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Soil decontamination using ozone generated in electrical discharge

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This work introduces an overview on the bactericidal properties of plasma assisted ozone treatment for soil remediation. Developed system provided above 20 g/m³ of ozone concentration, that is the critical value for efficient soil decontamination. The gaseous ozone injection system consisted of porous ceramic injectors and the treatment container to sterilize large volumes of agricultural soil. Additionally, treatment system based on ozonized water using sprinklers and underground irrigation lines was developed.

Influence of ozone soil treatment on basic soil properties, on chosen plant species and microorganisms was tested. Gaseous ozone sterilization was proven to be satisfactory for the treatment of soil infected by *Fusarium oxysporum*. Up to 99.9% decontamination efficiency was achieved using ozone concentration over 20 gO₃/m³.

Application of ozone as a environmental-friendly plants' growth supporting factor should be carefully justified because influence of this oxidant strongly depends on the plant's type. Establishing potentially beneficial doses for certain species still requires further research work.

The fundamental experiments on biological reaction between the λ -E.Coli DNA and ozone exposure suggested that the molecular structure of the DNA collapsed completely using 5% wt. ozone concentration. 0.2-1 g of ozone was supplied to 0.5 ml of λ -E.Coli DNA solution during 5-20 min of treatment with 0.5 l/min causing complete collapse of the DNA structure.