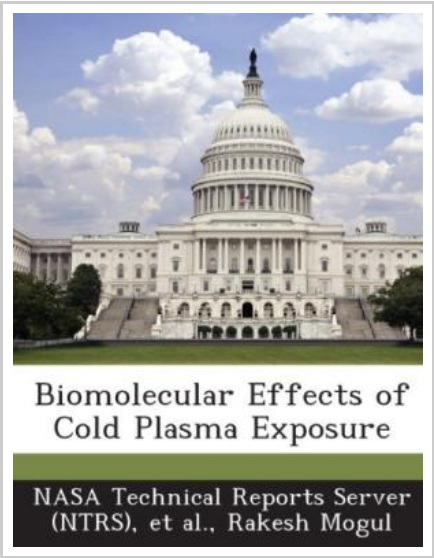

Biomolecular Effects of Cold Plasma Exposure

By Rakesh Mogul

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 32 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.The effects of cold plasma exposure on Deinococcus radiodurans, plasmid DNA and model proteins were assessed using microbiological, spectrometric and biochemical techniques. Exposure of D. radiodurans, an extremely radiation resistant microbe, to O2 plasma (less than or equal to 25 W, approx. 45 mTorr, 90 min) yielded a approx. 99. 999 sterilization and the sterilization rate was increased approx. 10-fold at 100 W and 500 mTorr. AFM images shows that the exposed cells are significantly deformed and possess 50-70 nm concavities. IR analysis indicates the chemical degradation of lipids, proteins and carotenoids of the cell wall and membrane. Intracellular damage was indicated by major absorbance loss at 1245, 1651 and 1538cm corresponding to degradation of DNA and proteins, respectively. Biochemical experiments demonstrate that plasmas induce strand scissions and crosslinking of plasmid DNA, and reduction of enzyme activity; the degradation is power dependent with total sample loss occurring in 60 s at 200 W and 500 mTorr. Emission spectroscopy shows that D. radiodurans is volatilized into CO2, CO, N2 and H2O confirming the removal of biological matter from contaminated surfaces. The O2...

Reviews

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