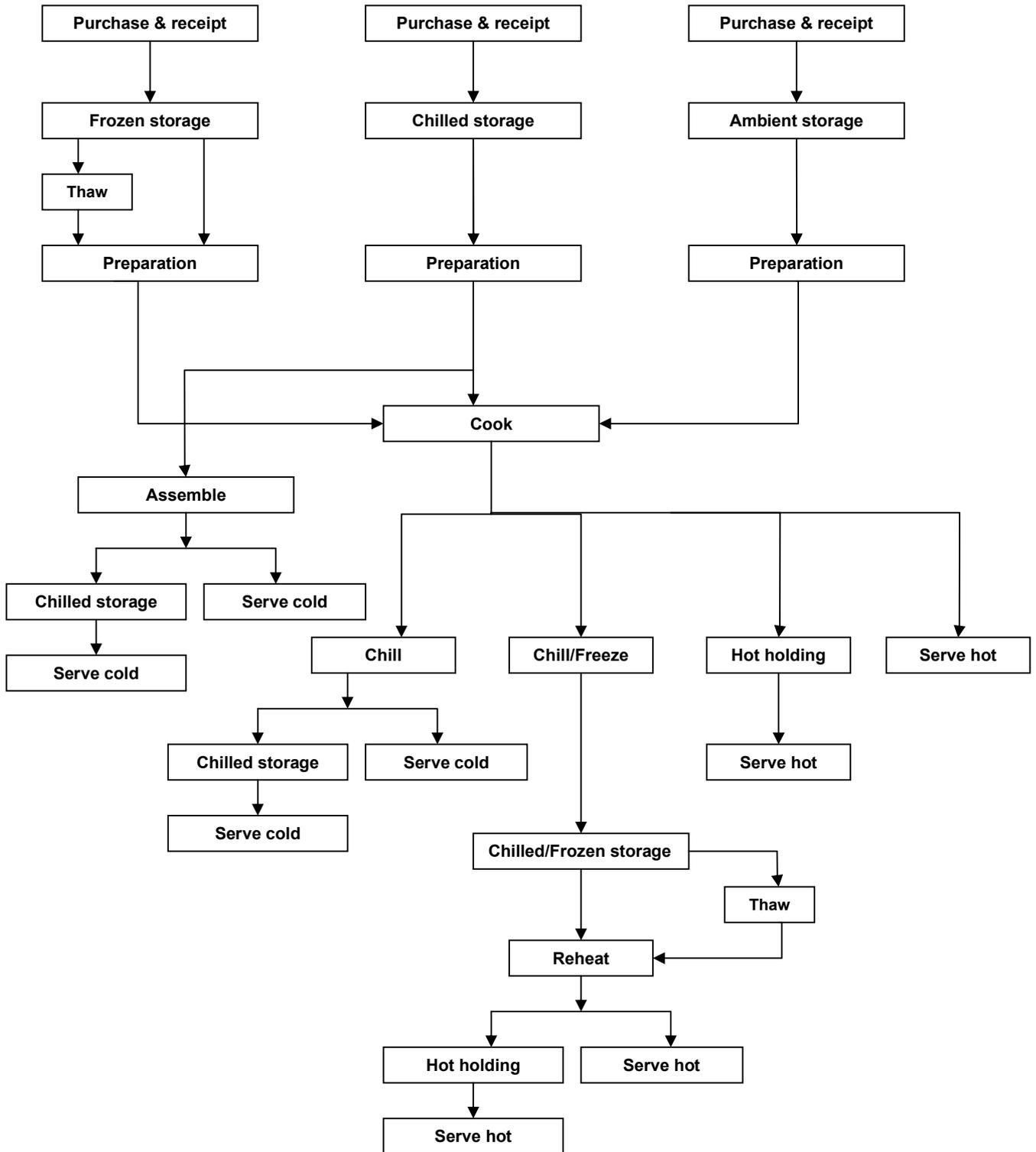


Flow chart



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Source and review hazard data

Food safety hazards, which may occur in the catering kitchen, should be identified. Information about hazards may be found in the scientific literature, in the regulatory guidelines, from consumer complaints, from internal audits, etc. The following is a summary of the potential hazards, which may occur in the catering environment.

Biological hazards

The biological hazards are primarily bacterial pathogens but viruses and parasites should also be considered. Bacterial pathogens including *Salmonella*, *Campylobacter*, *Listeria monocytogenes*, *Yersinia enterocolitica*, *Staphylococcus aureus* and *Escherichia coli* are present in the catering kitchen environment and have been isolated in ready-to-eat foods. *Clostridium perfringens* and *Bacillus cereus* are also worthy of mention as both may become a major problem if cooked foods are held at an incorrect temperature.

Chemical hazards

Chemical residues may occur in food and in the food service environment. Residues present in food ingredients cannot be removed at this stage in the food chain and their control is reliant on the implementation of suitable chemical residue control programmes at the primary and / or processing stages prior to delivery. Management should seek written assurance from their suppliers that the use of chemicals in meat, fruit and vegetable production was in compliance with the regulations. Residues from packaging may be avoided by ensuring suppliers use recommended packaging materials and that the packaging or container has not been damaged. Residues from cleaning agents, sanitisers, etc. used in the kitchen are prevented from entering the food through proper storage and application, which is controlled as part of the prerequisites. In recent years there has been a steady increase in serious reactions to food allergens, e.g. peanuts and other nuts. Every establishment should be aware of the potential presence of allergens in ingredients and these should be stored, prepared and displayed in a separate area so as to prevent cross contamination. Customers should be informed of the potential presence, trace or otherwise, of these substances.

Physical hazards

Most complaints in restaurants relate to physical hazards. Foreign objects in food, such as metal, glass, plastics, knife blades, hairs, etc. are all examples of physical hazards. The prerequisites in the kitchen should prevent physical hazards contaminating the food. Preventing such hazards in the raw ingredients is reliant on the food safety control system(s) in supplier operations.

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Potential Critical Control Points

This section will discuss potential CCPs in the catering kitchen including critical limits, monitoring and corrective actions. It is not envisaged that every CCP should be applied in a catering HACCP plan but that a given establishment selects those CCPs necessary to control the significant hazards which arise in their establishment and which are not dealt with under the prerequisite programme.

Chilling

Cooked foods should be chilled immediately using a blast chiller. If the latter is unavailable, the product should be placed in chilled storage within 90 minutes of the completion of cooking. Dividing the cooked food into smaller portions will facilitate faster cooling.

Chilling or cooling devices should be capable of reducing the core temperature to 10°C or less within 150 minutes. Failure to achieve the target temperature within this time frame would allow bacteria like *Salmonella* and *S. aureus*, which are present in catering kitchens, to multiply and in the case of the latter, to produce toxins. As with all CCPs where the temperature is being monitored, care should be taken to ensure that the temperature probe is clean and disinfected between samples.

CCP	Critical limit	Monitoring	Corrective actions
Chilling	food should be placed in chilled storage within 90 minutes of cooking less than 10°C within 150 minutes	time between cooking and chilling core temperature	discard the food investigate the cause and rectify accordingly

Chilled storage

Perishable foods such as meat and dairy products and cooked foods that are not for immediate consumption should be stored between -1°C and 5°C in a fridge, cold room or other chilling device. These temperature limits are important. *L. monocytogenes* and *Y. enterocolitica*, which may be present in a low percentage of restaurant chillers, will grow and multiply if these temperatures are not maintained. If the chilling is consistently in breach of the critical limits, this may be the result of over stacking. The air in the chilling unit should circulate freely around the produce so care should be taken when storing food to prevent the development of warm spots.

CCP	Critical limit	Monitoring	Corrective actions
Chilled storage	-1°C to 5°C	check the core and surface temperature of the food in chilled storage at least twice per day (preferably at a busy time of the day)	re chill (if the surface temperature of the food has not reached 10°C or higher) discard the food (if the surface temperature of the food has reached 10°C or higher)

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			<p>high risk deserts: discard the food if the exposure time to temperatures above 5°C exceeds 90 minutes</p> <p>high risk sauces: discard the food if the exposure time to temperatures above 5°C exceeds 150 minutes</p> <p>investigate the cause and rectify accordingly</p>
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Frozen storage

Perishable foods may also be maintained at temperatures of -12°C or below. Freezing and frozen food storage may be considered to be a CCP as freezing also prevents growth, multiplication and toxin production by bacterial contaminants.

CCP	Critical limit	Monitoring	Corrective actions
Frozen storage	at or less than -12°C	check the surface temperature of the food in the freezer at least once per day	<p>place in chilled storage or use immediately (if the surface temperature of the food has not reached 10°C or higher)</p> <p>discard the food (if the surface temperature of the food has reached 10°C or higher)</p> <p>investigate the cause and rectify accordingly</p>

Thawing

Frozen foods should be thawed in the chilling device or if necessary using the defrost cycle in a microwave oven. Thawing should never be performed at room temperature as any bacterial pathogens on the surface of the food will have an opportunity to grow, multiply and may produce toxins. In addition, care should be taken to ensure that the core of the food is fully thawed as a frozen centre may not receive sufficient heat in any subsequent cooking process to ensure the destruction of dangerous pathogens. Thawed foods should be cooked or consumed within 24 hours. This CCP may be defined as follows:

CCP	Critical limit	Monitoring	Corrective actions
Thawing	<p>2°C to 5°C</p> <p>24 hours or less time between thawing and cooking</p>	<p>core temperature</p> <p>time between thawing and cooking</p>	<p>continue thawing (if the core temperature is less than 2°C)</p> <p>discard the food (if the surface temperature of the</p>

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			food has reached 10°C or higher) investigate the cause and rectify accordingly
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Cooking

Cooking is a reliable method of ensuring the safety of food. The scientific literature would suggest that cooking to a core temperature of [1] at least 70°C for at least 2 minutes (Mackey et al., 1990) or [2] achieving at least 75°C (core temperature) are sufficient to destroy bacteria like *Salmonella*, *Campylobacter*, *L. monocytogenes* and *Y. enterocolitica*. Lower cooking temperatures are permissible for gourmet dishes. However, the time-temperature combinations used should be validated to ensure the destruction of bacterial pathogens and these dishes should be consumed within 30 minutes of cooking, unless maintained at 63°C or higher.

CCP	Critical limit	Monitoring	Corrective actions
Cooking	70°C or higher for at least 2 minutes (core temperature) 75°C or higher (core temperature) the use of lower temperatures is permissible if validated & the food is consumed within 30 minutes or held at 63°C or higher	core temperature of each batch (this frequency may be reduced if data has been accumulated which demonstrates that cooking at a given oven / grill / other setting for a defined period of time consistently achieves the critical limits)	continue to cook until the critical limit is achieved discard the product investigate the cause and rectify accordingly

Hot holding

Hot holding is a temporary measure and should be applied for as short a period as possible. Food should be placed in the bain marie or other hot holding device before the temperature decreases to below 63°C and held at this temperature or higher. Failure to comply with these limits will facilitate the growth and toxin production by bacteria like *S. aureus*, *C. perfringens* and *B. cereus*.

CCP	Critical limit	Monitoring	Corrective actions
Hot holding	63°C or higher	core temperature (of each batch) at least once per hour (this frequency may be reduced if data has been accumulated which demonstrates that the hot holding device at a	increase the temperature of the hot holding device discard the food investigate the cause and rectify accordingly

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		particular setting achieves the critical limits)	
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Reheating

Pre-cooked foods that are not served at chilled temperatures should be heated immediately after removal from chilled storage to a core temperature of not less than 70°C, should not be reheated more than once and should be served within 30 minutes. While reheating will destroy most bacterial cells, pre-formed toxins may remain. Thus, this CCP should be used in conjunction with other CCPs such as chilling and/or hot holding. This CCP is summarised as follows:

CCP	Critical limit	Monitoring	Corrective actions
Reheating food	70°C or above (core temperature) to be achieved immediately serve within 30 minutes or less	core temperature of each batch (this frequency may be reduced if data has been accumulated which demonstrates that reheating at a given oven / other setting for a defined period of time consistently achieves the critical limits)	increase the temperature until the critical limit is reached discard the food investigate the cause and rectify accordingly