



Contribution ID: 572

Type: Oral

A novel device enhanced the active antimicrobial components in the plasma treated solution

Tuesday 25 June 2019 11:30 (15 minutes)

The plasma have shown a wide application prospect in sterilization, such as the medical device disinfection, tooth whitening and fruit preservation. Among these plasma generator devices, the surface dielectric barrier discharge plasma have been widely researched. This kinds of plasma device have a feature that the plasma generated area is bigger than plasma jet. But, as the the active species is short-lived and the transfer distance is extreme short, Neither the directly reached RONS nor the plasma-liquid reaction regenerated RONS generally accumulated in the surface layer of liquids. So in this experiment, a magnetic stirring apparatus was designed and utilized to enhance the solution streaming when the solution was treated by plasma. By adjusting the rotational speed, we treated several group of solution. The short-lived $\cdot\text{OH}$ and long-lived H_2O_2 were measured. Apart this the ORP and pH were detected, which can indicate the electrochemical properties. Analyzed these parameters, we can find the streaming of solution influence the amount of RONS in the solution. Besides, we choose yeast as a model cell to study the specific difference under the streaming or not. The yeast after treated were examined via colony forming unit (CFU) count, and further verified by LIVE/DEAD staining and scanning electron microscope (SEM).

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Session Classification: 6.5 Biological and Medical Applications II

Track Classification: 6.5 Medical and Biological Applications