Summary

Bacterial growth is the cell division, of a bacterium into two daughter cells, in a process called binary fission. There is an effect of various environmental factors which influence the rate of bacterial growth such as acidity (pH), water activity, temperature, micro and macro nutrients, oxygen levels, and various toxins. Bacterium have optimal growth conditions under which they thrive, but once outside of those conditions the resulting stress can result in either stalled or reduced growth, dormancy (such as formation spores), or even death.

The combinatorial effect of these factors. viz, Intrinsic factors and Extrnsic factors, determine whether microbial growth will preserve or spoil foods. Intrinsic or food related parameters are those parameters of plants and animal tissues which are inherent part of the tissue. e.g., pH, water activity (a_W), oxidation-reduction potential (Eh), antimicrobial constituents, nutrient content and biological structures. Extrinsic or environmental parameters are properties of storage environments which affect both foods as well as microorganisms and is inclusive of temperature, relative humidity of storage environment, and concentration of different gases in environment.

Although each of the major factors listed afore plays an important role, the interplay between these factors ultimately determines whether a microorganism will grow in a given food. Often, the results of such interplay are unpredictable, as poorly understood antagonism or synergism may occur. Lead is taken of this interplay with regard to preventing the outgrowth of **a bacterium.** Viz, *C. botulinum*. Food with a pH of 5.0 (within the range for the *C. botulinum*) and a_w of 0.935 (above the minimum required for *C. botulinum*) may not support the growth of this bacterium.

Therefore, any predictions about whether or not a particular microorganism will grow in a food can, in general, only be made through experimentation and research. As also there are many microorganisms that do not need to multiply in food to cause the disease.