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TOWARDS THE FORMULA OF PEAT-FREE SOIL CONDITIONER

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Abstract
The need to elaborate a peat-free formula applicable as a modern soil conditioner is driven by the global trends in environmental sustainability and circular economy: to increase reuse of biodegradable industrial waste instead of landfilling, and to exploit renewable natural resources instead of non-renewable, fossil resources, e.g., peat. This study aims to elaborate a peat-free soil conditioner using locally available materials: waste from energy production – biomass combustion fly ash – in a mixture with natural adhesive – organic-rich freshwater sediments (sapropel). The current form of soil conditioner is developed as granules made by extrusion and drum granulation. The range of analyses and tests were performed with raw material and derived granules detecting physical-chemical properties. The optimal mass ratio of raw material suitable for the best granulation result is 67:100 (fly ash to sapropel). The average diameter of a granule is 8 mm. Analysis of chemical composition indicated that granules are abundant in several elements (e.g., Ca, K, Mg, Mn) with variable bioavailability. Plant cultivation tests with lettuce revealed that most optimal was the addition of 50 g/L of granules to a neutral growing media in combination with an additional source of nitrogen and phosphorus. The formula requires further adjustment and tests to provide the set of objectives such as con-trolled-release fertilizing effect significant for soil fertility and remediation encouraging environmental benefits, notably, soil protection by promoting recultivation and exploitation of degraded, eroded, depleted and salinized soil.

Keywords: Circular Economy, Granulation, Material Cycling, Soil Improvement and Revitalisation, Sustainable Use of Resources

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