
Scaling plasma systems for the Agri-Food sector

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Plasma generation at atmospheric pressure is of interest to the agri-food processing sector because it is compatible with many typical manufacturing conditions. The ability to generate cold plasma discharges at atmospheric pressure makes integration of the decontamination or treatment process easier and less expensive. The diverse range of processes and products found in the industry, from field to factory, from growing tissue to post-harvest, from batch to continuous processing, from dry to wet processing from fine granular matter to large carcasses will require a diverse range of plasma treatment designs. The potential of cold plasma as a food processing aid has been demonstrated for a range of processes including; microbial decontamination, pest control, toxin elimination, food and package functionalisation. However, to date most studies are at laboratory scale, this talk discusses the status and challenges of transferring the technology to the industry. The feasibility of using air as the plasma source gas offers a cheap processing aid for food applications which is practically essential given the large scales of production and the typically low value added nature of agri-food processing. A key aspect is the effective scaling of plasma systems up to larger areas without compromising the plasma uniformity. Potential designs include plasma jet arrays, microplasma arrays, surface barrier discharge, in-package DBDs and plasma activated water. Other challenges discussed include: effective process control and validation; regulatory approval and consumer acceptance.