

# 24<sup>TH</sup> BIOTECHNOLOGY CONGRESS: RESEARCH & INNOVATIONS

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### Growth and yield of *Pisum sativum* L. (pea) in response to bio-fertilizer produced from *Rhizobium* species isolated from soya bean root nodules

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**Statement of Problem:** The indiscriminate use of chemical fertilizers to increase the soil nutrients and the use of pesticides is one major problem facing crop farming. Hence, the use of bio-fertilizers can be a very good complementary to the chemical fertilizers as they not only promote crop growth and yield but also maintain soil health for sustainable agriculture. The growth and yield of pea (*Pisum sativum* L.) in response to bio-fertilizer produced from *Rhizobium* species using poultry droppings and earthworm casts as carrier materials were evaluated.

**Methodology & Theoretical Orientation:** Soya bean (*Glycine max* L.) was cultivated to obtain the root nodules for the isolation of *Rhizobium* species. The nodules were sterilized, crushed, serial dilutions prepared, inoculated on Yeast Extract Mannitol Agar (YEMA) media and incubated at 28°C. The pure culture of *Rhizobium* was isolated, mass-produced and then mixed with sterile carrier materials (poultry droppings and earthworm casts), each for application unto the experimental crops. The *Rhizobium* broth and carrier materials were mixed in the ratio of 2 liters to 100kg. Analyses of experimental soil, poultry droppings, and earthworm casts were carried out to determine their physicochemical properties. Four treatments were replicated four times and arranged in a Complete Randomized Block Design (CRBD). Ten kilograms (10kg) of the fertilizer types each was applied to the cultivated ridges in plots A, B, and C Plot D (control) was not treated with fertilizer. Plant growth and yield parameters of pea grown on soil amended with the bio-fertilizers (of different carriers), inorganic fertilizers and the control were measured and compared.

**Findings:** The results showed an improvement in the growth and yield parameters of *Pisum sativum* (pea) that received *Rhizobium* bio-fertilizer over the control. There was a significant difference at ( $p < 0.05$ ) in the growth and yield parameters of a pea in relation to fertilizer treatments. The highest improvement in the growth and yield of pea was observed in bio-fertilizer amended with poultry droppings, while the control had the lowest. Plants treated with inorganic fertilizer had a mean value of 1.84t/ha while the control gave the least yield of 1.25t/ha.

**Conclusion & Significance:** The outcome of this study is important in that farmers can fall back on *Rhizobium* bio-fertilizer for the cultivation of pea since the inorganic fertilizers are very expensive such that most poor farmers cannot afford them.

#### Biography

Janet Uchechukwu Itelima has her expertise in Applied Microbiology and passion in research related to Applied Microbiology, Biotechnology, and Plant Science, lecturing, and community services. She has obtained her PhD and currently an Associate Professor of Applied Microbiology. She is an academic staff of the Department of Plant Science and Technology, Applied Microbiology Unit, Faculty of Natural Sciences University of Jos, Nigeria. She has published 40 papers both nationally and internationally. She has also written two books. She is deeply involved in motivating students on how to obtain academic excellence. She has attended workshops and conferences both nationally and internationally, where she presented papers, chaired sessions and served in the advisory committee. She has recently been to the United States of America where she attended three conferences and also presented papers.

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