

Microbial Activity in Food

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Editorial

When a food is spoiled, its characteristics are changed so that it is no longer acceptable. Such changes might not generally be microbiological in origin; a product can also become unacceptable due to insect damage, drying out, discolouration, staling or rancidity for instance, however most food spoilage is an end result of microbial activity. Microbiological food spoilage can happen in numerous exclusive ways, a number of which frequently arise in combination. Visible microbial growth can be obvious in the form of surface slime or colonies, degradation of structural components of the food can cause a loss of texture; anyway the most widely recognized sign can be chemical products of microbial metabolism, gas, pigments, polysaccharides, off-odours and flavours. A general feature of microbial spoilage is its rather unexpected onset; it does not seem to grow progressively, day by day a little worse, yet more regularly as an unexpected and unpleasant revelation. This is an impression of the exponential nature of microbial multiplication and its result that microbial metabolism can also proceed at an exponentially increasing rate.

If a microbial product related with spoilage, for instance an off odour, has a certain detection threshold, the extent will be well beneath this threshold for maximum of the product's ideal shelf-life. Once reached, however, it will be rapidly passed so that within a relatively short time, levels will be well in excess of the threshold and the product might be profoundly spoiled. Prediction or early identification of spoilage is not always simple since the mechanisms underlying microbiological deterioration can be quite intricate. It is generally far easier to recognize the chemical responsible for a particular off-odour than to identify the organisms responsible. Total

microbial counts are usually a poor indicator of spoilage potential. Many of the organisms specified may not grow in the food and many of those that do will not be responsible for spoilage. The value of microbial enumeration techniques can be improved if they are specific to those organisms associated with spoilage, so called Specific Spoilage Organisms (SSO).

Vegetables should not normally be a cause of public health concern but the transmission of enteric pathogens such as *Salmonella*, *Escherichia coli* and *Shigella* is possible by direct contamination from farmworkers and the faeces of birds and animals, the use of manure or sewage sludge as fertilizer, or the use of contaminated irrigation water. Contamination can be decreased by washing products in clean water, however even chlorinated water will normally give only a 2-3 log decrease in microbial numbers as some surface microbes are lodged in hydrophobic folds or pores and thus evade treatment. Not all pathogens are always transmitted to vegetables via direct or indirect faecal contamination. Organisms that include *Clostridium botulinum* have a natural reservoir within the soil and any products contaminated with soil can be assumed to be infected with spores of this organism, probably in very low numbers. Psychrotrophic organisms readily isolated from the environment are *Yersinia enterocolitica* and *Aeromonas hydrophila*, both expected to be associated with vegetables could grow to levels capable of causing illness if care is not taken during the growth, harvesting, storage and treatment of these commodities.

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