EVALUATION OF THE ANTIFUNGAL ACTIVITY OF CATTLE MANURE BIO-OIL

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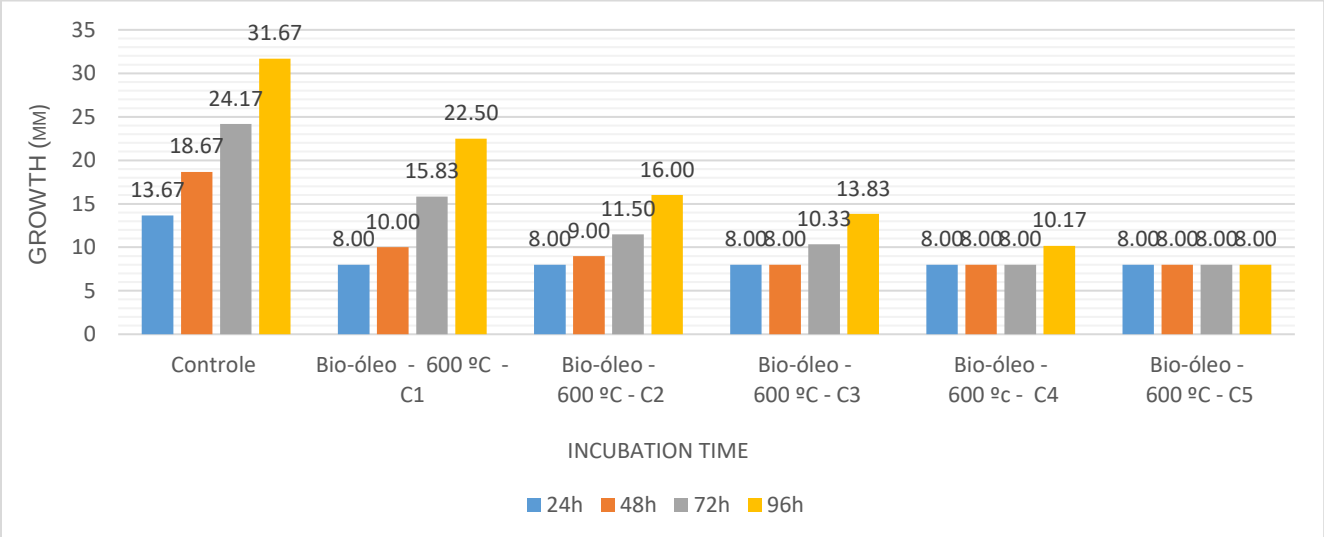
Plant diseases are a threat to the health and functionality of both natural and man-made ecosystems. Diverse methods and strategies are being employed to prevent, ameliorate or control plant diseases. Unsustainable practices such as use and misuse of synthetic fungicides have caused severe harm to human health, wildlife and the environment (1). Fungal cause the most destructive plant diseases and impose major losses to both natural and production systems, and one of it is the fungi. Botanical fungicides are particularly sought after because they are abundant, selective, readily degraded, and are not toxic to mammals (2).
Bio-oils produced by rotatory kiln pyrolysis reactor at 400 °C, 500 °C and 600 °C had their antifungal activities tested by the disc-diffusion technique. The bio-oil samples were used at concentrations of 1000 μg mL^{-1} (C1), 2000 μg mL^{-1} (C2), 3000 μg mL^{-1} (C3), 4000 μg mL^{-1} (C4) and 5000 μg mL^{-1} (C5) against two types of phytopathogenic fungi, *Fusarium solani* and *Lasiodiplodia theobromae*, saprophytic species capable of living in the soil for long periods that devastate the production of citrus fruits. Furthermore, DMSO (dimethylsulfoxide) was used as the surfactant with concentration of 1% in the samples.
In general, cattle manure bio-oils presented satisfactory fungistatic potentials, reaching higher than 50% of growth inhibition, and the one produced at 600 °C presented the best result, achieving 95% inhibition of growth against the fungus of the genus *Lasiodiplodia*. Against *Fusarium*, the bio-oil produced at the highest temperature was able to inhibit 100% of its growth at the same concentration C5. The samples were characterized using GC/MS and a predominance of phenolic compounds was observed, among them phenol, which had a concentration of 12.35% in the samples. Therefore, it is suggested that this antifungal action is correlated to the predominant presence of phenolic compounds in the sample, which act by penetrating the fungal cytoplasmic membrane, altering its selective permeability, vital for the maintenance of vital intracellular substances.



Graph 1 - Growth in mm of the fungus Fusarium solani in the presence of the bio-oil produced at 600 °C.

References

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