

Biochar from Empty Fruit Bunches Generated in the Palm Oil Extraction and Its Nutrients Contribution in Cultivated Soils with *Elaeis guineensis* in Casanare, Colombia

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Abstract : The oil palm sector has seen significant growth in Colombia after the insertion of policies to stimulate the use of biofuels, which eventually contributes to the reduction of greenhouse gases (GHG) that deteriorate not only the environment but the health of people. However, the policy of using biofuels has been strongly questioned by the impacts that can generate; an example is the increase of other more harmful GHGs like the CH_4 that underlies the amount of solid waste generated. Casanare's department is estimated be one of the major producers of palm oil of the country given that has recently expanded its sowed area, which implies an increase in waste generated primarily in the industrial stage. For this reason, the following study evaluated the agronomic potential of the biochar obtained from empty fruit bunches and its nutritional contribution in cultivated soils with *Elaeis guineensis* in Casanare, Colombia. The biochar was obtained by slow pyrolysis of the clusters in a retort oven at an average temperature of 190 °C and a residence time of 8 hours. The final product was taken to the laboratory for its physical and chemical analysis as well as a soil sample from a cultivation of *Elaeis guineensis* located in Tauramena-Casanare. With the results obtained plus the bibliographical reports of the nutrient demand in this cultivation, the possible nutritional contribution of the biochar was determined. It is estimated that the cultivation requirements of nitrogen is 12.1 kg.ha⁻¹, potassium is 59.3 kg.ha⁻¹, magnesium is 31.5 kg.ha⁻¹ and phosphorus is 5.6 kg.ha⁻¹ obtaining a biochar contribution of 143.1 kg.ha⁻¹, 1204.5 kg.ha⁻¹, 39.2 kg.ha⁻¹ and 71.6 kg.ha⁻¹ respectively. The incorporation of biochar into the soil would significantly improve the concentrations of N, P, K and Mg, nutrients considered important in the yield of palm oil, coupled with the importance of nutrient recycling in agricultural production systems sustainable. The biochar application improves the physical properties of soils, mainly in the humidity retention. On the other hand, it regulates the availability of nutrients for plants absorption, with economic savings in the application of synthetic fertilizers and water by irrigation. It also becomes an alternative to manage agricultural waste, reducing the involuntary emissions of greenhouse gases to the environment by decomposition in the field, reducing the CO₂ content in the atmosphere.

Keywords : biochar, nutrient recycling, oil palm, pyrolysis

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