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**Abatement of ammonia and butyraldehyde under non-thermal plasma and photocatalysis:  
Oxidation processes for the removal of mixture pollutants at pilot scale**

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**Abstract**

Dielectric barrier discharge DBD-plasma based technologies have been widely investigated for the abatement of air pollutants. More recently, photocatalysis (TiO<sub>2</sub>/UV-lamp) has also showed promising results for air pollution abatement. In this work, these two methods were used separately and combined (TiO<sub>2</sub>/UV-lamp/DBD-plasma) in order to enhance the performance of the process for air pollutants degradation/mineralization. Ammonia (NH<sub>3</sub>) and butyraldehyde (C<sub>4</sub>H<sub>8</sub>O) have been firstly treated alone and then an equimolar mixture (NH<sub>3</sub>/C<sub>4</sub>H<sub>8</sub>O) was monitored in a continuous reactor. Effect of operational parameters such as pollutants inlet concentration, flowrate, humidity and specific energy of plasma were thoroughly determined. Results showed that coupling both methods in the same reactor improves removal efficiency for single pollutant or a mixture of two pollutants. This processes combination showed a synergy between DBD-plasma and photocatalytic oxidation. Moreover, pollutant mineralization and potential

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