

## Pesticide Reduction in Soil through Advanced Cold Plasma Treatment: A Transformative Solution

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Recently cold plasma has been studied for its potential application in agriculture [1], [2]. Cold Plasma can have several effects that contribute to sustainable agriculture such as controlling pathogens, pests, weeds and pesticides in the soil. Pesticide-containing soil poses an environmental and human health problem, which may be solved by non-thermal plasma technology [3], [4]. In this study, a DBD-based cold atmospheric pressure plasma is used to degrade the pesticide in soil. The degradation of pesticides is influenced by electrode gap, voltage, frequency, initial pesticide concentration, soil moisture and soil pH. The main components for degradation of pesticides are NO<sub>x</sub>, ozone and hydroxyl radicals generated by plasma discharge. The fundamental studies on electrical characteristics and temperature variation in DBD sources have been analysed. To measure the concentration of pesticide in soil UV visible spectrometry has been used. Also, the changes in the soil nitrite content after degradation of pesticide is analysed.

Plasma treatment is found to enhance the availability of nutrients in the soil by breaking down organic matter and converting nutrients into more accessible forms. Plasma influences the soil structure by altering the physical and chemical properties of soil which are confirmed by Field Emission Scanning Electron Microscopy (FESEM) and Fourier Transform Infrared Spectroscopy (FTIR) thereby improving soil porosity, water retention and aeration. Plasma agriculture possesses the potential to lead the way for sustainable agriculture. The detailed results of this study will be presented.

### References

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