The True Impact of Food Borne Infections

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Several developments in microbiology has helped in bridging various subdisciplines and these appear to be by-products of increased interests in food borne diseases. The new developments have profound ramifications for food microbiology and food technology, and enable us to understand the basic mechanisms of certain phenomenon and in doing so, direct and target future research. This becomes all the more important, because the list of acute diseases linked to a food vector has increased dramatically and microbe have demonstrated their adaptability to new food and food processing.

Recent experiences suggest that the name of the organism is not that important, rather, the genes carried by the microbes determine whether it is harmless or potentially harmful. One example is the Yersinia species. These organisms are encountered in food, sometimes in large numbers, but are usually not able to cause human disease because they lack the requisite virulence gene. The discovery and characterization of this virulence gene (inv) , may give important clues about the potential pathogenicity of other bacteria and enable development of rapid screening test to differentiate harmless from harmful bacteria which share a common name.

Micro organism alone does not define the outcome of an infection, but the traits of the hosts also contribute to virulance of the microorganism. Experience with Listeria monocytogenes show that certain populations are at a greater risk than others- pregnant women, cancer patients etc. Knowledge of host factors that predispose to the disease enables educational programmes to be directed at population most at risk- when these are coupled with the knowledge of where the organism is likely to be encountered (high risk foods) , avoidance of infection is possible.

A recent study of an AIDS patient in San Fransisco demonstrates that AIDS diagnosed males were more than 300 times as susceptible to Listeriosis as AIDS negative males. Once the increased susceptibility was realised dietery advice in the form of information about food likely to contain L monocytogenes could be given to AIDS patients.

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New problems with old pathogens

We also have got new problems with some old pathogens like salmonella. The transovarian transmission of a salmonella, highly virulent for humans is a very bad news indeed. This shows that bacteria can adopt to new riches and if given time, become established in new primary hosts. Bacteria considered autochthonus ,such as Citrobacter, Hafnia and Enterobacter have been shown to be capable of producing human disease. How then to differentiate the autochthonus bacteria from allocthonus microbes?

This has led to rapid adoption of method based on recombinant DNA technology into the repertoire of microbiological identification techniques. Gene probes are now used with regularity in food micro biology. They afford speed and specificity and can quantitate those microbes possessing virulence gene and ignore those in the same food and with same name that are harmless. The polymerase chain reaction can also be used to analyse bacterial DNA in a way that remains useful to the food analyst.

Microbiology in Food Industry

Food microbiology has thus become a driving force for research in several disciplines and focal point of research in many fields. The "Heat Shock" response in bacteria has been widely studied and has got important applications in food industry. Comparing the response of heat shocked and non-heat shocked Salmonella thompson in egg, it was shown that while 54°C/ 1 hour can kill 5 $\log_{10}$ non-heat shocked bacteria, it kills only 1 $\log_{10}$ heat shocked bacteria. The rate of temperature increase dictates the degree of thermal resistance. A slow rise in temperature induced far more thermal resistance than a more rapid rise.

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