

ABSTRACT

Biofertilizers have been used as source to improve plant nutrients in sustainable agriculture. A pot experiment was conducted to evaluate the potential of *Bacillus* strains (*B. polymyxa* as nitrogen fixer, *B. megaterium* as phosphate dissolving bacteria and *B. circulans* as potassium release bacteria) inoculated to cowpea seeds and wheat grains in soil fertilized with mineral fertilizers (chemical "super phosphate, potassium sulfate" and natural "rock phosphate , feldspar") on growth, yield characters and chemical composition of two tested plants cowpea (*Vigna unguiculata L.*) cv. Doki and Wheat (*Triticum aestivum L.*) cv. Sakha 93 to study the residual effect of chemical and natural mineral fertilizers. Results showed that characters of studied plant were positively affected increased with inoculation by biofertilizers for two tested plants. Data revealed that fertilized cowpea by biofertilizers as *Bacillus* strains combined with chemical mineral fertilizers (super phosphate and potassium sulfate) significantly enhanced plant height (21.50 cm), fresh and dry weight (6.85 g and 1.77 g) respectively, weight of 100 seeds (24.50 g) and enhanced N, P, K and protein contents (%) in cowpea seeds (3.66%, 0.84%, 0.67% and 22.88%) respectively. For later crop (wheat), combined between *Bacillus* strains and natural mineral fertilizers (rock phosphate and feldspar) gave the highest plant height (58.00 cm), highest number of tillers (4.25 tillers/plant), highest fresh and dry weight (2.89 g and 1.04g), weight of 1000 grains (45.04 g) and also enhanced N, P, K and protein contents of grains. On the contrast, lowest results for two tested plants were observed under the uninoculated control treatment. It can be noticed that fertilized cowpea with natural mineral fertilizers (rock phosphate and/or feldspar) enhanced growth, yield, yield components and chemical composition of wheat plant.

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ABBREVIATIONS

%	Hundred percentage
AM	<i>Mycorrhizae</i>
<i>B. circulans</i>	<i>Bacillus circulans</i>
<i>B. megaterium</i>	<i>Bacillus megaterium</i>
<i>B. polymyxa</i>	<i>Bacillus polymyxa</i>
BF	Biofertilizer
cv.	Cultivar
Ca	Calcium
CF	Chemical fertilizer
cm	Centimeter
Cu	Copper
EC	Electric conductivity
Fad.	Faddan
FAM	Farmyard manure
Fe	Iron
Fig.	Figure
g.	Gram
GA ₃	Gibberilic acid
H ₂ SO ₄	Sulphuric acid
ha	Hectare
IAA	Indole-3-acetic acid
K	Potassium
K ₂ O	Potassium oxide
Kg	Kilogram
KSB	Potassium solubilizing bacteria
L.S.D	Least significant difference
m ²	Meter square
mg	Milligram

Mg	Magnesium
mm	Millimeter
N	Nitrogen
NA	Nutrient agar
Na	Sodium
NH ₄ NO ₃	Ammonium nitrate
Ns	Non significant
P	Phosphorous
P ₂ O ₅	Di phosphorus pentoxide
PAPR	Partially acidulated phosphate rock
PDB	Phosphate dissolving bacteria
PGPR	Plant growth promoting rhizobacteria
PSB	Phosphate solubilizing bacteria
RP	Rock phosphate
RZ	<i>Rhizobium</i>
SSP	Single super phosphate
TSP	Triple super phosphate
VAM	Vesicular Arbuscular <i>Mycorrhiza</i>
Zn	Zinc