Source control method

This section explains how the source control method can be used to produce and serve LTTC beef burgers.

?Overview of the method

This method starts with beef/minced beef/beef burgers being bought from a supplier that has control methods in place to reduce bacteria and/or control the growth of harmful bacteria. Examples of these control methods include lactic acid rinsing of meat cuts, steam surface treatment and the separation of storage materials and equipment to reduce the risk of cross contamination. The food business must carry out microbiological testing to verify that controls are working. Research has shown that appropriate source controls can result in at least a two-log reduction in harmful bacteria.

The beef burgers are then cooked to a validated time/temperature combination as determined by the food safety management system, which will result in a four-log (99.99%) reduction in bacteria. Overall, this method can achieve a six-log reduction in bacteria.

A consumer message is used to alert consumers, particularly vulnerable groups, to the increased risk of eating LTTC beef burgers.

The information below provides a quick checklist for food businesses preparing and/or serving LTTC beef burgers using the source control method. More detail on each step is given further on in the guidance.

Best practice

Food businesses may wish to appoint an expert food safety consultant as this is a complex process and must be carefully controlled.

Step 1: Purchase

- if the supplier requires approval, then they must be specifically approved for the production of minced meat or beef burgers to be LTTC
- specific controls in place at suppliers (for further information see Annex 3)
- supplier’s FSMS specifically takes into account that product will be LTTC
- product specification
- microbiological testing has been carried out as per the requirements for minced meat and meat preparations

Step 2: Delivery to caterer

- food safety intake checks
- temperature
- cross-contamination
- product must comply with specification
- product to have use by date and to be within use by date
- malformed/misshapen beef burgers

Step 3: Storage

- temperature
- burgers becoming misshapen
- cross-contamination
- shelf-life

Step 4: Preparation of beef burgers onsite by the catering business

- temperature/time combination
- cross-contamination
- shelf-life

Step 5: Cooking

- validated system for reducing bacteria by at least four-logs

Step 6: Service

- consumer message

Purchase

Best practice

It is best practice to buy minced beef, beef burgers or patties from a reputable supplier that has been specifically approved by the EA to supply products that will be LTTC. Generally, food businesses which supply minced meat or burgers, such as cutting plants and meat processors, must be approved by either the FSA or by a LA. However, some food businesses are exempt from approval. If a food business does require approval, then they must also have specific approval for the activity of supplying minced beef or beef burgers to be LTTC. The list of approved less than thoroughly cooked meat establishments in the UK will assist food businesses with finding a suitable supplier.

Hygiene standards

There are specific hygiene standards that apply to suppliers of minced beef or beef burgers to be LTTC and these are summarised in Annex 3.

Suppliers of minced beef or beef burgers which will be LTTC must have appropriate procedures in place which reduce the risks associated with raw beef. Suppliers must specifically identify relevant pathogens, such as salmonella and STEC, as hazards in their FSMS. There must be evidence that suppliers have identified and put in place controls for these hazards and that they monitor and verify that the controls are effective on an ongoing basis. Annex 3 provides further information about an appropriate HACCP-based FSMS.

Generally, food businesses handling products of animal origin must be approved by the relevant EA. However, some food businesses may be exempt from approval. If the food business serving the LTTC beef burgers uses a supplier which is not approved, they must be able to demonstrate that the supplier meets the stringent hygiene standards that would be required of a LTTC approved establishment.

Annex 3 provides further information about these hygiene standards and an appropriate HACCP-based FSMS.

Best practice

It is best practice that suppliers are audited to ensure that appropriate controls are in place.

Product specification

Food businesses serving LTTC beef burgers must be able to demonstrate that appropriate product specifications are in place. Examples include:

- making beef burgers a consistent shape, size and thickness, so that safety controls such as cooking times are easy to apply
- using packaging which does not squash or misshape the beef burgers
- clear labelling to distinguish them from burgers that require thorough cooking
- using strict temperature controls and ensuring the cold chain is maintained to limit the growth of harmful bacteria
- avoiding cross-contamination at all stages, for example ensuring outer packaging is not a source of contamination
- shelf-life and storage instructions take into account the temperature that the beef burgers will be stored at in the food business serving the LTTC beef burgers

Validation and verification of the FSMS at suppliers

As part of the process for validation and verification, microbiological sampling and testing regimes are needed to validate and verify controls as part of the FSMS. The regime must include specific corrective action that will be taken in the event of unsatisfactory results. Although microbiological sampling and testing is not a guarantee of the safety of a product, it is an important means of verifying that the FSMS is effective.

Microbiological testing requirements for food businesses that mince meat

Microbiological testing is required for minced meat/beef burgers that will be LTTC throughout each stage of production and including when the beef is minced, in order to validate the implementation of the FSMS.

Legal requirements

The requirement for a HACCP-based FSMS is included in:

- Article 5 of retained Regulation (EC) No 852/2004 for England and Wales
- Article 5 of Regulation (EC) No 852/2004 for Northern Ireland

The requirement for food business operators throughout each stage of production to carry out testing for minced meat/beef burgers that will be LTTC is included in:

- Annex 1, Chapter 1 and 2 of retained regulation (EC) No 2073/2005 for England and Wales
- Annex 1, Chapter 1 and 2 of regulation (EC) No 2073/2005 for Northern Ireland

Retained Regulation (EC) No 2073/2005 and Regulation (EC) 2073/2005 provides specific microbiological criteria for salmonella levels in minced meat and meat preparations to be

consumed raw.

These criteria also apply to minced meat and meat preparations which are to be LTTC, including minced meat with seasoning or additives, formed into beef burgers.

The food business serving LTTC beef burgers must be able to demonstrate that this verification sampling and testing has been carried out and that the results comply with the regulations.

Any food business that produces minced meat or meat preparations to be LTTC using the source control method must always carry out verification sampling and testing, regardless of volume. The exemption in the regulations for small amounts of minced meat and meat preparations does not apply and sampling must be undertaken in all cases.

The FSMS must also consider controls for hazards other than salmonella, including STEC, which may include additional verification sampling and testing alongside the criteria in the regulations. There must be procedures in place for the appropriate corrective action to be taken if the results are unsatisfactory.

If sampling and testing results show that STEC are confirmed as present in a batch of minced meat or meat preparations, that batch of meat must not be used for burgers that will be LTTC due to the risk to public health. This should be considered as part of the FSMS.

More information about sampling for STEC and what to do in the event of presumptive or unsatisfactory results can be found on the FSA website.

Delivery to caterer

- if the product is delivered above the maximum temperature limit that has been set by the supplier and/or detailed in the FSMS, the delivery must be rejected
- it is a legal requirement for approved producers of minced meat to chill to an internal temperature of not more than 2 °C, for meat preparations this would be 4 °C, and to maintain that temperature during storage and transport
- if third party distributors are used to transport the minced meat/burgers, the cold chain must still be maintained
- the delivery must be placed into chilled storage as soon as possible, so the cold chain is not interrupted
- the ‘use by’ date must be checked on arrival and if it has expired, the food must be rejected
- during transport, meat, or burgers to be less than thoroughly cooked should be separated from other raw meat and ready-to-eat products, to reduce the risk of cross contamination
- if the delivery does not meet the product specification, such as size and shape, it must be rejected
- delivery intake procedures must be verified on a routine basis; monitoring records and any corrective actions taken should be checked by management

Best practice

It is best practice for catering businesses to carry out microbiological sampling and testing of uncooked minced beef or beef burgers they have received from the supplier. This is to verify they are meeting the required microbiological criteria.

Storage

- fridges must be large enough and of a suitable grade to hold the required volume of product at the correct temperature
- burgers must be kept at the temperature specified by the supplier, or the food business must demonstrate that they have appropriately assessed the hazards and provide evidence that the storage arrangements do not pose a risk to food safety
- temperatures must be monitored using calibrated equipment and records kept
- products must be used within the supplier's specified shelf life
- minced beef or beef burgers bought in fresh must not be frozen before use, unless instructions are provided by the supplier
- products to be LTTC must be stored separately from other foods, including other raw meat products and ready-to-eat foods
- if the shape and size of the burgers, and/or the way they are stacked or packaged, has been specified, then storage at the catering establishment must not affect this
- management must make routine verification checks of storage practices to ensure that temperatures are being monitored and recorded correctly and remain within the set limits, staff are using the designated storage areas correctly and any corrective action required is being taken and recorded
- if any deviation from the documented storage procedures is observed, the root cause of this should be determined and addressed to ensure the same issues do not recur

Best practice

It is best practice to store products to be LTTC in a separate, designated fridge.

Production of beef burgers on site by the food business which serves LTTC beef burgers

- controls must be specified in the FSMS, for example, the time taken to produce the beef burgers and the time the beef burgers are out of the fridge, or the temperature of beef burgers at the end of processing may need to be checked and recorded
- beef burgers to be LTTC should not be prepared in the same area at the same time as any other raw meats, and the work surface must be thoroughly cleaned and disinfected between uses, detailed guidance on cleaning and disinfection can be found in the E. coli cross-contamination guidance
- complex equipment such as mincers must be designated for products to be LTTC only and other pieces of equipment, such as knives and chopping boards, must also be designated, unless they can be completely dismantled, thoroughly cleaned and heat disinfected
- designated utensils and equipment must be stored in a location where they are not at risk of being contaminated
- the beef burgers must be labelled with a suitable shelf life that is supported by verification and it is the responsibility of the food business to determine the shelf life of the burgers in line with their FSMS, this date should be determined by a HACCP validation study
- to reduce the risk of contamination and reduce the hazards to a safe level, the preparation methods must be validated before they are introduced to make sure they are going to work. It may be helpful to consider the following questions:

Is the preparation space adequate?
Is the right equipment available?
Will safe temperatures be maintained?

- microbiological testing is legally required if the caterer minces meat to be LTTC, and specific legislation applies

Best practice

It is best practice to:

- prepare beef burgers during times when the kitchen is quiet, as it is likely to be cooler and staff are less likely to be distracted by other tasks
- use separate, designated equipment and surfaces for the preparation of beef burgers/patties to be LTTC
- remove meat from the fridge only when staff are ready to mince the meat and/or form the beef burgers. Staff should work on small batches at a time and place finished batches in the fridge before starting on another
- handle the meat as little as possible, to prevent it from becoming warm. Any equipment used should not be hot, for example after being washed in a dishwasher
- use a chilled room or a cool area of the kitchen as this will help keep meat cold and if any ingredients are added to the beef burger they should be as cold as possible before being used, e.g., onions

Cooking

The proposed time/temperature combination must be validated to show that a minimum of a four-log reduction in bacteria will be achieved. Further validation is needed to show that the proposed cooking method will consistently achieve the validated time/temperature combination. Validation must be carried out using the worst case conditions as several factors will affect the cooking such as:

- the thickness of the burger
- the percentage of fat in the burger
- the initial burger temperature (fridge or room temperature)
- cold spots on the hot plate/grill, the use of surface temperature probes on hot plates can assist with finding cold spots
- type of grill/hotplate

Validation and verification that the time/temperature combination achieves four-log reduction
When validating and verifying the proposed time/temperature combination to ensure that it will result in a four-log reduction in bacteria, evidence may be gathered as below. The list is not exhaustive and there may be other ways to provide evidence.

Challenge testing

Challenge testing can be used to demonstrate that the cooking method will result in a four-log reduction of bacteria throughout the beef burger. Challenge testing is the deliberate addition of specific microorganisms to monitor their growth and/or survival in a product. The challenge testing must take into account that the bacteria associated with raw beef are Salmonella and Shiga-toxin producing Escherichia coli (STEC), including Escherichia coli (E. coli) O157.The laboratory will be able to advise on how testing can be done safely. Challenge testing can be done using actual pathogens in certain accredited laboratories using actual processing equipment to be used by the premise. Alternatively, challenge testing can be done in a food processing area using a qualified non-pathogenic surrogate organism with similar thermal resistance properties to the pathogen under consideration. Genuine human pathogens should not be used for microbiological testing in food processing environments. Microbiological testing must be carried out by a laboratory accredited to ISO 17025 and the methodology used by that laboratory should also be accredited. A list of accredited laboratories can be found on the United Kingdom Accreditation Service's (UKAS) website. Laboratories will be able to advise on tests in further detail.

Scientific data

The food business may consider scientific and/or technical data that has been produced by the food industry to support their validation and challenge testing. For example, where food businesses have a number of identical establishments, equipment and products, it may be that a validation for one establishment is suitable for other establishments.

It may also be possible to use wider industry validation data, if available, where products and cooking methods are similar. In this situation, it would be important to consider factors such as:

- time and temperature
- equipment
- method of handling
- ingredients
- fat content
- uniformity of composition
- size and shape of burger
- the heating method

Modelling

Potentially, mathematical modelling could be used to support validation and challenge testing. Models used for this purpose must be validated and verified as appropriate for LTTC beef burgers. There must be sufficient data to predict the effects of different treatments. Factors such as, but not limited to, size and composition must be considered.

Note: If changes are introduced to the method or product specification, for example a new piece of equipment is provided, or a new supplier or product specification is used, then the process must be re-validated.

Verification sampling

A FSMS that is effectively implemented will ensure that food safety hazards are under control. An important part of any FSMS is verification - activities that ensure the system is working. Microbiological sampling and testing after cooking can be used to verify that the FSMS in place is working as intended. When planning a sampling and testing regime, the following matters may need to be considered:

- quantity of LTTC beef burgers served
- controls in place
- purpose of the sampling regime
- pathogens being tested for
- against what parameters the final test results will be compared
- sample size to be tested each time
- frequency of sampling and testing

It is important to recognise the limitations of sampling and testing. For example, a result that reports the absence of STEC does not necessarily verify that all the burgers are free from STEC. If STEC was not present in the burger that was sampled before cooking, it will not be present after cooking, regardless of the controls in place.

Validation and verification of the cooking method

Following the validation of the temperature/time combination to achieve a four-log reduction, the cooking method must be validated before it is introduced to show that the proposed time/temperature will be achieved consistently. Once the cooking method has been validated and it is introduced, food businesses must verify that the time/temperature combination is being met consistently.

Temperature checks to validate and verify the FSMS

- the temperature at the centre of the burger will need to be tested, as this is likely to be the last part of the burger to reach the required temperature
- the type of probe thermometer used must be suitable and instructions must be followed, it must be calibrated according to instructions to ensure it gives an accurate reading
- the probe thermometer must be cleaned and disinfected before and after each use to reduce the risk of cross contamination
- temperature monitoring records should be kept in accordance with the FSMS
- monitoring records should be verified by management, in accordance with the FSMS
- the method used to check burger temperatures should be verified on a regular basis by observation, in accordance with the FSMS
- staff must be able to be identified and retrained if management identify any issues with records
- verification checks should be recorded along with any corrective actions taken, in accordance with the FSMS

Cooking time check to validate and verify the FSMS

The validated cooking method may entail burgers being cooked at a certain temperature for a certain amount of time to achieve the time/temperature combination throughout the burger. Several factors need to be considered when using time checks including:

- the type and temperature of equipment used - different grills and flat tops operate in different ways and some will have cold spots that will affect cooking time
- the number of burgers cooked together may affect cooking time
- heat will distribute at different rates through burgers with different thicknesses, fat content and ingredients
- the temperature of the burger before cooking - a burger removed from the fridge at 1°C will take longer to heat to core temperature than a burger at 5°C, the ambient temperature of the kitchen may also affect cooking time
- if timers are used to monitor the time taken to cook burgers, the number of timers needed will depend on the number of burgers to be cooked at the same time and whether every burger is timed, a maximum cook load may need to be set

Validation of cooking time

If the cooking time is used to assess whether the beef burgers are cooked to an appropriate time/temperature combination, this system must be validated before it is introduced. This would involve checking that the correct time/temperature of the burger has been achieved after it has been cooked for the set time.

If anything changes which may affect the cooking time, such as the cooking equipment or the supplier of the burgers, the method must be validated again.

Verification of cooking time

It is important that the time taken to reach the required time/temperature is verified regularly. To verify that an adequate time/temperature has been achieved, a burger must be cooked for the set time. Then the core temperature must be checked and monitored for the required length of time, as per the time/temperature combination. If cold spots on the cooking plate/grill have been identified, the verification must be carried out in the known cold spot.

Consideration must also be given as to how the above process will be recorded.

Consumer message

A consumer message should be provided to alert consumers, particularly vulnerable groups, to the increased risk of eating LTTC beef burgers.

Food businesses have a legal obligation to provide information to the consumer concerning the avoidance of specific adverse health effects from a particular food or category of foods. Although it is not a legal requirement to provide this information for LTTC beef burgers by way of a consumer message, it is best practice so that the consumer can make an informed choice.

Legal requirements

This legal requirement can be found in:

- Article 14 of retained Regulation (EC) 178/2002 for England and Wales
- Article 14 of Regulation (EC) 178/2002 for Northern Ireland

A relevant extract from the legislation can be found below:

- 'In determining whether any food is unsafe, regard shall be had:
- … to the information provided to the consumer, including information on the label, or other information generally available to the consumer concerning the avoidance of specific adverse health effects from a particular food or category of foods

And

- … In determining whether any food is injurious to health, regard shall be had… to the particular health sensitivities of a specific category of consumers where the food is intended for that category of consumers'

When a food carries a level of risk that is deemed as elevated but still within acceptable levels of risk, and that risk is not communicated to consumers to allow them to consider that before they order it, this could be considered as not fully compliant with general food law.

Consumer messaging research

The FSA conducted consumer focused research on the effectiveness of consumer advisory messages at the point of ordering, which was published in July 2016. The findings of the research were taken into consideration, along with comments from LAs and industry stakeholders, to develop the wording for consumer messages. Messages should be clear, meaningful and easily understood. The best practice box below contains the recommended consumer message to be used when LTTC beef burgers have been produced and served using the source control method.

Best practice

The FSA recommends using the following consumer message:
'Burgers cooked rare and medium rare carry a higher risk of food poisoning. Unlike a steak, a

burger needs to be cooked through to reduce that risk.

The Food Standards Agency recommends that children, pregnant women and anyone with a weaker immune system have their burgers well done. Please ask us for more information.'

As children are classed as a vulnerable group, it would not be appropriate for LTTC beef burgers to be included on children's menus. Food businesses should also consider if unaccompanied children can make an informed decision.

It is best practice that the consumer advisory message is prominent, clearly legible and considers the needs of those with impairments. The font size used for the consumer message should be legible to prompt discussion between staff and consumer if necessary. It is recommended the message is in the same sections of the menu in which burgers are listed and not obscured in any way. Where food is ordered remotely, such as online sales, the consumer message should be available and easily visible.