In this paper, we investigate the UVC light emission from phosphors under plasma excitation for anti-microbial testing on Escherichia coli (E-coli).

For this purpose, we developed in collaboration with Saint Gobain a small Dielectric Barrier Discharge (DBD) lamp prototype (80mmx120mmx6mm) constituted by two quartz plates playing the role of the dielectric, an internal phosphor coating, calcium (Ca2P2O7) doped with Pr3+, generating UV-C emission, and a gas gap filled with a mixture of Ne/Xe 50% at a chosen pressure. A conducting grid has been deposited on both external sides (parallel and plane electrodes) to apply the voltage and ignite the discharge. The operating principles are the same as Planilum lamp from Saint Gobain1. We selected the phosphor coating from our previous work2 where phosphor efficiencies were compared in a dedicated experiment chamber filled with a mixture Ne/Xe 50% at 250 mbar and the highest temperature process (α- Ca3P2O7:Pr2%Na2%) was identified to be the most efficient.

The lamp prototype can be filled at different pressures, the standard pressure used in this study is 250 mbar. The power supply can generate square or sinus waveform with frequency up to 100kHz and a 2kV maximum voltage.

We will first present the parametric studies based on different excitations (waveform, frequency and power) with spectral investigations on the UV-C emission leading us to the standard configuration. In this configuration, we will investigate the anti-microbial effects on E-coli for different exposure times and concentrations.