

Basic Bacteriology & Curing

Bacteria, yeasts and moulds require *water, food, warmth* and *suitable Ph* to grow.

Most bacteria grow well at 36.6°C/98.6°F which is body temperature. Most bacteria are *aerobic* which means they require oxygen but some, including the dangerous *clostridium botulinum*, grow *anaerobically* e.g. without oxygen.

Reducing temperature, even freezing, will *reduce* the rate of bacterial multiplication but not stop growth, as will changing the *Ph* of the host, in this case, meat.

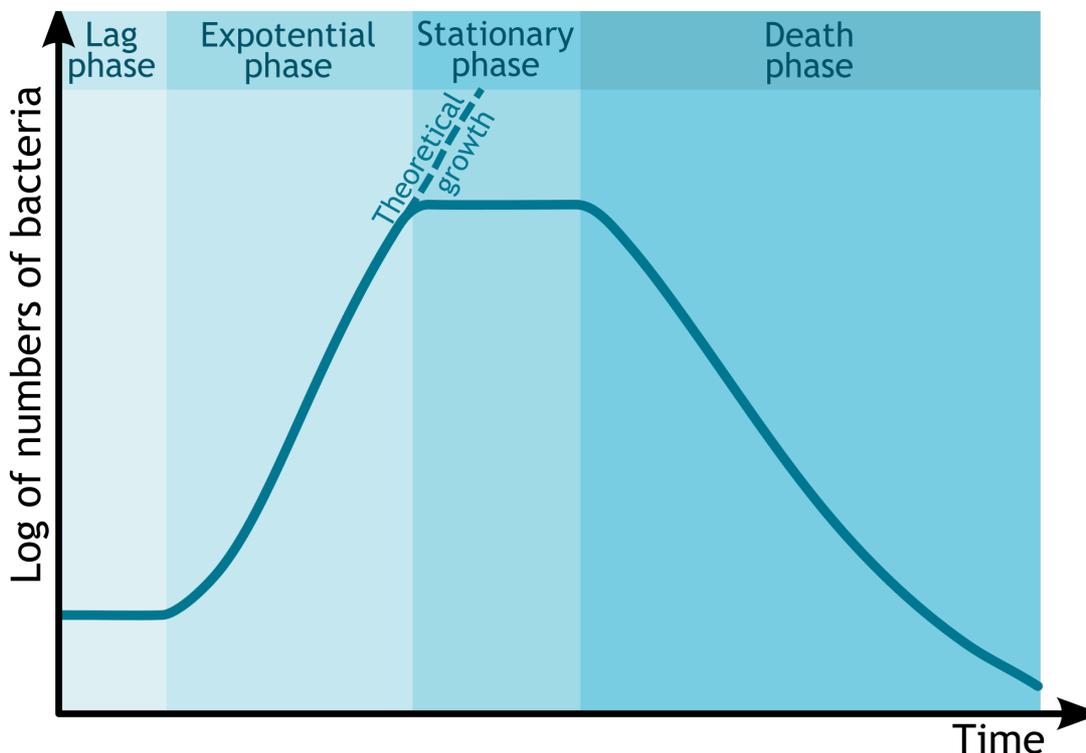
Ph is a measure of acidity and is measured logarithmically²⁹ on a scale of 0 to 14 with 0 being acid and 14 being alkaline (or base which means it is a water soluble solution that can accept [hydronium ions](#)). Distilled water is said to be neutral which is 7 on the scale.

To spread and grow *bacteria require water* and the typical water content of meat muscle (approx 75%) give bacteria a good environment in the presence of suitable foodstuffs in the meat. Most bacteria are not motile so they are spread by water or through contact.

Most bacteria are said to grow at *exponential* rates because bacteria divide to reproduce. In other words, one bacterium divides and becomes 2, 2 become 4, 4 become 8, ad infinitum.

If you look at the chart below you can see that bacteria can double in 20 minutes in their optimum growth temperature range.

This growth rate is known as the *exponential* or *logarithmic phase* and the dormant phase, when bacteria do not have suitable temperature or food conditions to reproduce, is called the *lag phase*.



²⁹ In a solution pH approximates but is not equal to $p[H]$, the negative logarithm (base 10) of the molar concentration of dissolved hydronium ions (H_3O^+); a low pH indicates a high concentration of hydronium ions, while a high pH indicates a low concentration. Crudely, this negative of the logarithm matches the number of places behind the decimal point, so for example 0.1 molar hydrochloric acid should be near pH 1 and 0.0001 molar HCl should be near pH 4 (the base 10 logarithms of 0.1 and 0.0001 being -1 , and -4 , respectively). Source: Wikipedia