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EFFECTS OF DIFFERENT SANITIZATION TREATMENTS ON SOIL CHARACTERISTICS

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Abstract

In the present study, the effects of two methods for thermal sanitization of soil, by oven and by autoclave, and two non-ionizing radiation sterilization methods, UVC and microwave on pH, conductivity, dry weight, total number of germs and respiration of samples from neutral commercial soil were evaluated, using international standard methods. Also, the infrared and UV-VIS spectroscopy were applied for the determination of chemical properties and structural characterization of humic acid and hydrophilic indexes at molecular level. The independent variable parameters used in the study were the time and temperature of sterilizing process and also the radiation dose applied. The results had shown a few variation of pH regardless the method of sanitization. However, the initial conductivity (EC) of soil (44 $\mu\text{S}/\text{cm}$ for control) increases after UVC (54 $\mu\text{S}/\text{cm}$) and oven (68 $\mu\text{S}/\text{cm}$) treatments. Concerning microbial inactivation, the autoclave method is more efficiently because the initial NTG (total number of bacteria germs) of 96×10^9 cells/g decreased under the detection limit after this treatment. For autoclaved soil, the CO_2 level remains constant. After application of oven treatment, an intensification of metabolic processes in the sense of degradation of organic matter occurred besides reducing the number of microorganisms. Also, the result reflected a similar tendency between the hydrophilic component and humic acid content. Variation of hydrophilic compounds of humic acids calculated for soil exposed to different techniques suggested that sanitization techniques applied to the commercial soil induced modification of soil and organic compounds, besides sanitation.

Key words: humic acid index, hydrophilic index, sanitization techniques, soil basic characteristics

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