (HARPC)* course instructed by Dr. Elizabeth Boyle. This specific certification made me applicable for the internship opportunity I received from the Food Safety and Lodging program at the KDA. As far as the i-MOVES program at the UNIPD in Italy goes, the *DMP 816 Trade and Agricultural Health and DMP 888 Globalization, Cooperation, and the Food Trade* courses prepared me for this two-week international program. These courses, instructed by Dr. Justin Kastner, helped me understand the history of the international intergovernmental organizations. The *MPH 802 Environmental Health* course*,* instructed by Dr. Paige Adams, covered all of the bases in public health from the environmental contaminants to regulatory programs. After the completion of these courses, I was able to apply what I learned to the three-part field experience.

Within the duration of the MPH program, the MPH Director Dr. Ellyn Mulcahy, was able to connect me with the National Agriculture Biosecurity Center (NABC) at the KSU. I am currently working on the DHS, National Livestock Readiness Program project to ensure food system resiliency. Similar to the NABC job, the Assistant Dean and Director of Diversity Programs, Dr. Zelia Wiley, and the Senior Executive Administrator to the Dean/Director in the College of Agriculture, Susan Metzger connected me the KDA internship. The aforementioned individuals are responsible for the development of my professional and academic success, and without their guidance, expertise, and foresight this project and myriad of experiences would not have come into fruition.

The Integrative Learning Experience (ILE) played an important part of my entire Master of Public (MPH) academic career. This intensive program allowed me the opportunity to advance myself in the public health realm through education and on the job experience. At the University of Padova in Italy as well as the Kansas Department of Agriculture (KDA) I obtained competencies and applied knowledge all while developing products to demonstrate those outcomes. This experience gave me the opportunity to refine my skills as well and learn how the KDA operate in both food safety and in a foreign disease outbreak. After the completion of the

MPH program, my career goals include working with the Food and Drug Administration (FDA) or the Centers for Disease Control and Prevention (CDC). The completion of the ILE will make me more marketable in the public health industry and help me reach my future career goals. I am forever grateful. As an MPH student, this ILE has will serve as a building block of reference for my future endeavors upon graduation.

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Appendix I

ESTABLISHMENT NAME

ESTABLISHMENT ADDRESS
ESTABLISHMENT CITY, STATE, ZIP

HACCP PLAN

For Fermenting Tea

General SOP's

Cleaning and Sanitizing
Employee Practices
ROP Procedures
Training Program
HACCP Based SOP's

REVISION DATE
(Must be reviewed annually)

Plan Approval by KDA Date:_____

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KOMBUCHA TEA HACCP PLAN

OVERVIEW

Products: [Enter menu items] Kombucha Tea

Ingredients: [Enter ingredients] Raw SCOBY (symbiotic culture of bacteria and yeast), Tea Leaves, Sugar.

Intended Use: Served in the restaurant to diners.

PROCESS DESCRIPTION

ESTABLISHMENT NAME's processes of fermenting tea are limited to products which are fermented and intended for in-house restaurant use only. Products are maintained in sanitary conditions during the fermenting process. We purchase all of our kombucha SCOBY and ingredients from approved and licensed suppliers and inspect them during receiving for quality. The handling, prepping, fermenting, storing, and monitoring of fermented tea products are conducted by employees who have thorough understanding of this HACCP plan and are trained in the fermenting processes. The fermenting operations are conducted only in the designated areas of the kitchen. The designated area located [ENTER THE LOCATION DESCRIPTION] and is identified by [DESCRIBE SIGNS, LINES ON THE FLOOR, OR OTHER IDENTIFYING METHODS].

EQUIPMENT LIST (Include make and model and attach specification sheet)

Thermometers*: _____

Fermenting Container: _____

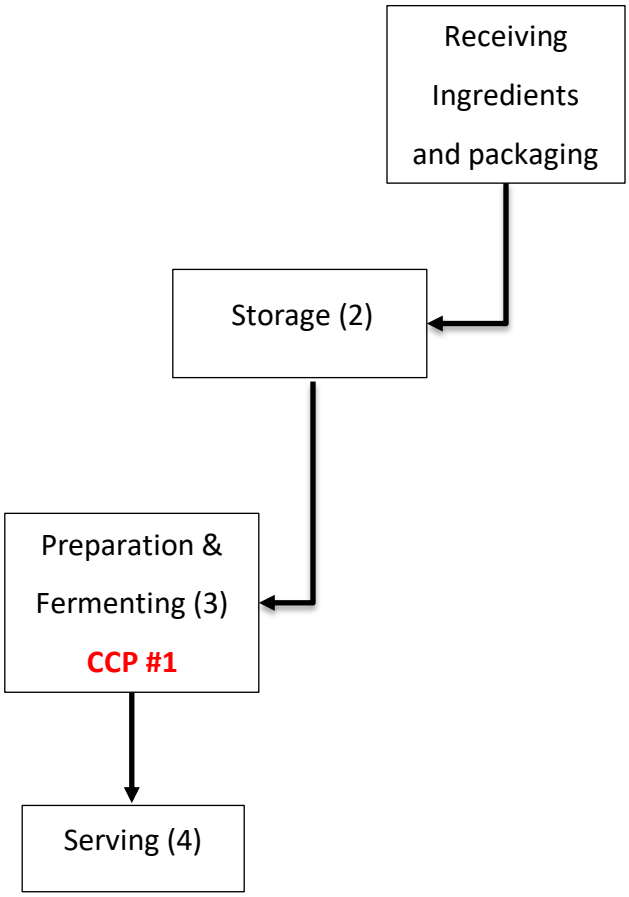
[Pick One] pH Meter or pH Strips: _____

*Includes all temperature measuring devices like thermometers, thermistors, and thermocouples.

HACCP TEAM MEMBERS

NAME	TITLE/ROLE
_____	_____
_____	_____

FLOW DIAGRAM



Verified by (Name)	Signature	Date

HAZARD ANALYSIS

PROCESS STEP					
Process Step	**Potential Hazards** (B) Biological, (C) Chemical, (P) Physical	**Hazard Significant ?**	**Justification of Decision**	**Preventative Measures**	**Is this step a CCP?**
Receiving Ingredients and Packaging (1)	(C) Deleterious Chemicals (P) Foreign Material.	No		Visual inspection on delivery to check for damage, visible contamination, etc	No
Storage (2)	(P) Foreign Material.	No		Store ingredients to prevent contamination from chemicals, etc. during storage	No
Preparation Fermenting (3)	(B) *Salmonella, E. coli, Listeria Monocytogenes, Norovirus, Shigellosis, Hepatitis A, etc*	Yes	Potential growth of pathogens due to cross-contaminations is likely if sanitary conditions are not maintained	Preparation area and fermentation containers will be kept in sanitary condition Bare hand contact will not be allowed with products during the preparation for fermenting	Yes **CCP 1**
Serving (4)	B) *Salmonella, E. coli, Listeria Monocytogenes, Norovirus, Shigellosis, Hepatitis A, etc*	Yes	Potential contamination of products if not handled properly during the serving process is likely	Ready-to-Eat Products will be handled as is required in the KS Food Code	No

HACCP FORM

CCP									
(1) Critical Control Point	(2) Hazard Description	(3) Critical Limits	Monitoring				(8) Corrective Action	(9) Verification Activities	(10) Record-keeping Procedures
			(4) What	(5) How	(6) Frequency	(7) Who			
Preparation and Fermenting **(CCP 1)**	Pathogens	**Sanitation:** Use SCOBY that show no signs of mold or unusual contamination. The preparation area and fermenting containers will be maintained cleaned and sanitized. Fermenting will be completed in a clean and covered container. **pH levels**: The pH level of the product after the fermenting process is completed will be < 4.2 to be rendered non-PHF/TCS	Area and Equipment Sanitation	Cleaning and Sanitizing Before and After Fermenting Preparation	Each Time Fermenting is Done	[Enter Designated food worker]	Clean equipment and sanitize thoroughly	Sanitation Log reviewed daily by [Title].	Sanitation Log
			pH Level	[Pick One] pH Meter or pH Strips with clear color difference between pH levels	Every Batch	[Enter Designated food worker]	Discard Product	pH Log reviewed daily by [Title].	pH Log pH Meter Calibration Log (if using meter instead of strips)

FERMENTING TEA PROCEDURES

Only foodservice employees trained in the fermenting process and safety hazardous, as well as have a thorough understanding of the HACCP plan shall conduct Fermenting operations.

1. **Receiving Dry Ingredients:** Inspect the condition of dry goods upon receipt. Verify products are in good condition.

2. **Storage:** Store non-perishable products in clean location that is separated from any potential sources of contamination.

3. **Preparation & Fermenting (CCP #1):** Clean and sanitize preparation area and equipment prior to beginning the fermenting process to ensure proper sanitation. Prepare products and ingredients necessary to the operation according to recipe/instruction. [Write in your process] Example Process: Infuse tea leaves into freshly boiled water and add sugar. Brew the tea for approximately 10 minutes and tea leaves are removed. One SCOBY from the previous batch is added to the room temperature tea. It is then covered with a clean porous cloth and incubated at room temperature for about 7-10 days. If fermentation is allowed to continue beyond 10 days, acidity may rise to levels potentially harmful to consumers. Bare hand contact will not be allowed with the SCOBY or other ingredients during preparation.
   - Critical Limit: Preparation area and equipment will be maintained in clean and sanitary conditions.

     The pH level of the fermented product will be < 4.2 once the fermenting process is complete. The pH meter must be calibrated before every use [if using a pH meter].
   - Monitoring: [EMPLOYEE TITLE] must visually check and sanitize the preparation area and equipment prior to beginning the fermenting process for every batch of fermented product. Observations and Sanitization will be recorded on the Sanitation Log.

     [EMPLOYEE TITLE] must manually check the pH level of the product after the fermentation process is complete using [pick one] a calibrated pH meter or pH strips with a clear color difference between pH levels. The pH meter will be calibrated prior to every use and the calibration recorded in the pH Meter Calibration Log. The pH level of every batch will be recorded on the pH Log.

   - Corrective Action: If the area or equipment is not sanitary and the fermentation process has not begun, [EMPLOYEE TITLE] will perform a second cleaning and sanitation of the area and equipment. If the area or equipment is found to not be sanitary and the product has already been exposed to this area or equipment, [EMPLOYEE TITLE] will discard the product. Record corrective actions on the Sanitation Log.

If the pH does not measure < 4.2, [EMPLOYEE TITLE] will discard the product and notify the manager of the issue. Identify cause of deviation in fermenting process that prevented the pH from reaching proper levels and prevent reoccurrence. Record corrective actions on the pH Log.

- Verification: [MANAGER TITLE] must verify that designated employees are monitoring and checking fermentation areas, equipment, and pH levels of fermented products by observing employees during the fermenting processes and reviewing Sanitation Log and pH Log on each day products are prepared and fermented.

4. **Serving:** Serve product per order. Bare hand contact will not be allowed with the products during the serving process. Products will be handled as required in the KS Food Code.

SANITATION STANDARD OPERATING PROCEDURES (SSOPs)

EMPLOYEE HYGIENE AND PRACTICES

1. Hands are to be thoroughly washed in a designated hand sink with soap and water, paying particular attention to the areas underneath the fingernails and between the fingers by scrubbing thoroughly and using a fingernail brush. Dry with single use towels and use the towel to turn the water back off. Handwashing is to be done at the following times:
    - after using the toilet, in the toilet room
    - after coughing, sneezing, using a tissue, using tobacco, eating, or drinking
    - after handling soiled equipment or utensils
    - immediately before engaging in food preparation activities
    - during food preparation as necessary to remove soil and prevent cross contamination
    - when switching between raw and ready-to-eat foods
    - other times as needed to maintain good sanitation
2. Fingernails must be kept trimmed, filed, free of nail polish, and maintained so the edges are cleanable and not rough.
3. No bare hand contact will be allowed with ready-to-eat products. Ready-to-eat products will be handled with gloves, utensils, or other means that prevent potential contamination from bare hands.
4. Eating and drinking is prohibited in areas where contamination of exposed food, clean equipment, utensils, unwrapped single service and single use articles could occur. A food employee may drink from a closed beverage container in a food prep area as long as it is handled to prevent contamination.
5. Effective hair restraints must be worn in processing areas.
6. Smoking and other uses of tobacco are prohibited.
7. Clean outer clothing must be worn each day and changed as often as necessary throughout the day (when moving from a raw food operation to a ready-to-eat food operation).
8. Frocks and aprons used by employees are to be hung in a designated area when not in use. They are not to be worn in the toilet area, eating areas and locker rooms.
9. Foot wear is to be kept clean.
10. No jewelry (except a smooth wedding band with no engravings or other plain ring) is allowed during handling of food.
11. Food Employees shall report to the Person in Charge when they have a symptom caused by illness, infection, or other source that is:
    - associated with diarrhea, vomiting or other acute gastrointestinal illness

- jaundice
- a boil, infected wound or other lesion containing pus that is open or draining unless: if on the hands or wrists, unless a finger cot or other impermeable cover protects the lesion and a single use glove is worn if on exposed portions of the arms, the lesion is protected by an impermeable cover.

The Person in Charge must impose the proper restrictions and exclusions according to Kansas Food Code requirements in Part 2-2.

CLEANING AND SANITIZING

Equipment Food Contact Surfaces

Properly cleaned and sanitized food contact surfaces are critical to ensuring a safe, sanitary operation. Use of approved cleaners and sanitizers will reduce levels of pathogenic organisms to prevent cross contamination of the product. Detergent cleaners suspend and help remove various food soils. Chemical sanitizers (chlorine, quaternary ammonia, etc.) reduce the numbers of pathogens and other microorganism to insignificant levels.

The cleanup process must be completed in accordance with following procedures:

- **Pre-cleaning:** Equipment and utensils shall be pre-flushed, presoaked, or scraped as necessary to eliminate excessive food debris
- **Washing**: Equipment and utensils shall be effectively washed in water measuring 110°F or higher to remove or completely loosen soils using manual or mechanical means. Only approved chemicals are to be used in this process.
- **Rinsing:** Washed utensils and equipment shall be rinsed in water measuring 110°F or higher to remove abrasives and to remove or dilute cleaning chemicals with water
- **Sanitizing:** After being washed and rinsed, equipment and utensils must be sanitized with an approved chemical by immersion, manual swabbing, brushing, or pressure spraying methods. Exposure time is important to ensure effectiveness of the chemical. *Ensure that an appropriate chemical test kit is available and routinely used to ensure that accurate concentrations of the sanitizing solutions are being used.*
- **Air Drying:** After sanitizing, equipment and utensils must be allowed to air dry in a protected location.

Frequency of Cleaning Equipment, Food Contact Surfaces and Utensils:

1. Before each use with a different type of raw animal food, including beef, fish, lamb, pork, or poultry;
2. Each time there is a change from working with raw foods to working with ready to eat foods;

3. Between uses with raw fruits or vegetables and with potentially hazardous foods;
4. At any time during the operation when contamination may have occurred;
5. If used with potentially hazardous foods, throughout the day at least once every four hours;
6. Utensils and equipment that are used to prepare food in a refrigerated room that maintains the utensils, equipment, and food under preparation at 41°F or less and are cleaned at least once every 24 hours;
7. Food contact surfaces used with non-potentially hazardous items are cleaned at least once every 24 hours;
8. Before using or storing a food thermometer;
9. For equipment used for storage of packaged or un-packaged food, including coolers, and the equipment is cleaned at a frequency necessary to eliminate soil residue;
10. For ice bins, at a frequency necessary to preclude accumulation of soil or mold;
11. Food contact surfaces of cooking equipment shall be cleaned at least once every 24 hrs;
12. Non-food-contact surfaces of equipment shall be cleaned at a frequency necessary to prevent accumulation of soil residues.

pH METER CALIBRATION PROCEDURES

[ADAPT TO YOUR PH METER CALIBRATION DIRECTIONS] It is important to calibrate a pH prior to every use to ensure accuracy when testing the pH. Calibration is completed using pH buffers, usually a 7.0 pH buffer and a 4.0 pH buffer. The buffer solutions should be stored at the same temperature as the product that will be tested for pH. Many pH meters require the probes be soaked 10 minutes to 2 hours the first time they are removed from the original packaging and initially calibrated. While calibrating the pH meter, only used distilled water for rinsing the pH probe. To begin calibrating, rinse the pH meter with distilled water and carefully blot dry. Immerse the pH electrode in the pH 7.0 buffer solution, then press and hold the calibration button for 5 seconds. The meter should read pH 7.0 when the calibration button is released. Rinse the pH electrode with distilled water and carefully blot dry. Afterwards, immerse the pH electrode in the pH 4.0 buffer, then press and hold the calibration button for 5 seconds. The meter should read pH 4.0 when the calibration button is released. Rinse the pH electrode with distilled water and carefully blot dry. The pH meter may now be used to check the pH of the tea containing the SCOBY.

HACCP TRAINING FOR EMPLOYEES

UNDERSTANDING THE POTENTIAL HAZARDS ASSOCIATED WITH FERMENTING TEA.

Fermenting tea is a common process in many cultures and is a method for giving the tea a unique flavor and texture. The basic preparation procedure for making fermented tea is safe as long as it is fermented under sanitary conditions. The combination of ingredients serves to inhibit the growth of undesirable microorganisms that could otherwise form during the fermentation process. The combination of ingredients also encourages beneficial microorganisms, such as Acetic Acid Bacteria, to grow in place of the harmful microorganisms.

The kombucha process resembles a vinegar fermentation. Like vinegar, kombucha is a yeast fermentation of sugar to alcohol followed by a bacterial fermentation of alcohol to acetic acid. The symbiotic culture forms a pellicle or biofilm on the surface of the brew often called a mushroom or SCOBY (symbiotic culture of bacteria and yeast). The yeasts in the mixture metabolize sucrose into glucose and fructose, then into ethanol and carbon dioxide Ethanol is then oxidized by the bacteria (in the presence of air) to acetaldehyde, then to acetic acid. Typically, the alcohol and acetic acid content of kombucha is less than 1%, respectively, but each can rise to 3% during a long ferment. The acetic acid bacteria also utilize glucose to produce gluconic acid to approximately 2%. Fructose is used to a lesser extent and some remains after the fermentation. Some glucose will remain unmetabolized, and together with the remaining fructose, provides sweetness.

Some operators will place containers of fermenting tea in areas that are not approved for food storage. Fermenting tea must not be stored in areas where contamination may occur. Such areas include toilet rooms, mechanical rooms, under unshielded sewer lines, stairwells, or outside the facility. Fermenting must always take place in a cleaned and sanitized location that is maintained to prevent any sort of contamination to the product.

It is safe to do the fermenting process at room temperature, but once the fermenting process is completed and the SCOBY is removed from the tea, it must be served. The major pathogens of concern during the fermenting process that need to be prevented from growing are Salmonella, Listeria Monocytogenes, E Coli, and other fecal-oral route pathogens.

CONCEPTS REQUIRED FOR A SAFE OPERATION

A thorough understanding of this HACCP plan, the use of the fermenting equipment, and the HACCP based standard operating procedures is necessary for the safe operation of the restaurant's fermenting processes. Areas to focus on include products that can be fermented; temperature control; prevention of cross contamination; and health and personal hygiene of food handlers.

Products that can be fermented

State of Kansas regulations limit the types of foods that can be fermented. [ESTABLISHMENT NAME]'s HACCP plan defines the foods that can be used in the fermenting process. **Only the specific products on the product list can be reduced oxygen packaged**. Any addition to the above list must first have the approval of [MANAGER TITLE] and Kansas Department of Agriculture. Changes must be noted in the HACCP PLAN.

Preventing Cross Contamination

Raw foods must be handled separately from cooked and ready to eat foods to avoid cross contamination. Utensils, equipment and work surfaces used for raw foods must be thoroughly cleaned and sanitized prior to using for cooked or ready-to-eat foods. In addition, ensure that ready-to-eat foods are stored so that blood or juices from raw products cannot drip or otherwise come into contact with them. Food handlers can also be a source of cross contamination through improper handwashing, or soiled clothing or aprons. The requirements of Kansas Food Code Parts 3-3 and 3-4 must be followed.

Employee Health and Hygiene

The health and personal hygiene of food handlers can also play a critical role in producing a safe fermented food. It is vital that employees working in this operation follow the Employee Hygiene and Practices guidelines.

Sanitation Log

Instructions: [EMPLOYEE TITLE] must record the date, time, sanitization of prep area and fermenting equipment, and inspection of Prep Area and Equipment prior to beginning the fermenting process. Record the cleaning, sanitizing, any corrective actions upon final inspection, and initials on this log daily. [MANAGER TITLE] must verify that foodservice workers have taken the required sanitation prevention steps by observing food workers during prep and sanitizing activities, and must review, initial, and date this log each day fermented products are produced. This log must be maintained for a minimum of 6 months after the last record.

Date	Time	Sanitization of Prep Area	Sanitization of Fermenting Equipment	Final Inspection of Prep Area & Equipment Cleanliness	Corrective Action	Initials	Verified By
		☐	☐	☐			
		☐	☐	☐			
		☐	☐	☐			
		☐	☐	☐			
		☐	☐	☐			
		☐	☐	☐			
		☐	☐	☐			
		☐	☐	☐			
		☐	☐	☐			
		☐	☐	☐			
		☐	☐	☐			
		☐	☐	☐			
		☐	☐	☐			
		☐	☐	☐			
		☐	☐	☐			

pH Log

Instructions: [EMPLOYEE TITLE] must manually check and record the pH of the fermenting brine after the fermentation process is complete for every batch of product being made. [MANAGER TITLE] must verify that foodservice workers have taken the required measurements by periodically observing food workers to ensure pH is being checked, and must review, initial, and date this log every day fermented products are produced. This log must be maintained for a minimum of 6 months after the last record.

Product	Date	Time	pH	Corrective Action	Initials	Verified By

pH Meter Calibration Log

Instructions: [EMPLOYEE TITLE] must record the calibration of the pH meter and corrective action taken each time the meter is calibrated. Calibration of the pH meter will be done using 7.0 and 4.0 buffers with distilled water for rinsing. [MANAGER TITLE] must verify that foodservice employees are using and checking pH meters properly by observing employee activities involving pH meters periodically during all hours of operation. The supervisor must review and initial the log any day a pH meter calibration is recorded. This log must be maintained for at least 6 months after the last record.

Date	Time	pH Meter #	pH 7.0 Buffer Used	pH 4.0 Buffer Used	Accurate (Yes/No)	Corrective Action	Initials	Verified By
			☐	☐				
			☐	☐				
			☐	☐				
			☐	☐				
			☐	☐				
			☐	☐				
			☐	☐				
			☐	☐				
			☐	☐				
			☐	☐				
			☐	☐				
			☐	☐				
			☐	☐				

Employee Training Log

Instructions: Record the name of each employee who is trained to perform work with products covered by the HACCP plan for fermenting tea. [MANAGER TITLE] will verify that the designated food worker has received the appropriate training. This log must be maintained for a minimum of 6 months after all of the employees listed are no longer assigned to these products.

Date	**Employee Name**	Concepts for Safe Operation/Processes	Equipment/ Facilities	Health/ Hygiene	**Employee Initials**	**Verified By**	**Designated Manager?**
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐

Appendix II

Name of Food Establishment

HACCP PLAN

for

Raw Meat Vacuum Packaging

General SOP's

Cleaning and Sanitizing
Employee Practices
ROP Procedures
Training Program
HACCP Based SOP's

(Plan will be reviewed at least annually)

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RAW MEAT VACUUM PACKAGING HACCP PLAN

OVERVIEW

Products: Raw meats (beef, pork, goat and lamb) and raw poultry (chicken, turkey, and duck)
NOTE: Seafood requires prior approval from the Kansas Department of Agriculture.

Ingredients: Cuts of raw beef: ground beef, ribeye, kc strip, filets pork: pork loin, ground pork, and poultry: chicken breast, legs, thighs, whole chicken with no added ingredients.

Intended Use: For retail sale in establishment.

Time/Shelf-Life: 14 Days under cold storage (≤41°F) while in vacuum packaging, 12 Months while frozen (hard).

PROCESS DESCRIPTION

The establishments, vacuum packaging processes are limited to raw meats and poultry which are packaged and intended for in-house restaurant use only for the purposes of extending the shelf-life and quality of the meats and poultry. We purchase all of our meats and poultry from approved and licensed suppliers and inspect them during receiving for proper temperature (41°F or below) and quality. The handling, prepping, vacuum packaging (which is a type of reduced oxygen packaging, or ROP), storing, and monitoring of products are conducted by employees who have thorough understanding of this HACCP plan and are trained in the vacuum packaging processes. The term ROP is used throughout this plan to refer to vacuum packed products. The vacuum packaging operations are conducted only in the designated areas of the kitchen. The designated area located in the meat processing area and is identified by signs indicating it is a restricted area to customers and where the processing equipment is located inside of the meat processing area.

EQUIPMENT LIST (Include make and model and attach specification sheet)

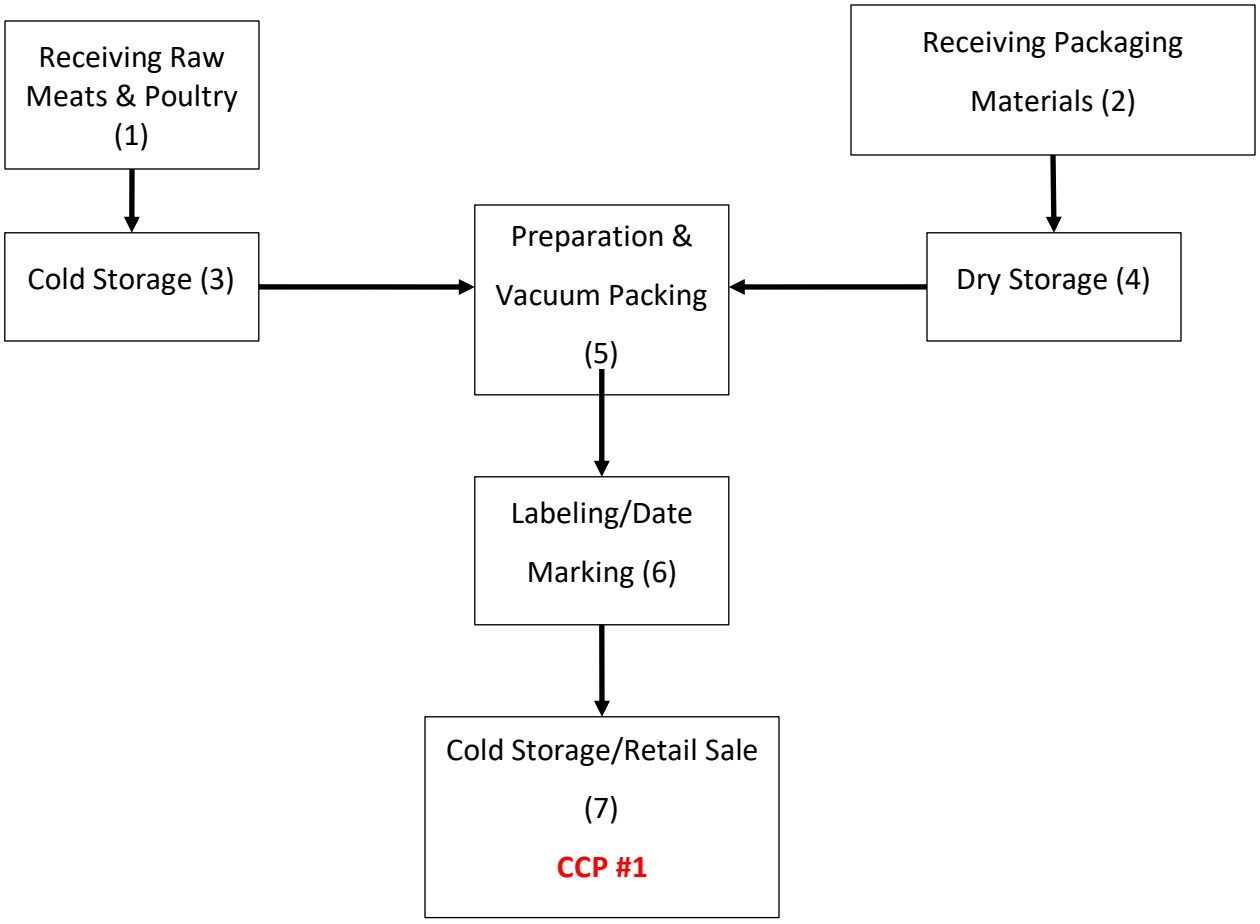
Walk-in-Freezers:	6 X 6 Walk-in, 6 X 10 Walk-in
Walk-in-Coolers:	6 X 6 Walk-in Copeland Model # RS47C@-IAV-959
Freezers:	2 True GDM-49F, 3 Excellence VB – 7L, 1 Frigidaire T8CLGPCS Copeland Model #RST80C1E-PFV-959, Leer Model 6X8X7RF
Refrigerators:	True GDM-49
Thermometers*:	True and Taylor thermometers in all freezers/coolers, Taylor waterproof digital thermometer
Vacuum Packager:	Promax Model 2712C

HACCP TEAM MEMBERS

NAME	TITLE/ROLE
	Owner Operator
	Manager

*Generic term for all temperature measuring devices

FLOW DIAGRAM



HAZARD ANALYSIS

PROCESS STEP					
Process Step	**Potential Hazards** (B) Biological, (C) Chemical, (P) Physical	**Hazard Significant?**	**Justification of Decision**	**Preventative Measures**	**Is this step a CCP?**
Receiving Raw Meats & Poultry (1)	(B) Salmonella, E. coli, Campylobacter jejuni, Clostridium botulinum, etc.	Yes	Fresh meat and poultry are known to contain pathogens	Meat and poultry will be purchased from approved suppliers and received at proper temps	No
Receiving Dry Ingredients & Bags (2)	(C) Deleterious Chemicals (P) Foreign Material.	No		Letters of guarantee ensuring bag ingredients are from approved sources and appropriate for product use. Visual inspection on delivery to check for damage, visible contamination, etc	No
Cold Storage of Raw Meats & Poultry (3)	(B) Salmonella, E. coli, Campylobacter jejuni, Clostridium botulinum, etc.	Yes	Potential growth of pathogens	All meat and poultry will be immediately stored in coolers and freezers	No
Storage of Dry Goods & Bags (4)	(C) Deleterious Chemicals (P) Foreign Material.	No		Visual inspection of packaging materials to ensure no foreign material is present Store packages to prevent contamination from chemicals, etc during storage	No
Preparation & Vacuum Packing (5)	(B) Salmonella, and E. coli, Campylobacter jejuni, Clostridium botulinum, etc.	No	Potential growth of pathogens due to cross-contaminations is likely	Time product will be in the temperature danger zone during preparation will be minimized and monitored (< 30 minutes) Different species and types will be kept separated during the packaging process. The machine will be cleaned and sanitized in between different species and types	No
Labeling/Date Marking (6)	B) Salmonella, and E. coli, Campylobacter jejuni, Clostridium botulinum, Listeria, etc.	Yes	Improperly labeled products will result in outdated or unsafe products	Each bag will be properly labeled with product name, date packaged, and 'Use-By' date	No
Cold Storage (7)	B) Salmonella, and E. coli, Campylobacter jejuni, Clostridium botulinum, Listeria, etc.	Yes	Potential growth of pathogens if proper temperatures and time are not maintained	ROP packaged and labeled products will be monitored for time and temperature control	Yes **CCP 1**

HACCP FORM

CCP									
(1) Critical Control Point	**(2) Hazard Description**	**(3) Critical Limits**	**Monitoring**				**(8) Corrective Action**	**(9) Verification Activities**	**(10) Record-keeping Procedures**
			(4) What	**(5) How**	**(6) Frequency**	**(7) Who**			
Cold Storage **(CCP 1)**	Pathogens	**Temperatures:** Product temperature at 41°F or less Frozen products must be kept frozen (hard). **Time Limit:** 14 days or less (Prep day is Day 1) under refrigeration 12 months while frozen (hard)	Cooler and product temperature Date on ROP bag label	Use probe Thermometer Visual check of the labels on the bag	Every batch 2x Daily Daily	Sales Clerk Sales Clerk	-Immediately discard product if temperature exceeds 41°F. Identify and eliminate cause of deviation. -Identify out of date products and discard them.	Refrigerator/ Freezer Log reviewed daily by Manager. Product Date/ Label Log will be reviewed daily by Manager.	Refrigerator/ Freezer Log; Thermometer Check Log; Product Date and Label Log

VACUUM PACKAGING PROCEDURES

Only foodservice employees trained in the use of the reduced oxygen packaging equipment and have a thorough understanding of the HACCP plan shall conduct ROP operations.

6. **Receiving Raw Meat/Poultry:** Inspect meat and poultry products upon receiving for temperature and quality and verify product temps are at or below 41°F.

7. **Receiving Packaging Materials:** Inspect the condition of dry goods and packaging materials upon receipt. Verify products are in good condition.

8. **Cold Storage:** Immediately store all perishable products in the designated coolers that maintain product temperatures at or below 41°F. All products will be stored to prevent cross-contamination between raw and ready-to-eat items, as well as between different types of raw products.

9. **Dry Storage:** Store non-perishable products in clean location that is separated from any potential sources of contamination.

10. **Preparation & Vacuum Packaging**: Prepare products, ingredients, and packaging materials necessary to the operation according to recipe/instruction. Prepare products for vacuum packaging and ensure products remain at room temperature no longer than 30 minutes during the preparation and packaging process.

    Place product in the packaging materials. Place bags in the vacuum machine ensuring that adequate space is provided around each package. Ensure that machine is working properly and settings are appropriate for the product being packaged. Start the machine and wait for the lid to open indicating that the process is complete. Remove packages from the machine. Visually check the seal to ensure that it is tight and that there are no food materials in the seal. Packages with a faulty seal must be re-packaged. Trim excess packaging as required. Clean and sanitize the machine to remove any spill between different animal species and types to prevent cross contamination.

11. **Labeling/Date Marking:** Properly label each package with name of product, date packaged, and Use-By date.

12. **Cold Storage (CCP #1):** Place ROP packages in coolers immediately after labeling.
    - Critical Limit: Products must be at or below 41°F and must be held in ROP packages for no more than 14 days. Frozen products will be maintained frozen (hard) for no more than 12 months and will be used within one day of thawing.

- Monitoring: Sales Clerk must visually check and record temperatures of coolers containing ROP products at least twice a day during business operating times and record temperatures on the Refrigeration/Freezer Log.

  Employee must also visually check labels of ROP products for use-by dates and record the check and any corrective action on Product Date/Label Log daily.

- Corrective Action: If ambient cooler temperatures exceed 38°F, Employee will check actual product temperatures and, if above 41°F, discard the product and notify the Manager on Duty that the cooler is not properly working. Record corrective actions on the Refrigerator/Freezer Log.

  Discard any product that exceeds the Use-By date and record the corrective action on the Product Date Marking / Label Log.

- Verification: Manager must verify that designated employees are monitoring and checking ROP product temperatures and use-by dates daily by reviewing Refrigeration/ Freezer logs and Product Date/Label Logs on daily basis.

EMPLOYEE HYGIENE AND PRACTICES

12. Hands are to be thoroughly washed in a designated hand sink with soap and water, paying particular attention to the areas underneath the fingernails and between the fingers by scrubbing thoroughly and using a fingernail brush. Dry with single use towels and use the towel to turn the water back off. Handwashing is to be done at the following times:
    - after using the toilet, in the toilet room
    - after coughing, sneezing, using a tissue, using tobacco, eating, or drinking
    - after handling soiled equipment or utensils
    - immediately before engaging in food preparation activities
    - during food preparation as necessary to remove soil and prevent cross contamination
    - when switching between raw and ready-to-eat foods
    - other times as needed to maintain good sanitation
13. Fingernails must be kept trimmed, filed, free of nail polish, and maintained so the edges are cleanable and not rough.
14. No bare hand contact will never be allowed with ready-to-eat products. Ready-to-eat products will be handled with gloves, utensils, or other means that prevent potential contamination from bare hands.
15. Eating and drinking is prohibited in areas where contamination of exposed food, clean equipment, utensils, unwrapped single service and single use articles could occur. A food employee may drink from a closed beverage container in a food prep area as long as it is handled to prevent contamination.
16. Effective hair restraints must be worn in processing areas.
17. Smoking and other uses of tobacco are prohibited.
18. Clean outer clothing must be worn each day and changed as often as necessary throughout the day (when moving from a raw food operation to a ready-to-eat food operation).
19. Frocks and aprons used by employees are to be hung in a designated area when not in use. They are not to be worn in the toilet area, eating areas and locker rooms.
20. Foot wear is to be kept clean.
21. No jewelry (except a smooth wedding band with no engravings or other plain ring) is allowed during handling of food.

22. Food Employees shall report to the Person in Charge when they have a symptom caused by illness, infection, or other source that is:
    - associated with diarrhea, vomiting or other acute gastrointestinal illness
    - jaundice
    - a boil, infected wound or other lesion containing pus that is open or draining unless: if on the hands or wrists, unless a finger cot or other impermeable cover protects the lesion and a single use glove is worn. If on exposed portions of the arms, the lesion is protected by an impermeable cover.

    The Person in Charge must impose the proper restrictions and exclusions according to Kansas Food Code requirements in Part 2-2.

CLEANING AND SANITIZING

Equipment Food Contact Surfaces

Properly cleaned and sanitized food contact surfaces are critical to ensuring a safe, sanitary operation. Use of approved cleaners and sanitizers will reduce levels of pathogenic organisms to prevent cross contamination of the product. Detergent cleaners suspend and help remove various food soils. Chemical sanitizers (chlorine, quaternary ammonia, etc.) reduce the numbers of pathogens and other microorganism to insignificant levels.

The cleanup process must be completed in accordance with following procedures:

- **Pre-cleaning:** Equipment and utensils shall be pre-flushed, presoaked, or scraped as necessary to eliminate excessive food debris
- **Washing**: Equipment and utensils shall be effectively washed in water measuring 110˚F or higher to remove or completely loosen soils using manual or mechanical means. Only approved chemicals are to be used in this process.
- **Rinsing:** Washed utensils and equipment shall be rinsed in water measuring 110˚F or higher to remove abrasives and to remove or dilute cleaning chemicals with water
- **Sanitizing:** After being washed and rinsed, equipment and utensils must be sanitized with an approved chemical by immersion, manual swabbing, brushing, or pressure spraying methods. Exposure time is important to ensure effectiveness of the chemical. *Ensure that an appropriate chemical test kit is available and routinely used to ensure that accurate concentrations of the sanitizing solutions are being used.*
- **Air Drying:** After sanitizing, equipment and utensils must be allowed to air dry in a protected location.

Frequency of Cleaning Equipment, Food Contact Surfaces and Utensils:

13. Before each use with a different type of raw animal food, including beef, fish, lamb, pork, or poultry;
14. Each time there is a change from working with raw foods to working with ready to eat foods;
15. Between uses with raw fruits or vegetables and with potentially hazardous foods;
16. At any time during the operation when contamination may have occurred;
17. If used with potentially hazardous foods, throughout the day at least once every four hours;
18. Utensils and equipment that are used to prepare food in a refrigerated room that maintains the utensils, equipment, and food under preparation at 41°F or less and are cleaned at least once every 24 hours;
19. Food contact surfaces used with non-potentially hazardous items are cleaned at least once every 24 hours;
20. Before using or storing a food thermometer;
21. For equipment used for storage of packaged or un-packaged food, including coolers, and the equipment is cleaned at a frequency necessary to eliminate soil residue;
22. For ice bins, at a frequency necessary to preclude accumulation of soil or mold;
23. Food contact surfaces of cooking equipment shall be cleaned at least once every 24 hrs;
24. Non-food-contact surfaces of equipment shall be cleaned at a frequency necessary to prevent accumulation of soil residues.

THERMOMETER ACCURACY CHECK PROCEDURES

Thermometers, which is a generic term for all temperature measuring devices used in the establishment, will be checked for accuracy using an ice and water slurry at least once monthly, at any time when the accuracy may be questionable, and when the thermometer has been dropped or otherwise become broken. The container will be packed with small pieces of ice and enough water added to fill the spaces so that there is an ice-water mixture from top to bottom in the container. When inserting the thermometer, make sure that it is clean, that it is immersed at least 10 centimeters to 15 centimeters (approximately 4 inches to 6 inches), and that the probe tip is at least 2 centimeters (approximately 1 inch) from the sides container and about 5 centimeters (approximately 2 inches) from the bottom of the container. Thermometers will be checked to ensure they are reading 32^{o}F under these conditions. Thermometer accuracy checks will be recorded in the thermometer check log. Any thermometer that is not accurate will be calibrated per the manufacturer's directions and the correction will be recorded in the thermometer check log.

HACCP TRAINING FOR EMPLOYEES

UNDERSTANDING THE POTENTIAL HAZARDS ASSOCIATED WITH REDUCED OXYGEN PACKAGING.

While the process of packaging foods using a reduced oxygen method extends the shelf life, it also can pose a serious public health threat. Generally, bacteria survive under conditions where there is oxygen present (aerobic conditions) or where oxygen is not present (anaerobic conditions). Some bacteria have the ability to adapt to either condition.

Under traditional packaging conditions (aerobic conditions), spoilage bacteria would normally thrive and the product would spoil before the more hazardous types of bacteria might become a problem. During the process of 'vacuum packaging' or 'reduced oxygen packaging', the air inside the package (which is approximately 21% oxygen) is eliminated, creating anaerobic conditions and thereby changing the types of bacteria that can survive in the package. Spoilage organisms are eliminated, but several types of pathogenic bacteria survive and actually thrive under these conditions.

The pathogen of greatest concern is ***Clostridium botulinum***. While botulism bacteria will normally be killed in a cooking step, spores of the bacteria may survive and could grow and produce toxin if the conditions are right. These conditions are similar to those that occur in a vacuum/reduced oxygen package. Because Clostridium botulinum strains found in seafood can produce toxin at refrigeration temperatures, seafood in reduced oxygen packaging may not be packaged without approval from the Kansas Department of Agriculture. Other pathogens of concern include ***Listeria monocytogenes****, Yersinia enterocolitica, Campylobacter jejuni*, and *Clostridium perfringens*.

CONCEPTS REQUIRED FOR A SAFE OPERATION

A thorough understanding of this HACCP plan, the use of the reduced oxygen packaging equipment, and the HACCP based standard operating procedures is necessary for the safe operation of the restaurant's vacuum packaged products. Areas to focus on include products that can be packaged; temperature control; prevention of cross contamination; and health and personal hygiene of food handlers.

Products that can be packaged by ROP

State of Kansas regulations limit the types of foods that can be vacuum packaged. The HACCP plan defines the foods that can be packaged using reduced oxygen packaging. **Only the specific products on the product list can be reduced oxygen packaged**. Any

addition to the above list must first have the approval of and the Kansas Department of Agriculture. Changes must be noted in the HACCP PLAN.

Temperature Control

Temperature control is a very important factor in keeping all potentially hazardous foods safe. But the extended shelf life and decreased oxygen concentration allows certain pathogens to multiply in reduced oxygen conditions. To reduce the potential for growth of these pathogens, products (packaged and unpackaged) must be stored at cooler temperatures of 41^{o}F or less. Employees must monitor the cooler temperatures at least twice daily during business hours to ensure that foods are not allowed to be out of the temperature requirements for extended periods of time.

Preventing Cross Contamination

Raw foods must be handled separately from cooked and ready to eat foods to avoid cross contamination. Utensils, equipment and work surfaces used for raw foods must be thoroughly cleaned and sanitized prior to using for cooked or ready-to-eat foods. In addition, ensure that ready-to-eat foods are stored so that blood or juices from raw products cannot drip or otherwise come into contact with them. Food handlers can also be a source of cross contamination through improper handwashing, or soiled clothing or aprons. The requirements of Kansas Food Code Parts 3-3 and 3-4 must be followed.

Employee Health and Hygiene

The health and personal hygiene of food handlers can also play a critical role in producing a safe ROP food. It is vital that employees working in this operation follow the Employee Hygiene and Practices guidelines.

Refrigeration / Freezer Log

Instructions: Employee must record the location or description of holding unit, date, time, air temperature, corrective action, and initials on this Log twice daily. Manager must verify that foodservice workers have taken the required temperatures by periodically observing food workers to ensure temperatures are taken, and must review, initial, and date this log daily. This log must be maintained for a minimum of 6 months after the last record.

Location/Cooler Description	Date	Time	Temp	Corrective Action Taken	Initials	Verified By

Product Date Marking Log/Label Log

Instructions: Employee must check the date and label of vacuum packaged products and ensure they do not exceed the use-by date. The employee must record daily date and time the product label is checked, any corrective action, and initial on this Log. Manager must verify that foodservice workers have checked ROP product dates and labels by checking products each shift, and must review, initial and date this log daily. This log must be maintained on file for a minimum of 6 months after the last item.

Location/Cooler Description	Date	Time	Past Use-By Date?	Corrective Action Taken	Initials	Verified By

Employee Training Log

Instructions: Record the name of each employee who is trained to perform work with products covered by the Vacuum Packaging Raw Meat HACCP plan. Manager will verify that the designated food worker has received the appropriate training. This log must be maintained for a minimum of 6 months after all of the employees listed are no longer assigned to these products.

Date	**Employee Name**	Concepts for Safe Operation/Processes	Equipment/ Facilities	Health/ Hygiene	**Employee Initials**	**Verified By**	**Designated Manager?**
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐
		☐	☐	☐			Yes ☐ No ☐

Thermometer Check Log

Instructions: Employee must record the accuracy check temperature and corrective action taken each time a thermometer is checked. Accuracy of thermometers (includes all temperature measuring devices) will be checked using an ice and water slurry. Manager must verify that foodservice employees are using and checking thermometers properly by observing employee activities involving thermometers periodically during all hours of operation. The supervisor must review and initial the log each day a thermometer check is made. This log must be maintained for a minimum of 6 months after the last record.

Date	Time	Thermometer ID #	Method Used (Ice Slurry)	Thermometer Reading	Accurate (Yes/No)	Corrective Action	Initials	Verified By