

## Safe food

### Especially vulnerable groups in communal facilities

Every day, many people are catered for in hospitals and rehab clinics, old people's homes and childcare centres, who, due to the state of their health, their young or advanced age or their intake of certain medications, are particularly susceptible to foodborne infections. In some cases, illnesses of this kind can result in severe health damage or even death. Mistakes made when selecting and preparing food can have fatal consequences, particularly for especially vulnerable groups of people.

Especially vulnerable people can protect themselves in the restaurant, hotel and corporate catering sector by choosing what they eat by themselves; however, this is only possible to a limited extent in certain curative and care facilities. For this reason, the operators of these facilities, including hospital and care home managers, have a special responsibility for preparing and selecting the food. From a legal point of view, the responsible persons in facilities of this kind are food business operators that must ensure that the food they prepare is safe.

The Commission for Hospital Hygiene and Infection Prevention at the Robert Koch Institute (KRINKO) has published requirements for hygiene in the medical care of immunosuppressed patients (1). Supplementary to these and the existing guidelines and DIN standards (see section "Further information" on page 9), the German Federal Institute for Risk Assessment (BfR) has prepared these recommendations in cooperation with the BfR Commission for Hygiene. They are aimed primarily at those responsible (operators, managers, cleaning staff, kitchen management) at hospitals, old people's homes, childcare centres and other institutions that regularly cater for especially vulnerable groups. These recommendations are intended to help the responsible persons in these facilities and catering companies supplying these places to implement the existing legal provisions.



*Institutions that cater for especially vulnerable groups of people have a special responsibility.*

## Especially vulnerable groups

Especially vulnerable groups as defined by these recommendations include people whose body's defences are either impaired with regard to foodborne infections or are not yet fully developed. These include:

- ▶ Children up to the age of 5
- ▶ Elderly people (especially if their immune system is weakened)
- ▶ Pregnant women
- ▶ Persons whose body's defences are weakened by a previous illness or intake of medication (see KRINKO recommendation)

These groups are often referred to by the abbreviation **YOPI** which stands for **young, old, pregnant, immunosuppressed**.

## The challenge for large-scale catering

Foodborne diseases can occur in institutional catering (IC) when pathogens are carried into canteen kitchens via raw foods or infected personnel and spread to prepared foods through a lack of hygiene in the kitchens. Inappropriate temperature regimes can lead to survival and multiplication of pathogens in foods. For this reason, important elements in protecting against foodborne diseases are the conducting of hazard analyses, comprehensive personnel training and a function-

al separation of clean and unclean areas. Within the scope of in-house checks, the temperature control of the food supply should be examined critically all the way through from preparation to consumption, and a suitable transport system selected.

The differences between catering for especially vulnerable people and other IC facilities, such as dining halls and work canteens, exist primarily with regard to:

- ▶ Foods and food ingredients that should not be served
- ▶ Raw materials that should not be processed if possible
- ▶ Demands on suppliers
- ▶ Formulation of details in work instructions
- ▶ Frequency and intensity of operational monitoring measures (including temperature controls)
- ▶ Frequency and quality of staff training

## Hazard analysis and critical process stages

Avoiding microbiological hazards (e.g. *Salmonella* and *Listeria*) is vitally important when catering for especially vulnerable persons. For this reason, contamination of food with pathogens must be minimised, not just through comprehensive hygiene measures, but also through selecting ingredients and recipes.

Every kitchen operator and everyone with responsibility for serving food is legally obliged to ensure that the foods they distribute are safe (2).



The frequency and intensity of operational monitoring measures are paramount when catering for especially vulnerable groups.

The HACCP-based procedures are based on the following seven principles:

- ▶ Identifying any hazards that must be prevented, eliminated or reduced to acceptable levels (hazard analysis);
- ▶ Identifying the critical control points at the step or steps at which control is essential to prevent or eliminate all relevant hazards or to reduce them to acceptable levels;
- ▶ Establishing critical limits at critical control points (CCP), which separate acceptability from unacceptability for the prevention, elimination or reduction of identified hazards;
- ▶ Establishing and implementing effective monitoring procedures at critical control points;
- ▶ Establishing corrective actions when monitoring indicates that a critical control point is not under control;
- ▶ Establishing procedures, which shall be carried out regularly, to verify that the measures outlined in principles 1 to 5 are working effectively;
- ▶ Establishing documents and records commensurate with the nature and size of the food business to demonstrate the effective application of the measures outlined in principles 1 to 6.

Source: COMMISSION NOTICE on the implementation of food safety management systems covering prerequisite programs (PRPs) and procedures based on the HACCP principles, including the facilitation and flexibility of the implementation in certain food businesses (2016/C 278/01)

Every catering facility must ensure that basic hygiene is maintained through suitable measures, initially through “good manufacturing practice” (GMP) and “good hygiene practice” (GHP). These basic hygiene measures (e.g. personal hygiene, cleaning and disinfection, pest control, waste disposal) serve to protect consumers from health impairments caused by pathogens or allergens. Buildings, facilities and installations, machines and equipment in particular must always be kept in a good hygienic condition. For this purpose, prerequisite programmes (PRPs) should be established and maintained. These PRPs describe the TARGET condition and specify hygiene measures that must be constantly monitored at hygiene control points (CPs) that must be defined (e.g. cooling temperatures).

On this basis, a procedure based on the HACCP principles is established and implemented (3). HACCP (hazard analysis and critical control points) is a self-monitoring system for identifying, assessing and controlling relevant hazards based on a hazard analysis and critical control points (CCPs). There where the assessment of identified hazards (e.g. pathogens) concludes that no CCP with effective control measures can be established, but measures for hazard minimisation and their monitoring are required, the hazard should be prevented or controlled in advance of production through an operational prerequisite programme (oPRP). Examples of CCPs and oPRPs can be found in Table 2.

#### Examples of prerequisite programmes (PRPs)

- ▶ Basic hygiene measures relating to cleanliness and order, cleaning and disinfection
- ▶ Upkeep of infrastructure and equipment, including maintenance
- ▶ Compliance with and control of storage temperatures
- ▶ Hygienically correct handling of food in compliance taking any production instructions into consideration

The hazard analysis must also consider the consumer groups for which the food produced are intended. It must be taken into account here that different groups of persons have to be looked after in facilities, such as hospitals and clinics, including those who have no restrictions with regard to what they eat.

Here, hazard analysis means that every step in the process, from the planning of the menu through procurement to the serving of the food has to be analysed with regard to whether the health of the persons catered for will be endangered if the step in question is not under control. The goal is to minimise or eliminate every identified hazard. If this is not possible, the planning of the food preparation and/or purchasing of raw products must be altered in such a way that the risk cannot occur any more. The necessary measures must be determined in procedural and work instructions and compliance with these must be strictly controlled and documented. The results of the hazard analysis determine to a great extent how the foods are to be produced.

The principle of hazard analysis is not only for application in canteen kitchens or catering. It also has to be taken into account when food is produced and consumed together with children or residents in childcare centres or nursing homes. Foods that are consumed immediately after being thoroughly cooked are recommended for therapeutic or educational cooking with these groups. When processing raw foods of animal origin, especially fresh meat and fish and raw eggs, meticulous hygiene should be ensured in order to avoid smear infection and cross-contamination.

The essential process stages which should be observed during hazard analysis in IC facilities with regard to the YOPI risk group are listed below.

### Selecting the right foods

Both, foods of animal origin and several of plant origin can be contaminated with pathogens (bacteria, viruses and parasites), which constitute a serious health hazard to especially vulnerable persons. Accordingly, it is prohibited by law to serve products such as raw milk in institutional catering facilities, for example (4). In addition to this, IC facilities may only serve dishes prepared with raw eggs to especially vulnerable persons if a suitable method is available that guarantees the elimination of *Salmonella* bacteria prior to serving (5).

In addition to this, the ready-to-eat foods listed in Table 1 can contain pathogens in quantities that could, under certain circumstances, have severe effects on the health of especially vulnerable persons. If these foods are not intended to be heated shortly before serving (see “Cooking” section), it is advisable not to serve them to especially vulnerable persons.

For all other foods and beverages, it must be established on the basis of a hazard analysis whether it is possible to serve them to especially vulnerable groups, which other measures may be required to minimise the risks or whether they should not be served at all due to an increased health risk.

The risk of food infections by eating fruit and vegetables raw can be reduced, for example as follows:

- ▶ By not only thoroughly washing fruit and vegetables, but also peeling them, if possible;
- ▶ By immediately eating fruit that is low in acid (especially melon pieces), vegetables and lettuce after chopping or storing it in the refrigerator until consumption;
- ▶ By consuming smoothies made of fresh fruit and vegetables immediately after preparation.

The decisive factors are whether and in what numbers potentially health-damaging microorganisms are to be expected in the finished food at the time of consumption and for whom the food is intended. For example, pregnant women and people with a massive impairment of the body's own defences against *Listeria* infections are particularly vulnerable.

To protect against *Listeria*, it can be advisable to heat not only raw foods but also pre-heated, ready-to-eat foods before serving. Alternatively, these products can be substituted by other ready-to-eat foods that are free of *Listeria* due to the production method (e.g. canned foods). More tips on how to protect against infections with *Listeria* can be found at BfR Consumer Tips “Protection against food infections with *Listeria*”.

According to information from KRINKO, the consumption of foods containing probiotic cultures may also possibly pose a hazard to immunosuppressed persons (1).

### Procurement of goods

Specifications for the foods to be procured can be taken from the hazard analyses. It is important to select suppliers who can prove their ability to guarantee the required quality. It is not sufficient to merely shift responsibility for the microbiological properties of the raw ingredients to the supplier, e.g. by means of a specification stating “free of pathogenic germs”.

In the interest of preventing foodborne infections, it is also recommended that catering facilities minimise the risk of introducing and subsequently spreading pathogens in their kitchens by imposing “procurement bans” for certain raw foodstuffs. Food ingredients with a higher processing level (degree of convenience), such as pre-portioned meat preparations or pasteurised whole eggs, can help to reduce the introduction of germs to the production process.



**Table 1: Raw and ready-to-eat food should only be served in facilities for especially vulnerable groups of people as part of institutional catering (IC) if it has been sufficiently heated shortly before being served**

#### **Milk and products made from milk, including cheese**

- ▶ Raw milk (serving ban in accordance with Section 17 German Animal Foods Hygiene Regulation – Tier-LMHV)
- ▶ Products made using raw milk (e.g. butter, milkshakes, desserts)
- ▶ Cheese made of raw milk with the exception of hard cheese matured for at least 6 months (e.g. Parmigiano Reggiano, Grana Padano)
- ▶ Sour milk cheese and soft cheeses made from pasteurised milk which are produced with a (yellow and/or red) surface smear (e.g. the varieties Harzer, Mainzer, Ölmützer Quargel, Limburger, Munster)
- ▶ Ice cream produced in the IC facility

#### **Products made from meat or poultry**

- ▶ Meat or poultry that has not been cooked through (e.g. steak, rare duck breast, carpaccio)
- ▶ Raw minced meat preparations (e.g. fresh ground pork, steak tartare and similar)
- ▶ Spreadable, rapidly matured, uncooked sausages (e.g. fresh Mettwurst, Teewurst, Braunschweiger)

#### **Products made from eggs**

- ▶ Dishes made with raw egg if the production process does not guarantee the elimination of *Salmonella* bacteria prior to serving (serving ban in accordance with Section 20a Tier-LMHV)

#### **Products made from fish or sea food**

- ▶ Raw fish and raw sea food (e.g. sushi, sashimi, oysters)
- ▶ Smoked or pickled fish products (e.g. smoked salmon, hot-smoked salmon, smoked trout fillet, smoked mackerel, gravlax)

#### **Products made from fruit, vegetables and other plant-based ingredients**

- ▶ Sprouts/shoots
- ▶ Frozen berries
- ▶ Frozen vegetables
- ▶ Cereal flours and doughs made of these

## Storage

Proper storage can prevent the introduction of pathogens to foods and their propagation and spread throughout the premises. It is important to have written procedural instructions on such matters as how to deal with stored foods requiring refrigeration in the event of a technical breakdown.

Foods that can easily be recontaminated with *Listeria* after heat treatment through further processing steps, such as slicing and packaging, thus enabling the growth of the bacteria, should be regarded critically. This includes, for example, meat products, such as sliced boiled sausages, soft cheese and self-prepared delicatessen salads. As *Listeria* bacteria are fundamentally capable of proliferating at cooler temperatures, it is recommended that foods of this kind be consumed as fresh as possible prior to the expiry of their best-before date. They should not be used at all if the cold chain has been interrupted.

## Preparation/interim storage of semi-finished products

A lack of hygiene can allow germs to get into foodstuffs and spread under certain circumstances. That is why the spatial and/or chronological separation of “clean” and “unclean” processes has to be monitored particularly strictly in IC facilities that regularly cater for especially vulnerable persons. This should go hand in hand with a clear segregation of equipment and work surfaces.

## Cooking

As most pathogens die off in foods through sufficient heating (minimum +72 °C for two minutes at the core), compliance with the necessary temperature specifications and the regular control thereof are of vital importance when cooking foods.



To protect against food poisoning, hot food must be kept sufficiently hot when served (at least +60 °C throughout the food).

To this end, the core temperature should be measured regularly, automatically if possible. With low-temperature cooking processes, temperatures of at least +65 °C must be reached and cooking times extended in such a way that the same level of microbiological safety is achieved. However, to kill pathogens in very dry foods (e.g. flour, spices), significantly higher temperatures and longer heating times are required.

## Cooling

Heat-resistant bacterial spores are insensitive to cooking processes at temperatures of up to +100 °C. If hot foods are cooled down slowly, these spores can germinate so that high concentrations of pathogens can build up which could possibly form toxins. Foods that are produced hot and served cold at a later point in time (e.g. cooked pudding) should be cooled down as quickly and actively as possible (cooling from +60 °C to +10 °C within max. 120 minutes). Afterwards, the food should be kept at a constant temperature of max. +7 °C until served. It is, therefore, crucial that kitchen staff comply with the specifications for re-cooling and cold storage.

The appropriate equipment with suitable appliances is a prerequisite. Even stricter temperature and time specifications apply to foods produced using the cook & chill method (see explanation in Table 2).

Using the cook & chill method, foods are quickly chilled to +3 °C to +1 °C shortly before the end of the cooking process, transported and stored under refrigeration before being reheated immediately before consumption and served hot.

## Regeneration/final cooking

Regeneration is understood to be the reheating of fully cooked dishes before serving them hot, whereas final cooking is the completion of the cooking process of precooked foods. In order to safely eliminate subsequently introduced pathogens and germinated bacterial spores in foods, the temperature specifications and checks should also be complied with in this process stage (see “Cooking”).

## Keeping hot/portioning

While bacteria capable of reproduction die when food is heated, bacterial spores can survive at high temperatures. Under certain circumstances, these spores can germinate again into bacteria capable of reproduction, which can then multiply and form toxins. This hazard is most prominent with dishes portioned on trays for hospital catering. Keeping foods hot in the correct manner (at least +60 °C throughout the food and for a maximum of three hours, including transport, for quality reasons) can prevent any existing spores from germinating. It should be ensured by means of suitable methods and equipment (e.g. transport systems with active heat retention), as well as regular temperature checks when serving the food, that these requirements are complied with.

## Serving

Clear regulation and agreements between the production and serving points are required where the serving of food is concerned (interface management). Only in this way can a high level of food hygiene, including temperature specifications, be guaranteed. Hot foods should be served at an adequate temperature (at least +60 °C throughout the food). With cold dishes (e.g. salads, desserts), it should be ensured that they are kept at a maximum of +7 °C before serving and that they are consumed without delay thereafter. Follow the manufacturers' refrigeration instructions when storing pre-packed food.

## Reusing foods produced in excess of requirements

Raw and delicatessen salads, cream dishes, including cakes with a cream filling not baked all the way through, and confectionery products containing cream must be disposed of under all at the end of the production day. Other foods produced in excess of requirements that have not left the kitchen area can be either properly frozen or should be consumed as quickly as possible, but within two days, after being sufficiently heated again. However, the further use of foods produced in excess of requirements can only be considered if the food has not been adversely affected during interim storage and the temperature requirements for previous cooking, keeping hot and/or rapid cooling and keeping cool have been demonstrably met.

## Monitoring measures

IC facilities that regularly cater for especially vulnerable persons should place paramount importance on temperature monitoring. The availability of suitable measuring instruments (e.g. data recording devices for refrigeration areas, cooling and transport processes) and their regular calibration are the necessary prerequisites for this. As the orderly implementation of cleaning and disinfection measures is also of great importance, their effectiveness should be checked as often as possible using suitable methods. It goes without saying that all monitoring measures and clear procedural instructions in the event of deviations should be carefully documented.

## Personnel

Personnel play a key role in the above-mentioned curative and nursing institutions because any mistakes made by personnel in the production of food can trigger severe illnesses among especially vulnerable persons in particular. To ensure that personnel can meet the special requirements on hygiene, they must be professionally qualified to recognise risks and control points in production, storage, transport and serving, thoroughly acquainted with the in-house self-assessment systems and hygiene management measures, and regularly trained (6). In addition to the conveying of knowledge, it all depends on sensitising and motivating the staff in such a way that they comply with the provisions of the Infection Protection Law and general hygiene rules on their own. This concerns the personal hygiene of each individual on the one hand (e.g. regular hygienic hand washing, the wearing of hygienic clothing, including a head covering and disposable gloves where necessary, and a ban on jewellery and smoking), as well as the correct implementation of the control measures on the other (compliance with all instructions, immediate reporting of any deviations, precise documentation).

Businesses that cater regularly for especially vulnerable people must observe the following in particular:

- ▶ Sufficient personnel with the relevant professional training and experience must be employed;
- ▶ New staff should be carefully selected with verification of the necessary specialised knowledge;
- ▶ Prerequisites should be created to ensure that staff report hygiene-relevant health restrictions to supervisors and observe work bans (7); minimise the risk of infected persons handling foods by taking additional health monitoring measures;
- ▶ Training should be conducted several times a year with increased intensity while pointing out the special risks for YOPIs;
- ▶ Personnel in hospitals, nursing homes and on wards should also be trained in food hygiene matters.

### Notes on personnel training

Regular training with small blocks of subjects attracts more attention and creates more motivation for the correct and proper implementation of all hygiene measures. The following is important when conducting training:

- ▶ Training contents and the manner in which they are conveyed should be adapted to the previous knowledge and fields of activity of the personnel undergoing training; possible language barriers should be taken into account
- ▶ Personnel fluctuation increases the need for instruction and training
- ▶ Hygiene rules should be justified with the appropriate background information
- ▶ Rules for serving food and temperature specifications should always be addressed
- ▶ Always refer to the special vulnerability of certain persons and the resultant restrictions and special requirements where the choice of food is concerned
- ▶ Ensure that the kitchen manager and deputy are also given intensive training in theoretical and legal requirements, as well as in relation to the application of PRPs and HACCP principles
- ▶ Make use of new (interactive) media above all for the self-assessment of acquired knowledge
- ▶ Combine on-the-job training with practical exercises, e.g. serving food
- ▶ Document training and always combine it with a performance and comprehension check (counter-signing alone is not sufficient)



## Further information

- ▶ [www.bfr.bund.de/en](http://www.bfr.bund.de/en): Information and leaflets
- ▶ Consumer tips on protection against food infections with Listeria (German only):  
[www.bfr.bund.de/cm/350/verbrauchertipps-schutzvor-lebensmittelinfektionen-mit-listerien.pdf](http://www.bfr.bund.de/cm/350/verbrauchertipps-schutzvor-lebensmittelinfektionen-mit-listerien.pdf)
- ▶ DIN 10506, Food hygiene – Mass Catering
- ▶ DIN 10508, Food hygiene – Temperature requirements for foodstuffs
- ▶ DIN 10514, Food hygiene – Hygiene training
- ▶ DIN 10526, Food hygiene – Retained samples in mass catering
- ▶ Deutscher Caritasverband e. V. and Diakonisches Werk der Evangelischen Kirche in Deutschland e. V. (pub.): Cooking in Communal Facilities. Guideline for good food hygiene practices in social institutions, ISBN 978-3-7841-1788-1
- ▶ COMMISSION NOTICE on the implementation of food safety management systems covering prerequisite programs (PRPs) and procedures based on the HACCP principles, including the facilitation and flexibility of the implementation in certain food businesses (2016/C 278/01)
- ▶ ISO/TS 22002-2:2013-01, Prerequisite programmes (PRPs) on food safety – Part 2: Catering
- ▶ Schmid I, Albert MH, Stachel D, Simon A. Nahrungsmittelrestriktionen zur Infektionsprävention bei Kindern mit Krebserkrankung: Was ist gesichert und was ist sinnvoll? Hyg Med 2008; 33 (1/2): 16–24
- ▶ Lund BM. Microbiological food safety and a low-microbial diet to protect vulnerable people. Foodborne Pathog Dis 2014; 11(6): 413–424

## Appendix

### Hazard analysis information for “hot food”

The process stages that are of particular importance for the production of hot food for vulnerable persons in institutional catering facilities are listed in more detail below.

The potential biological hazards and appropriate preventive measures in these process stages are summarised in Table 2 below. The summary is intended to provide guidance for carrying out a hazard analysis and the HACCP concept, but cannot replace them. The table lists several general measures within the framework of prerequisite hygiene management programmes (PRPs) and their monitoring.

Critical control points (CCPs) are levels at which it is possible to prevent, eliminate or reduce a food safety hazard to an acceptable level. Typical CCPs to control microbiological hazards are heating processes (e.g. pasteurisation).

The criteria for classification as critical control points (CCP) are:

- ▶ A lack of control of the process stage will lead to an unacceptable health risk for the catering participant.
- ▶ The risk cannot be sufficiently reduced in a subsequent process stage.
- ▶ The hazard potential can be sufficiently reduced in this process stage by taking measures to control the risk.

If no CCP with effective control measures can be identified due to the lack of measurable limits, it must be examined whether the control of the hazards is possible through an operational prerequisite programme (oPRP) or/and a goods specification ahead of production. OPRPs are points in the production and distribution process that are monitored in an enhanced or more complex traceable manner within the framework of the PRPs using measurable or visible criteria.

**Table 2: Summarised overview of possible biological hazards associated with the production and serving of hot food in institutional catering, as well as appropriate measures for hazard minimisation**

Process Stage	Raw Material/ Product/ Individual Process	Hazard	CCP or HCP	Preventive Measures
Receiving	All foods	Contamination with pathogenic microorganisms, bacterial toxins and mycotoxins	PRP	<ul style="list-style-type: none"> <li>Visual inspection of deliveries for contamination, damaged or soiled packaging, pest infestation and spoilage</li> <li>With foods requiring refrigeration (including semi-finished products such as pre-cleaned vegetables, packed peeled potatoes) and deep-frozen foods, additional checks for compliance with the cold or deep-freeze chain and delivery temperature (see also Storage)</li> </ul>
Storage	Foods requiring refrigeration and deep-frozen foods	Multiplication of pathogenic microorganisms, toxin formation	PRP	<ul style="list-style-type: none"> <li>Observe best before dates and manufacturers' information on storage temperatures</li> <li>Temperature monitoring of refrigeration and deep-freezer equipment</li> <li>If no information is provided, the following temperature recommendations apply:                      -18 °C or lower: deep-frozen foods                      max. +2 °C: raw meat and poultry                      max. +7 °C: dairy products and other foods requiring refrigeration, pre-cleaned vegetables and peeled potatoes</li> </ul>
Preparation	Preparation of interim products, prepare ingredients for cooking, load cooking containers	Cross-contamination with and multiplication of pathogenic microorganisms	PRP	<ul style="list-style-type: none"> <li>Use pasteurised egg products where possible</li> <li>If raw eggs are used, crack them open at a separate workplace</li> <li>Process all interim products containing raw eggs separate from other foods</li> <li>Further process or refrigerate all interim products without delay</li> <li>Cleaning/disinfection of hands and equipment</li> </ul>
Cooking	Individual warm components or completely warm dishes	Unspored pathogenic bacteria	CCP	Heat to +72 °C core temperature for at least two minutes reaction time or equally effective process
Filling and portioning	Cooked foods	Pathogenic spore-forming bacteria ( <i>Bacillus cereus</i> , <i>Clostridium perfringens</i> ); pathogenic bacterial (recontamination)	PRP	Hygienic work methods, short standing times
Keeping hot, serving (Cook & Serve)			PRP	Sufficiently keep hot (min. +60 °C throughout the food) for three hours at the most
Quick chilling (Cook & Chill)			PRP	Cool from +60 °C core temperature to below 4 °C within 90 minutes
Regeneration or final cooking			CCP	Heat to +72 °C core temperature for at least two minutes reaction time or equally effective process

**Table 3: Example: HACCP plan for “hot food”**

Name of company:					Doc. No.:		Page 3 of 3		
					Revision No.:		Valid from:		
CCP No.	Process stage	Hazard to be controlled	Control measures	Benchmark	Temperature limits	Monitoring	Corrective measure	Other valid documentation	Responsible
1	Cooking	Unspored pathogenic bacteria	Correct cooking temperature and times		+72 °C core temperature reached or similarly effective process	Compliance with time-temperature settings; core temperature measuring with foods with which it is difficult to recognise when the target temperature has been reached	Re-cook	AA No. ...	Head chef
2	Keeping hot, serving (Cook & Serve)	Pathogenic spore-forming bacteria ( <i>Bacillus cereus</i> , <i>Clostridium perfringens</i> ); bacterial food infection pathogens (recontamination)	Correct temperature for keeping hot		At least +60 °C throughout the food	Measure temperature before serving	Dispose of product	AA No. ...	Head chef
3	Quick chilling (Cook & Chill)		Correct cool-down speed		From +60 °C core temperature to +4 °C in 90 minutes	Measure temperature after 90 minutes	Dispose of product	AA No. ...	Head chef
4	Regeneration or final cooking		Correct heating temperature and duration		+72 °C core temperature reached or similarly effective process	Compliance with time-temperature settings; core temperature measuring with foods with which it is difficult to recognise when the target temperature has been reached	Keep heating	AA No. ...	Head chef
<b>Prepared:</b>						<b>Approved:</b>			

AA: Arbeitsanweisung (work instruction)

## References

- (1) Commission for Hospital Hygiene and Infection Prevention: Hygiene requirements for the medical care of immunosuppressed patients. Federal Health Gazette Health Research Health Protection (2010) 53:357-388
- (2) Article 14 Regulation (EC) No. 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety, OJ EU, 2002, No. L 31, P. 1 (as amended)
- (3) Article 5 Regulation (EC) No. 852/2004 of the European Parliament and of the Council of 29 April 2004 on food hygiene, OJ EU, 2004, No. L 226, P. 3 (as amended)
- (4) Section 17 of the regulation on hygiene requirements when producing, treating and marketing certain foods of animal origin (Animal Foods Hygiene Regulation – Tier-LMHV) of 18 April 2018, Federal Law Gazette (BGBl) I, P. 480 (619)
- (5) Section 20 a Tier-LMHV, reference, see (4)
- (6) Section 4 and Appendix 1 Regulation on hygiene requirements when producing, treating and marketing certain foods (Food Hygiene Regulation – LMHV) as amended in the notice of 21 June 2016 (Federal Law Gazette (BGBl) I P. 1469) as amended by Article 2 of the Ordinance of 3 January 2018 (BGBl I P. 99); Regulation (EC) No. 852/2004, Annex II, Chapter XII
- (7) Sections 34 and 42 Law on the reorganisation of epidemic regulations (Epidemic Law Reorganization Act – SeuchRNeuG) – Article 1: Law on the Prevention and Combating of Infectious Diseases in Humans (Infection Protection Law – IfSG) of 20 July 2000, BGBl I, 2000, No. 33, P. 1045–1077 (as amended)

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