

MEAT MICROBIOLOGY

12 - Bacteria's basic needs

If we have an insight into bacteria's basic needs, we have the basics of a strategy of control through the removal of their needs. You may think this approach is simplistic, but it is surprising how often this basic information is overlooked, resulting in adverse consequences.

Essential food source

Bacteria are basically microscopic animals so their needs are similar to those of any animal.

First of all, they need to eat. For bacteria, any bit of organic dirt is a food source and they will extract the necessary nutrients. That splash of blood on the wall will be food for thousands of bacteria!

You might never have thought about cleaning in this way before, but surely all cleaning is the removal of the bacterial food supply?

Supply of water

Similarly, bacteria need to drink and any area of dampness is a water supply for thousands of bacteria. So, drying is also a way to slow down bacterial growth and so we raise conveyors after cleaning to facilitate the drying process.

If we leave the conveyors in situ there a water film is retained under them that favours bacterial growth and multiplication. This activity produces waste gases which can sometimes be detected by their smell when you lift up a conveyor on a Monday morning!

So, clean, dry areas are hostile areas when it comes to bacteria and their survival.

Most bacteria require air (oxygen) and the removal of this from poultry products by vacuum packing, MAP or CAP inhibits bacterial growth and multiplication.

That is why these processes are effective at extending or enhancing shelf-life.

Bacteria like to keep warm and grow and multiply faster at warm temperatures. Here again we can make use of this when it comes to managing the keeping quality of products as refrigeration, especially at $<4^{\circ}\text{C}$, greatly inhibits bacterial growth and multiplication.

Bacteria, like most animals, can move but they do not have legs or wings – some have whip like appendages or flagella which propel them through a water film. In some situation they are moved by capillary action through such films.

So, here is another benefit of a dry environment.

Mode of transport

Bacteria can be transferred from place to place by inanimate objects (taxis) known as fomites. Good examples of these are cloths, mops and brushes.

Anything that falls on the floor and is returned to the production surface effectively becomes a fomite as it transfers bacteria from the floor to the production surface and then invariably to the food that is being processed.

A key aspect of modern food hygiene management is to detect fomites and potential fomites and to remove them from the meat processing area.

Animals and bacteria like to be protected from adversities and, in the case of bacteria, this includes sunlight and disinfectants / sanitisers.

Any microscopic hole or crack, such as cracks in a perished washer or seal, will provide a safe haven that can harbour hundreds, if not more, of bacteria.

Management control

So, if management can provide rooms for meat processing with smooth, impermeable walls with no holes or cracks that are dry and clean and keep room temperatures low they are well on the way to controlling bacteria.

Conversely, wet, dirty, warm areas with rusting (damaged) metal, such as is found in wet vane coolers, is the perfect bacterial multiplication unit!