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Real time detection of bacteria for improved decontamination for the food industry

Food quality and shelf-life is seriously affected by bacterial contamination and food spoilage microorganisms, which can lead to reduction in food quality, food poisoning and death. It is estimated that food poisoning costs the USA $152B and kills 5000 people per year. In the UK an estimated 22M working days are lost with 50 deaths per year and 500 000 cases of food poisoning from known pathogens alone. A common route to campylobacter infection, for example, is through undercooked chicken or cross contamination and poor hygienic protocols, with many food production workers not even following simple hand washing procedures. It is clear, therefore, that there is a strong need for advanced protocols that can reduce the risk of food poisoning and improve food safety. There has been considerable effort to research and introduce advanced decontamination systems, but there has been little attempt to develop real time bacterial detection systems which could identify potential problems allowing appropriate solutions to be implemented such as advanced control strategies for real time detection, destruction and control of pathogens. The current state of the art of bacterial detection will be discussed, with emphasis on those that offer real time capability. Specific work on laser dynamic speckle analysis, laser induced fluorescence and detection of luminescent bacteria will be described and potential strategies for controlling decontamination processes identified.

Biography

Ian A Watson first degree was in Applied Physics followed by a PhD from the School of Engineering, University of Glasgow, in "Optimising the gaseous discharge and optical coupling of a pulsed CO2 laser". He has extensively researched the effects of high power laser beams on microorganisms and laser sterilization and inactivation; publishing on direct effects of lasers and their efficacy on decontaminating different substrates (solids, liquids and air) and a range of microorganisms (*E. coli* to *B. atrophaeus*, an anthrax simulant). He is actively investigating microalgal growth, dewatering and extraction of biofuel and utilization of microalgae for food.

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