Food Microbiology Management

Application and Management of Food Microbiology Concepts

Development

To define detail, scope and purpose.

Development

This information can be used to develop food safety and quality programs that meet the requirements of modern Regulatory, Customer and Industry Standards:

- We take the time to explain the expectations and requirements of food safety and quality compliance as these relate to your food safety and quality programs.
- You may choose to use our Premium Resources to build, enhance or upgrade your food safety and quality program.
- We encourage you to share this webpage with any food compliance associates and peers you believe may benefit from our commitment to providing our users with user-friendly information and resources to achieve a superior Food Microbiology Management program.
- We welcome your suggestions for additions of general or specific content through the haccp.com Contact Page.

Key Definitions for Food Microbiology Management

- Bacteria: Bacteria are microscopic single-celled organisms, commonly spherical, spiral or rod shaped, that are present everywhere: in the air, the soil and on human skin. Many types of bacteria can cause diseases, but others can be very helpful to humans.
- Binary Fission: A method of asexual reproduction in which the parent cell divides into two equal, or nearly equal, parts, each of which develops to parental size and form.
- Biochemistry: Biochemistry is the study of the chemical processes in living organisms. It deals with the structure and function of cellular components such as proteins, carbohydrates and lipids.
- Cross Contamination: The transfer of microorganisms or other contaminants from one food, surface, person or piece of equipment to another.
- Food Microbiology: Food microbiology is the study of the micro-organisms which inhabit, create or contaminate food, including micro-organisms that cause food spoilage, food borne illness and beneficial bacteria such as probiotics.
- Mesophiles: Bacteria that grow best at moderate temperatures, typically between about 20°C (68°F) and 45°C (113°F). Most food poisoning bacteria are mesophiles.
- Microbiological Pathogens: Any microbiological entity including viruses, bacteria or other micro-organisms that can cause food borne illness in humans.
- Organoleptic: Relating to the senses, including the flavour, aroma, texture and appearance of a food.
- Psychrophiles: Cold-loving bacteria that grow best at about 15°C (59°F) and can grow at or below 0°C (32°F).
- Psychrotrophs: Bacteria that can grow at refrigeration temperatures even though their optimum growth temperature is higher.
- Spoilage Organism: A microorganism that grows in food and causes undesirable changes in flavour, aroma, texture or appearance without necessarily causing illness.
- Thermophiles: Heat-loving bacteria that grow best at about 50°C (122°F) to 80°C (176°F) and are important in processes such as canning and hot filling.

Food Microbiology Management Development

When considering the development, documentation and implementation of Food Microbiology Management within food safety and quality management systems, the following information should be considered to ensure effective outcomes:

About Food Microbiology Management

A minimum of a basic understanding of Food Microbiology Management is an elemental requirement for food industry personnel who participate in the development, implementation and review of HACCP plans and finished product testing among other food safety and quality management system elements. This ensures that relevant microbiological hazards are effectively controlled and do not impact upon the safety or quality of finished food products.

Bacteria in Food



Bacteria are found almost everywhere, and laboratory culture shows how they grow on a food source.

Bacteria are everywhere in our environment. Most are harmless and are used to make foods, such as yogurt. Others are spoilage organisms that sour and rot foods. A few bacteria become a threat to our health when they grow and reproduce; these are commonly known as microbiological pathogens. Sources of these bacteria include soil, water, air, dust, edible plants, plant products, animals, animal products, intestinal tracts of humans and animals, employees' hands and contaminated food utensils and equipment. A common misconception is that food is free of bacteria that cause food borne diseases when it reaches the establishment or after processing.

Human Bacteria

Another common misconception is that healthy employees do not harbour harmful bacteria. Healthy people commonly carry their own natural population of bacteria, and some of these can cause food borne illness. For example, Staphylococcus aureus is commonly carried on the skin and in the nose of healthy people. Sick employees are carriers of greater numbers of organisms that cause food borne illness, so effective personal hygiene standards and the exclusion of ill employees from food handling are essential controls.

Bacterial Growth



Microscopy helps microbiologists identify the organisms present in food and in the production environment.

Bacteria require nutrients. These are essentially foods to provide the basic elements for their growth. These nutrients include carbon, hydrogen, oxygen, nitrogen, phosphorus, sulphur, sodium, magnesium, iron and manganese. Before bacterial growth can occur, other essential requirements must be favourable, such as temperature and the level of oxygen of the bacterial growth environment.

Bacterial growth refers to the increase in the number of organisms. This process is accomplished by binary fission, whereby the bacterial cell splits to form two cells. Bacterial growth can be very rapid. It may occur at a frequency of every 20 minutes in optimum conditions, but not until conditions are just right for the type of bacteria involved. There are four phases bacteria go through within their life cycle. It is important to understand what takes place at each phase of the bacterial growth curve to be able to target effective control points for bacteria within a structured food safety and quality program.

Bacterial Lag Phase: Phase 1

When bacteria are introduced to food, there is usually an adjustment or lag period. During this time there is considerable biochemical activity but no increase in the number of cells. The lag phase can be from a few hours to days. When conditions are right for the type of bacteria involved, rapid growth commences.

Bacterial Log Phase: Phase 2

This is called the logarithmic or log phase because the bacteria double their number by cell division, some doubling every 20 minutes. This rapid growth stage is generally not appreciated until it is illustrated. The following theoretical example shows how bacteria can multiply under ideal conditions, starting with 216 cells and a doubling time of 20 minutes:

- 20 minutes: 432 cells;
- 40 minutes: 864 cells;
- 60 minutes (1 hour): 1,728 cells;
- 80 minutes: 3,456 cells;
- 100 minutes: 6,912 cells;
- 120 minutes (2 hours): 13,824 cells;
- 140 minutes: 27,648 cells;
- 160 minutes: 55,296 cells;
- 180 minutes (3 hours): 110,592 cells;
- 200 minutes: 221,184 cells;
- 220 minutes: 442,368 cells;
- 240 minutes (4 hours): 884,736 cells;
- 260 minutes: 1,769,472 cells.

This example demonstrates how a starting population of 216 bacteria with a 20-minute doubling time would grow to more than 1 million bacteria after 4 hours and 20 minutes. Growth is slower when conditions are not ideal.

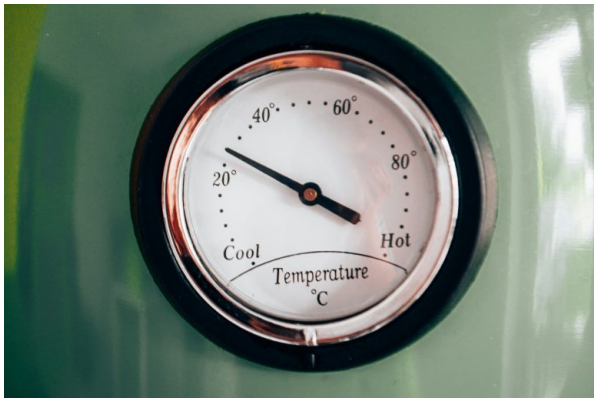
Stationary Phase: Phase 3

After a period of rapid growth, bacteria numbers reach the levelling-off stage as their nutrients are used up and waste accumulates. Foods contaminated by bacteria at this level and beyond are usually spoiled because of the bacterial activity and are generally unacceptable from a purely organoleptic viewpoint including flavour, aroma, texture and appearance.

Death Phase: Phase 4

At this point, the food is no longer suitable for supporting growth and the bacteria die. Toxins produced earlier, and heat-resistant spores, may remain in the food, so this phase does not make the food safe.

Effects of Temperature on Bacteria



Monitoring temperature is one of the most effective ways to limit bacterial growth in food.

Because of the unique survival capabilities of bacteria, it is important to limit their growth in food as much as possible. Bacteria have a maximum and minimum range of temperature for growth, which varies from one type to the next. Food poisoning bacteria grow in the temperature danger zone of 5°C (41°F) to 60°C (140°F), and growth is fastest at around 37°C (99°F). The following classification is provided as an example of bacterial profiling. The ranges are approximate and vary between sources and species:

- Psychrophiles: Grow best at around 15°C (59°F) and can grow at or below 0°C (32°F), with little growth above about 20°C (68°F). Psychrophiles can grow under refrigerated temperatures;
- Psychrotrophs: Able to grow at refrigeration temperatures and up to about 35°C (95°F). Psychrotrophs are important spoilage organisms in refrigerated foods;
- Mesophiles: Grow best between about 20°C (68°F) and 45°C (113°F), with an optimum near 37°C (99°F). Mesophiles are generally considered the most common bacteria affecting foods;
- Thermophiles: Grow best between about 50°C (122°F) and 80°C (176°F) and do not multiply at normal room temperature. Thermophiles are important to consider in processes such as canning and hot filling, as they are heat resistant.

Microbiological Cross Contamination



Separating raw foods from ready-to-eat foods helps prevent bacteria from spreading between them.

Pathogens can be transferred from one food to another, either by direct contact or by food handlers, contact surfaces or the air. Raw, unprocessed food should be effectively separated, either physically or by time, from ready-to-eat foods, with effective intermediate cleaning and where appropriate disinfection. Access to processing areas may need to be restricted or controlled. Where risks are particularly high, access to processing areas should be only via a changing facility. Personnel may need to be required to put on clean protective clothing including footwear and wash their hands before entering. Surfaces, utensils, equipment, fixtures and fittings should be thoroughly cleaned and where necessary disinfected after raw food, particularly meat and poultry, has been handled or processed.

If your food business supplies foodstuffs manufactured to a customer's specifications, it is important to consider any specific Food Microbiology Management Development requirements in relation to their items.

Common Foodborne Bacteria

The following bacteria are among those most often associated with foodborne illness. Typical sources are provided as examples only, and any food can become contaminated if controls fail:

- Salmonella: Commonly associated with poultry, eggs, meat and fresh produce contaminated through animals or the environment;
- Listeria monocytogenes: Can grow at refrigeration temperatures and is a particular concern in ready-to-eat foods such as deli meats, soft cheeses, smoked fish and pre-cut produce;
- Pathogenic Escherichia coli, including Shiga toxin-producing strains: Associated with undercooked beef, raw milk and fresh produce contaminated by animal faeces;
- Campylobacter: Commonly associated with raw poultry and raw milk;
- Staphylococcus aureus: Carried on human skin and in the nose, and able to produce heat-stable toxins in foods that are handled and then held at unsafe temperatures;
- Clostridium perfringens: Associated with large batches of cooked meat and gravies that are cooled slowly or held warm;
- Bacillus cereus: Associated with cooked rice, pasta and starchy foods held at unsafe temperatures, and capable of forming heat-resistant spores;
- Clostridium botulinum: Forms spores and produces a potent toxin in low-oxygen, low-acid foods that are improperly processed, such as some canned and vacuum-packed foods.

Controls for these bacteria are usually identified through the HACCP hazard analysis and include time and temperature control, effective cleaning, separation of raw and ready-to-eat foods, and personal hygiene.

Microbiological Testing and Criteria

Microbiological testing provides objective evidence of the hygiene and safety of ingredients, products and the processing environment. Testing is a verification tool and should not be relied on to make food safe, because it can only sample a small part of any batch.

Key considerations include:

- Pathogen and indicator tests: Pathogen tests look for specific disease-causing organisms, while indicator tests, such as total plate count or Enterobacteriaceae, show the general level of hygiene and process control;
- Sampling plans: The number of samples, their size and the frequency of testing should be based on risk and be documented;
- Microbiological criteria: Limits should be based on regulatory requirements, customer specifications and recognised guidance, with clear actions defined for results outside the limits;
- Laboratory selection: Where possible, use laboratories accredited for the test methods applied, and confirm that the methods are suitable for the food tested;
- Trend analysis: Results should be reviewed over time, because a gradual rise can show a loss of control before a limit is exceeded.

Results outside criteria should be managed through the corrective action and preventative action process and may require product to be placed on hold.

Regulatory and Industry References

The following official sources support the concepts on this page. Always check the current edition and the requirements that apply in your jurisdiction and to your customers.

- FSANZ Compendium of Microbiological Criteria for Food: Guidance on process hygiene criteria and microbiological guideline criteria for ready-to-eat foods, last updated August 2025;
- Codex Alimentarius guidelines: Includes Codex guidance on the establishment and application of microbiological criteria for foods;
- World Health Organization, Five keys to safer food manual: Includes the core message to keep food at safe temperatures.

Food Microbiology Management Development Key Points

- Food Microbiology Management programs must be developed to meet relevant Regulatory, Industry, and Customer standards and requirements;
- The senior management of your business facilitates a commitment to ensuring adequate resources for the development of your Food Microbiology Management program;
- Should you require additional resources for the development of Food Microbiology Management program elements, please discuss this with the relevant senior management representative;
- A properly developed Food Microbiology Management program will provide a strong framework for your business to maintain compliance with relevant Regulatory, Industry, and Customer standards and requirements;
- A poorly developed Food Microbiology Management program will not fully support your business and may contribute to significant non-compliance against Regulatory, Industry, and Customer standards and requirements.

Documentation

To establish the developed detail in a viewable format to facilitate information.

Documentation

Document: A document provides guidance and/or direction for performing work, making decisions, or rendering judgments which affect the safety or quality of the products or services that customers receive.

Documented policies, procedures, work instructions and schedules form the basis of any food safety and quality management system. The following documentation formats may be considered to ensure ongoing compliance with specified requirements for Food Microbiology Management:

- Food Microbiology Management policy;
- Food Microbiology Management development procedures;
- Food Microbiology Management implementation procedures and work instructions;

- Food Microbiology Management monitoring procedures;
- Food Microbiology Management corrective and preventative action procedures;
- Food Microbiology Management verification schedule;
- Food Microbiology Management verification procedures;
- Food Microbiology Management validation schedule;
- Food Microbiology Management validation procedures;
- Food Microbiology Management training procedures.

If your food business supplies foodstuffs manufactured to a customer's specifications, it is important to consider any specific Food Microbiology Management Documentation requirements in relation to their items.

You may wish to visit the Food Microbiology Management Templates section of haccp.com for examples of Food Microbiology Management documentation, record and resource formats commonly applied within food safety and quality systems.

Food Microbiology Management Documentation Key Points

- Food Microbiology Management programs must be documented to meet relevant Regulatory, Industry, and Customer standards and requirements;
- All documented Food Microbiology Management program elements must be controlled to ensure compliance;
- Key documented Food Microbiology Management program elements should be available to your business team at all times to ensure they can facilitate required tasks;
- A properly documented Food Microbiology Management program will provide a strong framework for your business to maintain compliance with relevant Regulatory, Industry, and Customer standards and requirements;
- A poorly documented Food Microbiology Management program will not fully support your business and may contribute to significant non-compliance against Regulatory, Industry, and Customer standards and requirements.

Implementation

To facilitate the application of the documentation.

Implementation

Implementation: Implementation is the application of documented food safety and quality system elements into the actual business operation.

The implementation of Food Microbiology Management within any food business requires genuine commitment from senior management, staff and visitors to ensure the nominated goals of implementation are achievable on an ongoing basis. It is a step which requires significant planning and consideration of general and specific food business circumstances to ensure the outcomes of Food Microbiology Management do not negatively impact upon the safety and quality of the food items dispatched from the business.

Implementation of Food Microbiology Management must include the clear definition of responsibilities and authorities for all levels of participation by senior management, staff and visitors to the site.

When implementing Food Microbiology Management within a food safety and quality system, you may wish to consider the following requirements prior to completion:

- Communication and display of the Food Microbiology Management policy;
- Completion of Verification and Validation of Food Microbiology Management development procedures;
- Availability of Food Microbiology Management implementation procedures and work instructions;
- Availability of Food Microbiology Management monitoring procedures and record templates where applicable;
- Availability of Food Microbiology Management corrective and preventative action procedures and record templates where applicable;
- Availability of the Food Microbiology Management verification schedule;

- Availability of Food Microbiology Management verification procedures;
- Availability of the Food Microbiology Management validation schedule;
- Availability of Food Microbiology Management validation procedures;
- Completion of Food Microbiology Management training procedures;
- Completion of product design and development requirements related to Food Microbiology Management;
- Completion of process design and development requirements related to Food Microbiology Management;
- Completion of training for team members who have responsibilities and involvement within Food Microbiology Management;
- Completion of competency approval for team members who have responsibilities and involvement within Food Microbiology Management.

If your food business supplies foodstuffs manufactured to a customer's specifications, it is important to consider any specific Food Microbiology Management Implementation requirements in relation to their items.

Food Microbiology Management Implementation Key Points

- Food Microbiology Management programs must be Implemented to meet relevant Regulatory, Industry, and Customer standards and requirements;
- Your Food Microbiology Management program must be fully implemented as per relevant documented Policies, Procedures, and Work Instructions;
- The implementation of Food Microbiology Management requires a commitment to the provision of resources by the senior management of your business;
- A properly implemented Food Microbiology Management program will provide a strong framework for your business to maintain compliance with relevant Regulatory, Industry, and Customer standards and requirements;
- A poorly implemented Food Microbiology Management program will not fully support your business and may contribute to significant non-compliance against Regulatory, Industry, and Customer standards and requirements.

Monitoring

To review, confirm and document evidence of the implementation against documented limits.

Monitoring

Monitoring: Monitoring is the act of reviewing and confirming measurable parameters of a defined process or product status.

Monitoring requirements within food industry sectors are generally identified against limits of acceptability defined within HACCP plans, implementation procedures and work instructions. Monitoring usually includes some element of record-keeping, which may be maintained manually or through digital systems. It is important to consider that advancements in technology have spawned many systems and processes which are self-monitored and/or self-adjusted when variances are identified. Regardless of the system used, the goal of any monitoring activity is to provide sufficient evidence that any limit of acceptability has been met.

Traditional Food Microbiology Management monitoring requirements include manual recording and the application of corrective actions when the results of monitoring are found to be outside acceptable limits. Corrective Actions should also generally be strongly linked to the monitoring process where applied to ensure full traceability of the applied actions.

Common monitoring activities and record formats may be applicable to Food Microbiology Management:

- HACCP monitoring records: Records designed to provide evidence that potential hazards are under control, which reduces the risk of microbiological food borne illness;
- Time and temperature records: Records of cooking, cooling, hot holding and cold storage temperatures and times;
- Microbiological test results: Results of ingredient, finished product and environmental testing, trended over time;

- Cleaning verification records: Swab, ATP or other hygiene monitoring results for food contact surfaces;
- Shelf life records: Records confirming that products are held and dated within their established shelf life.

If your food business supplies foodstuffs manufactured to a customer's specifications, it is important to consider any specific Food Microbiology Management Monitoring requirements in relation to their items.

You may wish to visit the Food Microbiology Management Templates section of haccp.com for examples of Food Microbiology Management documentation, record and resource formats commonly applied within food safety and quality systems.

Food Microbiology Management Monitoring Key Points

- Monitoring provides real-time confirmation and evidence that your risk-based FS&Q Controls are effectively implemented;
- Food Microbiology Management programs must be monitored to meet relevant Regulatory, Industry, and Customer standards and requirements;
- Monitoring of Food Microbiology Management must be facilitated as per relevant documented Policies, Procedures, and Work Instructions;
- Nominated monitoring records for Food Microbiology Management must be maintained as per relevant documented Policies, Procedures, and Work Instructions;
- A properly monitored Food Microbiology Management program will provide a strong framework for your business to maintain compliance with relevant Regulatory, Industry, and Customer standards and requirements;
- A poorly monitored Food Microbiology Management program will not fully support your business and may contribute to significant non-compliance against Regulatory, Industry, and Customer standards and requirements.

Corrective Action and Preventative Action

To apply "real time" interventions to documented monitoring limits.

Corrective Action and Preventative Action

Corrective Action: Corrective action is mandatory action to be taken when a deviation to the Quality System occurs, particularly in relation to a Critical Control Point.

Preventative Action: At any step in the process where a hazard has been identified, preventative action must be put into place to prevent recurrence.

Corrective Action and Preventative Action is implemented to ensure that any identified non-conformance issues are documented, investigated and rectified within appropriate timeframes. Corrective action is any action applied to regain control over a product, process, policy or procedure that has been identified as being non-conforming or outside nominated limits of acceptability. Preventative action is any action applied to prevent any identified non-conformance from reoccurring.

The outcomes of corrective and preventative actions should result in regained process control after effective application. Specified corrective actions are commonly linked to the HACCP Plans and to the food business certification process.

Below are Corrective Action and Preventative Action examples which may be associated with Food Microbiology Management related non-conformance:

- Review of the Food Microbiology Management policy;
- Review of Food Microbiology Management development procedures;
- Review of Food Microbiology Management implementation procedures and work instructions;
- Review of Food Microbiology Management monitoring procedures;
- Review of Food Microbiology Management corrective and preventative action procedures;
- Review of the Food Microbiology Management verification schedule;
- Review of Food Microbiology Management verification procedures;

- Review of the Food Microbiology Management validation schedule;
- Review of Food Microbiology Management validation procedures;
- Review of Food Microbiology Management training procedures;
- Re-training in Food Microbiology Management;
- Review of management review activities to include Food Microbiology Management as an agenda item;
- Initiation of “product hold” procedures where safety or quality may be compromised;
- Initiation of product recall or product recall procedures where investigations show that there is a substantial safety and/or quality risk to released product;
- Contacting stakeholders including customers regarding any confirmed or potential Food Microbiology Management concerns involving their product.

If your food business supplies foodstuffs manufactured to a customer’s specifications, it is important to consider any specific Food Microbiology Management Corrective Action requirements in relation to their items.

You may wish to visit the Corrective Action and Preventative Action section of haccp.com for examples of best practice applications for this food safety and quality system element.

Food Microbiology Management Corrective Action and Preventative Action Key Points

- The implementation of Corrective Action and Preventative Action provides confidence that your FS&Q Program is effectively implemented and that FS&Q criteria are being met;
- Where deviations or variations are observed, Corrective Action and Preventative Actions must be facilitated to meet relevant Regulatory, Industry, and Customer standards and requirements;
- Corrective Action and Preventative Action of Food Microbiology Management must be facilitated as per relevant documented Policies, Procedures, and Work Instructions;
- Records of Corrective Action and Preventative Action for Food Microbiology Management must be maintained per relevant documented Policies, Procedures, and Work Instructions;
- Proper application of Corrective Action and Preventative Action for your Food Microbiology Management program will provide a strong framework for your business to maintain compliance with relevant Regulatory, Industry, and Customer standards and requirements;
- Poor application of Corrective Action and Preventative Action for your Food Microbiology Management program will not fully support your business and may contribute to significant non-compliance against Regulatory, Industry, and Customer standards and requirements.

Verification

To review and confirm documented monitoring and corrective actions against documented parameters.

Verification

Verification: The act of reviewing, inspecting, testing, checking, auditing, or otherwise establishing and documenting whether items, processes, services, or documents conform to specified requirements.

Verification is the detailed review of all food safety and quality system elements to confirm that they are effectively developed, documented, implemented, monitored and reviewed. It is important that all food safety and quality system elements, including documented policies, procedures, training, HACCP plans and their operational applications are verified on an ongoing scheduled basis. The verification process commonly includes a defined schedule for which verification activities are required, how often they are conducted, who is responsible and detailed documented procedures for each nominated verification activity.

The general goal of an established verification process is to ensure any systemic non-conformance issues are identified and rectified within an appropriate timeframe. When non-conformance issues are identified through the verification process, Corrective Actions and Preventative Actions should be implemented to ensure they do not impact upon the effectiveness of the food safety and quality system.

The following examples of verification activities may be applicable to Food Microbiology Management:

- Review of the Food Microbiology Management policy;
- Review of Food Microbiology Management development procedures;
- Review of Food Microbiology Management implementation procedures and work instructions;
- Review of Food Microbiology Management monitoring procedures;
- Review of Food Microbiology Management monitoring records;
- Review of Food Microbiology Management corrective and preventative action procedures;
- Review of the Food Microbiology Management verification schedule;
- Review of Food Microbiology Management verification procedures;
- Review of the Food Microbiology Management validation schedule;
- Review of Food Microbiology Management validation procedures;
- Review of Food Microbiology Management training procedures;
- Review of Food Microbiology Management performance since the last review and historically;
- Analytical testing of product or process to ensure the effectiveness of Food Microbiology Management;
- Review of microbiological test results and trends against established criteria;
- Review of sampling plans and testing frequencies for ingredients, products and the processing environment;
- Review of laboratory accreditation and the suitability of test methods;
- Inclusion of Food Microbiology Management as an agenda item within the Management Review Process.

If your food business supplies foodstuffs manufactured to a customer's specifications, it is important to consider any specific Food Microbiology Management Verification requirements in relation to their items.

You may wish to visit the Verification Activities section of haccp.com for examples of best practice applications for this food safety and quality system element.

Food Microbiology Management Verification Key Points

- Your verification program provides evidence that your FS&Q Controls have worked;
- Food Microbiology Management programs must be verified to meet relevant Regulatory, Industry, and Customer standards and requirements;
- The verification of Food Microbiology Management must be facilitated as per relevant documented Policies, Procedures, and Work Instructions;
- Nominated verification records for Food Microbiology Management must be maintained as per relevant documented Policies, Procedures, and Work Instructions;
- A properly verified Food Microbiology Management program will provide a strong framework for your business to maintain compliance with relevant Regulatory, Industry, and Customer standards and requirements;
- A poorly verified Food Microbiology Management program will not fully support your business and may contribute to significant non-compliance against Regulatory, Industry, and Customer standards and requirements.

Validation

To confirm the documented monitoring or procedural limits.

Validation

Validation: The process of gathering evidence to provide a scientific basis for the documented act of demonstrating that a procedure, process and activity will consistently lead to the expected results. It often includes the qualification of systems and equipment.

Validation is the provision of evidence to support the limits of control or acceptability for food safety or quality parameters nominated within systemic elements. Limits of control or acceptability are commonly included within documented food safety and quality system elements such as procedures, HACCP plans and specifications.

Common sources of validation include regulatory and legislative standards, finished product specifications and

customer requirements, industry codes of practice and guidelines, verified and validated research, historical product and process control outcomes and analytical testing.

The general goal of an established validation process is to ensure any systemic non-conformance issues are identified and rectified within an appropriate timeframe. When non-conformance issues are identified through the validation process, Corrective Actions and Preventative Actions should be implemented to ensure they do not impact upon the effectiveness of the food safety and quality system.

Validation activities are commonly defined within the verification schedules and procedures of established food safety and quality management systems.

The following examples may be applicable to validation of the limits of control or acceptability for Food Microbiology Management:

- Confirmation of nominated food safety and food quality control limits for Food Microbiology Management. These limits may be applicable to regulatory, industry, customer or finished product specifications;
- Confirmation of analytical testing methods being used to confirm the effectiveness of Food Microbiology Management and ensure the accuracy of outcomes;
- Confirmation that microbiological criteria and limits reflect regulatory requirements, customer specifications and recognised guidance;
- Shelf life studies and, where appropriate, challenge testing to confirm that products remain safe and suitable for the stated shelf life;
- Confirmation that sampling plans and test methods are suitable for the hazards and foods concerned.

If your food business supplies foodstuffs manufactured to a customer's specifications, it is important to consider any specific Food Microbiology Management Validation requirements in relation to their items.

You may wish to visit the Validation Activities section of haccp.com for examples of best practice applications for this food safety and quality system element.

Food Microbiology Management Validation Key Points

- Your validation program provides evidence that your FS&Q Controls will work;
- Food Microbiology Management programs must be validated to meet relevant Regulatory, Industry, and Customer standards and requirements;
- The validation of Food Microbiology Management must be facilitated as per relevant documented Policies, Procedures, and Work Instructions;
- Nominated validation records and supporting documentation for Food Microbiology Management must be maintained as per relevant documented Policies, Procedures, and Work Instructions;
- A properly validated Food Microbiology Management program will provide a strong framework for your business to maintain compliance with relevant Regulatory, Industry, and Customer standards and requirements;
- A poorly validated Food Microbiology Management program will not fully support your business and may contribute to significant non-compliance against Regulatory, Industry, and Customer standards and requirements.

Training, Competency and Resources

Skills, knowledge and competency requirements to facilitate development, documentation, implementation, monitoring, corrective action, verification and validation of every Food Safety and Quality System Element.

Skills and Knowledge

Skills and Knowledge: Skills and knowledge are attributes of human interactions commonly linked to competency within any specified job-related task.

Training and competency requirements for Food Microbiology Management must be ongoing, including regularly scheduled reviews to ensure the effectiveness of training and competency outcomes.

Team members who have defined responsibilities regarding Food Microbiology Management should have

knowledge including:

- Basic Food Microbiology Management requirements;
- Positive outcomes of Food Microbiology Management;
- Negative outcomes of a lack of Food Microbiology Management;
- Current Food Microbiology Management procedures, methods and techniques;
- General operational, corporate and social awareness regarding Food Microbiology Management;
- Regulatory, industry and customer requirements regarding Food Microbiology Management.

Team members who have defined responsibilities regarding Food Microbiology Management should have skills including:

- Competency regarding basic Food Microbiology Management;
- Effective application of current Food Microbiology Management procedures, methods and techniques;
- The basic development, documentation and implementation of HACCP and Prerequisite Programs within the food industry sector.

Team members who have defined responsibilities regarding Food Microbiology Management should have access to resources including:

- Food Microbiology Management training;
- Food Microbiology Management associations and events;
- Regulatory standards, industry and customer information and updates regarding Food Microbiology Management;
- Incidents within the food industry sector regarding Food Microbiology Management;
- Commitment to Food Microbiology Management by senior management;
- Suitably qualified food industry professionals with verified experience in Food Microbiology Management;
- Effective communication systems including email, internet and phone through which Food Microbiology Management information can be sent and received within suitable timeframes.

If your food business supplies foodstuffs manufactured to a customer’s specifications, it is important to consider any specific Food Microbiology Management Training, Competency and Resources requirements in relation to their items.

You may wish to visit the Training, Competency and Resources section of haccp.com for examples of best practice applications for this food safety and quality system element.

Food Microbiology Management Training, Skills and Knowledge Key Points

- Your Training, Skills, and Knowledge program ensures all participating personnel, visitors and contractors have the required skills and knowledge to effectively facilitate the requirements of your FS&Q Program;
- Training, Skills, and Knowledge programs for Food Microbiology Management must be facilitated to meet relevant Regulatory, Industry, and Customer standards and requirements;
- Training, Skills, and Knowledge programs for Food Microbiology Management must be facilitated as per relevant documented Policies, Procedures, and Work Instructions;
- Training, Skills, and Knowledge records for Food Microbiology Management must be maintained as per relevant documented Policies, Procedures, and Work Instructions;
- Properly applied Training, Skills, and Knowledge programs for Food Microbiology Management will provide a strong framework for your business to maintain compliance with relevant Regulatory, Industry, and Customer standards and requirements;
- Poorly applied Training, Skills, and Knowledge programs for Food Microbiology Management will not fully support your business and may contribute to significant non-compliance against Regulatory, Industry, and Customer standards and requirements.

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