PLANT SCIENCES

Rice straw effect on phosphate rock from Morocco (PRM) phosphate solubilizing bacterium (PSB) combination on acid soil in Man (Ivory Coast, West Africa).

Guety Thierry Philippe^{1*}, Affi Jeanne Bongoua-Devisme¹, Wondouet Hippolyte Kpan¹, Konan-Kan Hippolyte Kouadio¹, Franck Michael Lemounou Bahan²

1 Soil Science and Sustainable Agriculture branch, UFR STRM, Université FHB, Cocody, 22 BP 582 Abidjan 22, Côte d'Ivoire

2 National Centre for Agronomic Research (CNRA) Man, BP 4040 Man, Côte d'Ivoire

* Corresponding author: thierryguety@yahoo.fr Tel: +225 07 07786744

Key words: Rice straw, phosphate rock from Morocco, PSB, Acid soil, Man.

Submitted 16/12/2023, Published online on 29/02/2024 in the *Journal of Animal and Plant Sciences* (J. Anim. Plant Sci.) ISSN 2071 – 7024

1 ABSTRACT

The study examines the problem of phosphorus (P) limited availability to plants. The experiment evaluates impact of rice straw, combined with Phosphate Solubilising Bacteria (PSB) and Phosphate Rock from Morocco (PRM) amendments, on P availability and soil chemical parameters. The results demonstrate the importance of the straw: it significantly lowers pH, to 4.80 in sterilised soil and 4.88 in non-sterilised soil. It encourages proliferation of PSB, increasing from 105 to 107 bacteria g⁻¹ of dry sterile soil to 105 and 106 bacteria g⁻¹ of dry non-sterile soil. The presence of straw also increased the level of dissolved phosphorus, reaching 9.77 mg.kg⁻¹ and 13.68 mg.kg⁻¹ of dry non-sterile soil compared with 5.05 mg.kg⁻¹ and 9.55 mg.kg⁻¹ of dry sterile soil. Furthermore, the introduction of straw exceeded the critical threshold for Dissolved Organic Carbon (DOC), exceeding 0.3 mg.kg⁻¹ of dry soil. Without rice straw, whatever the soil type, DOC remained below this threshold, while pH increased and phosphorus levels remained lower than those observed with the presence of straw. The mineralisation of rice straw acidifies the solution in the medium, increases P, encourages the proliferation of bacterial micro fauna and increases the medium's DOC. The addition of straw had a significant effect on the parameters of the growing medium.