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REVIEW ARTICLE

Hygienic management in hotel facilities, food safety, and service quality

Gestión higiénica en instalaciones hoteleras, seguridad alimentaria y calidad del servicio

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Abstract This review emphasizes the importance of hygienic management in the hospitality and food service sectors, focusing on ensuring food safety and service quality. It highlights the need for rigorous hygiene practices, advanced safety systems, and staff training to meet consumer demands and prevent foodborne diseases. It discusses key practices, including sanitation in preparation, storage, and service, alongside strategies to address microbial, chemical, and physical hazards. Best practices for training food handlers, ensuring compliance with Good Manufacturing Practices, and Hazard Analysis and Critical Control Points are outlined. The review examines challenges like resistant microbial strains and emphasizes sustainable waste management in tourism-related food services. The analysis advocates for a holistic approach to hygienic management, prioritizing consumer safety, enhancing operational quality, and building trust in food systems. These insights provide valuable guidance for industry professionals and policymakers in the tourism and gastronomy fields.

Keywords hygienic management, food safety, service quality, staff training, tourism, foodborne diseases.

Resumen Este estudio destaca la importancia de la gestión higiénica en los sectores de la hostelería y restauración, centrándose en su papel para garantizar la seguridad alimentaria y calidad del servicio. Destaca la necesidad de prácticas de higiene rigurosas, sistemas de seguridad avanzados y formación del personal para satisfacer las demandas de los consumidores y prevenir las enfermedades transmitidas por alimentos. Se describen las mejores prácticas para la formación de los manipuladores de alimentos y para garantizar el cumplimiento de las Buenas Prácticas de Fabricación y el Análisis de Peligros y Puntos Críticos de Control. El estudio examina desafíos como las cepas microbianas resistentes y hace hincapié en la gestión sostenible de los residuos en los servicios de alimentación relacionados con el turismo. El análisis aboga por un enfoque holístico de la gestión higiénica, con el objetivo de priorizar la seguridad del consumidor, mejorar la calidad operativa y generar confianza en los sistemas alimentarios. Estos conocimientos proporcionan una valiosa orientación para los profesionales de la industria y responsables de las políticas en los sectores del turismo y gastronomía.

Palabras clave gestión higiénica, seguridad alimentaria, calidad del servicio, capacitación del personal, turismo, enfermedades transmitidas por alimentos.

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PUBLIS EDITORIAL

Introduction

The management of collective catering and hospitality establishments aims to meet quality standards that align with customer expectations and demands. This activity involves implementing new technologies, improving equipment and facilities, and ensuring food with high sensory, nutritional, dietary, and hygienic-sanitary quality. Food safety, understood as a sign of respect for consumers, is one of the most significant challenges of the 21st century (Silva & Luján, 2022).

Consumers demand products with specific quality attributes. Food safety, the set of measures ensuring food is safe for human consumption, is essential in tourism. This preventive approach requires incorporating procedures that ensure high-quality food while minimizing consumer health risks (Bhagwat, 2019).

The Food and Agriculture Organization (FAO) and the World Health Organization (WHO) have urged strengthening food safety systems. These organizations have documented an average of 200 monthly incidents related to food safety, including using melamine in feed or using unauthorized veterinary drugs in intensive aquaculture. These issues often arise from ignorance of food safety standards, fraudulent practices, or deficiencies in control systems, increasing the incidence of foodborne diseases (FBD) caused by microorganisms such as *Salmonella*, *Escherichia coli*, *Campylobacter* spp., and *Listeria* (Schlundt, 2014).

Foodborne diseases represent a significant threat to the global tourism industry. The lack of hygienic-sanitary control affects customer perception of product quality and damages establishments' image. Factors such as limited access to drinking water, improper disposal of solid waste, lack of training in good handling practices, and ineffective control systems are determinants in the proliferation of these diseases (Perkumienė et al., 2023).

Recent advances in microbiology have highlighted the need to continually update food control systems due to the emergence of more resistant microbial strains. Hygienic-sanitary control in food handling environments maintains the original quality of products and prevents health risks (Bergwerff & Debast, 2021).

In this context, this review analyzes the hygienic management of establishments to ensure food safety. The hotel and out-of-home food market growth presents opportunities but challenges, especially regarding food handler training (Rifat et al., 2022). Ensure their training and awareness of the importance of their work to protect the health of consumers and promote a safe, high-quality experience.

Management

The term management, derived from the Latin gestĭo, refers to the action and effect of administering, which involves governing, directing, organizing, and arranging. Managing, in turn, means carrying out activities aimed at achieving a goal, solving issues, or meeting needs. This concept is linked to the ability to centralize knowledge as a tool for continuous improvement, focusing on promoting systematic innovation and its application in achieving results (García-Cediel et al., 2023).

According to ISO 9000 standards, management is the set of coordinated activities to direct and control an organization. This approach emphasizes the importance of planning and executing processes efficiently to ensure the achievement of organizational objectives (Andrés-Jiménez et al., 2020).

Management is also understood as a set of efforts to develop processes or achieve specific outcomes (Calle-Álvarez et al., 2020). In this sense, it includes activities of leadership and governance that enable the transformation of reality and ensure the effective functioning of systems. Additionally, the term can be understood as an integrative function within organizations, which coordinates resources and efforts to achieve common goals.

Currently, the concept of management is widely used in various contexts, with expressions such as project management, production management, knowledge management, personnel management, maintenance management, and environmental management. These applications reflect the term's versatility and relevance in multiple disciplines and sectors (Blak et al., 2023).

Hygienic management

Proper hygienic management focuses on achieving and maintaining a high level of decontamination in the food provided to customers to prevent potential health risks. Appropriate hygiene practices in food preparation are essential to ensure that the final product or service meets consumer expectations and requirements. In addition, a comprehensive pest control program must be developed, effective cleaning and disinfection plans must be implemented, reliable suppliers must be selected, and a thorough examination of raw materials must be carried out. It is essential to control temperatures during key processing stages, establish an appropriate maintenance plan for equipment and facilities, and ensure product traceability to guarantee its safety throughout the production chain (Oliveira et al., 2021).

Food safety

Food safety is a fundamental right of every person, involving the guarantee of permanent access to adequate quantity and quality food to maintain a healthy life. This food safety is achieved by offering safe food that does not pose health risks to consumers. It is an unavoidable social priority, ensuring it is a strategic goal for the responsible administrative entities. Failures in this area are often scrutinized, reflecting their importance in collective well-being (Li & Song, 2022).

Food safety is multidisciplinary, requiring contributions from epidemiology, hygiene, microbiology, food technology, economics, and administrative law (Cudjoe et al., 2022). Additionally, management tools dedicated to organizing and optimizing human and material resources dedicated to this purpose are essential, both in public administration and in food companies, integrating them as a core component of overall management.

The Food and Agriculture Organization of the United Nations (FAO) defines food safety in terms of four fundamental conditions: adequate food availability and supply; stability in its supply without fluctuations or seasonal shortages; people's ability to access it; and the guarantee of quality and safety in food products (Kakaei et al., 2022).

Sanitary crises related to food have highlighted the complexity of the production process and the need to address food safety comprehensively, covering the entire production chain, from primary production to final consumption. This global approach aims to protect the population's health and ensure confidence in food systems (Vaseghi & Esfandiari, 2023).

Correct hygiene practices applied to the food preparation process

Correct hygiene practices in the food preparation process consist of control measures designed to prevent, eliminate, or reduce to acceptable levels the microbiological, chemical, or physical hazards that could compromise consumers' health. These practices are structured into three main categories: those related to "knowing how to be", which refer to appropriate behavior during operations; those linked to "knowing how to be", which encompass attitudes and values towards hygiene; and those related to "knowing how to do", focused on applying specific hygiene techniques in each of the operations involved in the preparation processes. These integrated approaches ensure that food safety standards are maintained throughout all stages of production (Kowalska & Manning, 2022).

Knowing how to conduct oneself

The spatial distribution of work in the kitchen is essential for achieving proper organization, avoiding disorder, and optimizing the management of the food preparation process. To achieve these actions, assigning specific areas for culinary operations that share common characteristics is important, ensuring that each activity is carried out in the appropriate zone. For example, areas designated for handling fresh meat and fish should be separated from those where cooked or prepared products are handled and pastry areas to avoid cross-contamination between raw and processed foods (Nerín et al., 2016).

It is essential to ensure two key hygiene principles: first, that food is kept under the most appropriate environmental temperature conditions to prevent microorganism growth, and second, that the continuous flow and separation between clean and dirty zones and circuits are maintained to avoid cross-contamination by microbiological hazards (Ng et al., 2022). These approaches ensure food safety and quality at every stage of the process.

Knowing how to behave

Personal hygiene in food handling refers to a set of measures designed to prevent microbiological and, in some cases, physical contamination of food by the employees themselves (Lee & Seo, 2020). Hygiene guidelines, including personal cleanliness, appropriate clothing, and good personal habits, must be followed. Respecting these guidelines is essential to ensure food safety and prevent diseases and contagion among workers.

Food handlers must receive training in hygienic food handling, as this training is one of the most effective ways to ensure product safety. Proper staff training is key to the smooth operation of the kitchen and restaurant. The knowledge and skills of the staff are essential for food safety, food quality, and success in catering (Jevšnik & Raspor, 2022).

It is recommended that a medical certificate be required before employees begin their work, as it can serve as an important health filter. Additionally, conducting regular medical check-ups and analytical tests helps prevent potential risks. This aspect must be revised to ensure food safety.

Food handlers must wear protective clothing, hats, and appropriate footwear and practice constant handwashing, especially before touching food, using the bathroom, or handling potentially contaminated objects such as boxes or trash bins. They should also avoid behaviors that could

contaminate food, such as smoking, spitting, chewing or eating, or sneezing and coughing over uncovered food. Furthermore, personal items such as jewelry, watches, or pins are prohibited in food handling areas, as they may threaten food safety.

The clothing worn by food handlers must be specific to this type of work, as everyday clothing may contain dust, animal hair, or fibers that could contaminate food. The staff must have enough work clothing to change daily. Uniformity is one of the first disciplined guidelines that workers must follow before entering the kitchen, marking the beginning of other hygiene rules.

Hair is another aspect of personal hygiene, as it can spread bacteria such as staphylococcus. Therefore, it must be kept tied up and covered with a cap or scarf to prevent hair or dirt from falling into food. All workers in contact with food must wear appropriate head coverings made of white fabric, subject to the same cleaning and disinfection regimen as the other work clothing.

Regarding footwear, shoes with jute soles or similar materials are prohibited. Footwear must be made of leather, rubber, or another approved material and perfectly clean before starting the workday. It is also necessary to avoid using street shoes in work areas. When entering the restroom, disposable shoe covers must be worn and removed upon leaving the area, as current regulations stipulate.

Knowing how to perform

Applying specific hygienic practices is fundamental at each stage of the food production process (Montes et al., 2005). In the receiving operation, verifying that raw materials arrive in suitable conditions is essential by checking aspects such as color, odor, texture, packaging, labeling, and arrival temperature (Cruz, 2006). Additionally, suppliers should not enter the kitchen and should be limited to the reception area. If solid waste is regularly removed and raw materials are brought in, these activities should be performed at different times. Received products should be placed on the floor rather than on designated counters, carts, or tables, using appropriate containers for each product type. If reusable plastic containers containing food are dirty, they must be emptied, and the raw materials should be transferred to clean containers before being stored (Montes et al., 2005).

Storage operations should occur in an area as close as possible to the receiving point. It is essential to maintain temperature control, cleanliness, ventilation, and stock rotation (Montes et al., 2005). Additionally, separate areas should be provided for each product type, such as poultry, meats, fish, dairy, fruits, and vegetables (Cabellos et al., 2000). Containers for non-edible raw materials and waste should be airtight, made of metal or impermeable material, and easy to clean and dispose of (OPS/OMS, 2003).

In food preparation operations, staff begin handling the products continuously, so compliance with all hygienic standards related to personnel is required (Cabellos et al., 2000). Staff must wash their hands before handling food, and equipment, utensils, and surfaces that will come into contact with food must be thoroughly cleaned (Cruz, 2006).

Defrosting should not be done at ambient temperatures above 8 °C or by immersion in hot water (Montes et al., 2005). Defrosting should be carried out in refrigeration chambers or ante-chambers, preventing food from coming into contact with the exuded liquid (Cabellos et al., 2000). The defrosting time depends on the size of the item being defrosted. Raw animal-based raw materials that will be cooked should be kept at a temperature lower than 7 °C during defrosting, while semi-processed foods that will not be cooked should reach 4 °C (Montes et al., 2005; Cruz, 2006). It is important not to refreeze food once thawed and to avoid mixing defrosting food with other products, utensils, or work surfaces (Cruz, 2006).

Finally, cleaning, selecting, and classifying food includes disinfecting fruits, vegetables, and eggs. Fresh vegetables must be washed to remove dirt, pesticide residues, fertilizers, insects, and microorganisms. Fruits and raw vegetables, such as tomatoes and strawberries, must be washed and disinfected at the beneficiation facility.

Other practices recommended by Montes et al. (2005) include properly handling foods that must be kept at controlled temperatures. These foods should be extracted in portions, avoiding leaving them outside the appropriate temperature for too long before processing. In addition, it is essential to have all the necessary utensils ready to carry out the corresponding culinary practices before removing food from storage or maintenance areas. Packaging materials should be discarded before placing food on work tables to avoid contact with work surfaces. Utensils should remain submerged in a 5% citric acid solution or be washed and disinfected after each use. Also, pastry bags and tips should be for single use or, if not, be washed and disinfected with boiling water.

In cold maintenance operations, raw materials must be

fully protected with non-absorbent materials authorized for food use before being introduced into refrigeration facilities after being decontaminated. Prepared meals should be kept cold for a recommended maximum period of 3 to 6 days, depending on the type of meal. Additionally, both prepared and semi-prepared foods and raw materials (once their original packaging is opened) must follow the rotation principle and adhere to maximum shelf life dates. Hot foods should only be introduced into cold storage facilities if they have been previously cooled in specific facilities designed for this purpose (Montes et al., 2005).

For cooking and hot food preparation operations, the recommended cooking temperature should ensure that food reaches a temperature of 74 ºC in the center or a combination of time and temperature that ensures food safety (Montes et al., 2005; Cruz, 2006). According to Montes et al. (2005), pieces or portions of food to be cooked should be of similar size, which allows them to reach a homogeneous temperature inside. The thickness should not exceed 3 cm for grilled meats to prevent them from burning on the outside while not reaching the necessary internal temperature. It is also important to periodically renew the oil used in frying, as it undergoes decomposition, making it unsuitable for human consumption due to the formation of toxic compounds.

The reheating operation of cooked food requires that food not consumed immediately be stored properly before use or consumption. According to Cruz (2006), food should be kept in cold (<10 ºC) or hot (>65 ºC) areas, since the temperature range between 10 and 65 ºC promotes microbial growth. Additionally, the time elapsed from preparation to consumption should be as short as possible, and food should not be reheated more than once to avoid contamination risks.

Regarding food cooling operations, the main characteristic is that it should be done as quickly as possible (Cruz, 2006). The use of temperature reducers is recommended to speed up the process. If these are unavailable, it is suggested to cool the container with food in a cold water bath before placing it in the chamber (Cabellos et al., 2000). When using temperature reducers, Montes et al. (2005) recommend not using closed containers, cooling only food of similar thickness in the same batch, avoiding the introduction of thick and bulky foods, and cleaning and disinfecting the probe of the temperature reducer after each use.

In the service operation, particular attention must be paid to staff handling and hygiene (Cabellos et al., 2000). In a buffet-style service, it is essential to control the temperature of food on display tables, both hot and cold, recording the temperature every 2 or 3 hours. The temperature should be maintained between 0 and 3 ºC for cold food, while for hot food, it should be at or above 65 ºC to ensure safety (Cruz, 2006). Appropriate, covered trays should be used, being small at the beginning and end of service and large or medium during peak customer flow (Cruz, 2006).

Regarding risks and hazards in the food production process, the primary objective of a food establishment is to ensure the safety of products during their production, handling, processing, packaging, transport, and commercialization. It is essential to identify potential risks and hazards, detect critical points in the process where food may be affected, and take preventive measures to avoid incidents (ANMAT, 2008). According to the *Codex Alimentarius* (2001), "risk" refers to the likelihood of an adverse health effect occurring due to the presence of hazards in food, while "hazard" refers to the presence of physical, chemical, or biological agents that could harm the health of those consuming the product.

According to Cruz (2006) and Delagoutte (2008), food hazards can be classified into biological, chemical, and physical. Biological hazards include viruses, bacteria, yeasts, and molds. Viruses are the smallest and simplest life forms; they do not multiply in food but can survive. They withstand extreme temperatures such as freezing and, in some cases, temperatures close to 80 ºC for short periods. On the other hand, bacteria are highly relevant in food, as some produce toxins that can cause illness when ingested.

Additionally, some bacteria can form spores under unfavorable conditions, allowing them to resist extreme temperatures, chemicals, and other adverse conditions. Although some yeasts are beneficial in producing bread, wine, and beer, they can alter food, causing undesirable changes in taste and smell, especially in acidic foods. Molds can also grow on food, especially in acidic foods, and produce harmful toxins known as mycotoxins, which are detrimental to health.

Chemical hazards include residues from cleaning and disinfection products, pesticides, allergens, heavy metals, components of plastic packaging, and residues from veterinary drugs and chemical additives. To prevent its presence, food surfaces must be adequately cleaned after each cleaning and disinfection operation, using appropriate products in the recommended concentrations. Additionally, care should be taken when selecting materials

in contact with food and following good manufacturing practices.

Physical hazards include fragments of glass, metal, stones, wood, plastic, hair, or parts of insects or rodents that may break off from machines or fall during food harvesting or processing. Although they generally do not pose a significant health risk, these items can cause discomfort, damage the company's reputation, and result in economic losses due to customer complaints.

Risk analysis in food production should include a health assessment of all aspects of the process, such as ingredients that may be hazardous due to toxic substances or microorganisms, possible sources of contamination, and the likelihood of microorganisms surviving or multiplying. The possibility of increased chemical contaminants in food should also be considered (Caballeros et al., 2000). This analysis evaluates contamination possibilities, such as raw foods (meat, eggs, rice, and grains). These food handlers may carry microorganisms, direct or indirect contact of raw foods with ready-to-eat foods, insufficient cleaning of surfaces, and the use of unauthorized chemicals. The conditions that favor microbial survival and growth should also be assessed, such as insufficient cooking, inadequate acidification or maturation processes, and improper refrigeration. Additionally, microbial growth in foods stored at room temperature or with prolonged times between preparation and consumption should be considered.

The identification of potential hazards should consider the nature of the product, the process applied to it at the establishment (such as cooking, cooling, or reheating), and the subsequent use of the product, depending on the target population.

Basic operations in the food preparation process involve a series of resources and activities required to transform foods from their receipt as raw materials to their service as meals (Montes et al., 2005). The first step in this process is receiving, which involves activities related to entering raw materials into the establishment. Proper receiving and selecting food ensures that products arrive in good condition for the consumer (Gimferrer, 2008). At this stage, it is necessary to ensure that food meets quality and regulatory requirements by monitoring fragile products and maintaining records. Additionally, characteristics such as appearance, smell, color, and hygienic conditions should be evaluated, and the expiration date and temperature of the products should be verified to ensure safety (OMT, 1999; Gimferrer, 2008).

Storage is another critical stage involving depositing and maintaining raw materials until their use to preserve quality. This process should reduce or stop microbial development by implementing "barriers" to prevent its proliferation (Delagoutte, 2008). Depending on the temperature, storage may be at room temperature or in refrigerated conditions, such as refrigeration or freezing, depending on the type of food and its classification according to its hazard level (Montes et al., 2005). It is essential that materials in contact with food are suitable to prevent deterioration and the migration of substances and that strict temperature control is maintained to prevent hygiene risks (Chavarrias, 2007; Gimferrer, 2008).

Preparing cold foods, which excludes cooking, requires special attention, particularly for products containing eggs, such as mayonnaise, where hygiene standards must be strictly followed to prevent microbiological risks (Cabellos et al., 2000; Montes et al., 2005). As for cold maintenance, semi-prepared or finished foods must be kept below 5 °C until consumption or regeneration to prevent microbial growth (Cabellos et al., 2000). On the other hand, cooking must ensure appropriate temperatures to eliminate pathogenic microorganisms without compromising the organoleptic characteristics of the food (Gimferrer, 2007). For proper cooking of meats, precise time and temperature intervals must be followed (ANMAT/INAL, 2009). In the case of frying, the oil must be renewed appropriately to prevent the formation of toxic substances (Cabellos et al., 2000).

Hot maintenance, which refers to controlling the temperature of cooked foods until service, must be performed carefully to ensure safety. This process is done using hot tables, cabinets, or hot baths (Montes et al., 2005), and the temperature of the food should be regularly monitored with probe thermometers (Cabellos et al., 2000). Cooling of foods must be done rapidly, reaching a temperature below 10 °C within two hours to prevent bacterial growth (Cabellos et al., 2000).

The presentation of food for immediate consumption involves presenting it in a way that it is ready to be served to the customer, whether in restaurants, buffets, or for home delivery, with a particular focus on maintaining the hygienic conditions of equipment and surfaces in contact with food (Parilli, 2005; OPS/WHO, 2005). Good Manufacturing Practices (GMP) are essential at all these stages, as they ensure the quality and safety of food through

standardized procedures in hygiene, pest control, and staff training (Sánchez et al., 2004; Cruz, 2006). Along with Hazard Analysis and Critical Control Points (HACCP) procedures, GMP are important for producing safe and healthy food (Feldman, 2007).

Foods have characteristics that can favor microbial growth, such as the presence of nutrients, moisture, pH, and oxygen. Microorganisms need certain nutrients for their development, usually in most foods. They also require water in varying amounts, with moisture being a key factor in their growth. pH also plays a significant role, as microorganisms can only grow in specific pH ranges. Additionally, some microorganisms require oxygen for growth, while others need it in its absence, and some can grow under either condition (Cabellos et al., 2000). Although contaminants can be found in many foods, not all favor their multiplication or cause human disease (OPS/WHO, 2003). Foods that encourage the reproduction of these agents are nutrient-rich, such as milk, meat, eggs, and their derivatives, as well as those with sufficient moisture, such as cheeses, creams, and meats. On the contrary, dry foods like dried fruits and cereals offer fewer opportunities for microorganisms to survive.

In addition to nutrients and moisture, microorganisms require an appropriate temperature for reproduction, generally between 5 and 60 °C. Temperatures above 25-30 °C favor rapid multiplication, increasing food contamination. The most commonly implicated foods in contamination outbreaks include mammalian meats, poultry, and meat products, which account for more than 50% of cases, along with other animal-derived foods like fish, shellfish, eggs, milk, and dairy products, which account for approximately 90% of outbreaks (Tejedor, 1999).

Various practices in collective catering can favor contamination and microbial growth (Cabellos et al., 2000). The riskiest practices for health include storing products at room temperature or with insufficient refrigeration, infected food handlers, preparing large quantities of food in advance of consumption, insufficient cooking of contaminated food and improper reheating, defective thawing, cross-contamination, and insufficient cleaning of kitchen equipment and utensils. Problems may also arise from using raw materials from unsafe sources and handling food at bacterial incubation temperatures.

Conclusions

Hygienic management in a hotel facility is essential to ensure food safety and protect customers' health. Proper exposure to food and Good Manufacturing Practices ensures food is prepared, handled, and served under optimal conditions, minimizing contamination risks. Nutrients, moisture, pH, and temperature influence microbial growth, making controlling these aspects at all stages of the food process essential. Additionally, collective catering must pay special attention to proper product storage, prevention of cross-contamination, and continuous staff training. Implementing standardized hygiene operational procedures and rigorous control of equipment and surface conditions is key to offering safe and high-quality food, ensuring customer satisfaction and safety.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Author contributions

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