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Impact of different levels of chemical and biofertilizer application on biochemical components of *Vigna mungo*

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Abstract
Agricultural practices are generally soil dependent and also one of the most significant driving factors to support the livelihood as well as economic development of the country. In present time agricultural practices, farmers frequently add fertilizers above the required rate to ensure high crop yield. By supplying plants with nutrients, they serve as catalysts for their optimal growth and production but gradually, chemical fertilizers begin to show their ill impacts on the environment. With raising perception of the ill impacts of indiscriminate use of chemical fertilizers, the tendency of farmers toward environmentally sustainable technology is rising. Today, biofertilizers are important and frequently in use because of their role in maintenance of soil health, environmental pollution reduction and also reduce the use of chemicals in agricultural practices. A poly pot experiment was carried out to study the impact of different levels of chemical and biofertilizer application on biochemical components of *Vigna mungo* and found that the combined application of both fertilizers significantly enhanced the value of experimental parameters as compared to the control as well as their single treatments. Therefore, it concluded from the study that it could be reduce the dependency on chemical fertilizers alone to improve the crop growth and yield for sustainable agricultural practices.

Keywords: agricultural practices, biofertilizer, chemical fertilizer, *Vigna mungo*

Introduction
Plants, whether cultivated on the field or in a jar, utilize minerals nutrients for their nourishment. Nutrients must be accessible in adequate and steady amounts for optimum growth of plants (Chen, 2006) [7]. In mineral nutrients, both nitrogen and phosphorus are essential to nearly all the biochemical substances that make existence possible for plants. Adequate nitrogen availability is compulsory for proper growth and yield of plant (Mozumder *et al.*, 2003) [17]. Less nitrogen amount inevitably contribute to less biochemical machinery to catalyze plant metabolism and reduced the crop leaf area, seed development and photosynthetic assimilation (Sinclair and Vadez, 2002) [22]. After the nitrogen, phosphorus is the second most important nutrient and it is a major component of compounds with production, development of roots, flowering and ripening processes (Sompong *et al.*, 2010) [25]. It is completely clear that phosphorus and nitrogen are essential elements in their systemic, physiological and biochemical roles which contribute to the growth of crops (Sinclair and Vadez, 2002) [22]. Farmers inoculate the agricultural fields with different kinds of fertilizers to secure a preferable yield. India is one of the most important fertilizer generating and consumption nations. Many experiments have shown that the usage of phosphorus fertilizers typically has a significant effect on crop yield as its reduction restricts plant reaction to certain nutrients (Akinrinde and Adigun, 2005) [1]. Increasing high inputs of chemical fertilizers have not only left soil degraded, contaminated and less competitive over the past 150 years but have also posed intensive health and environmental hazards. Hence reliance on chemical fertilizers for potential agricultural development will lead in more degradation of soil fertility and water pollution possibilities. Biofertilizer, on the other hand, is the term to denote all the nutrients input of biological origin that serve as manure for crop plants. These are preparations containing latent or live cells of effective nitrogen fixing strains and/or solubilizing phosphates. Application of the beneficial microorganisms in agricultural practices started around 60 years ago and it is now revealed that such beneficial microbes may even improve plant resistance to adverse environmental pressures such as water and nutrient shortage and heavy metal pollution (Itelima, 2018) [12]. In India, DBT and ICAR, New Delhi is making continued efforts to popularize biofertilizers. Government extension programs have been active in technology transition including 'Lab to Land system'. Therefore, biofertilizers are gaining quickness due to the increasing insistence on maintenance of soil health, reducing the environmental pollution and cut down on the use of chemicals in agriculture that will lead to sustainable agricultural production (Rashid *et al.*, 2016) [20]. They have positive implications for plant development (Vessey, 2003) [24]. In the present study, experimental crop was *Vigna mungo* L. Hepper (var. Azad-3) also locally known as urd bean and black gram which is an annual herbaceous self-fertilized crop. Plants are rising to a height of 30 to 100 cm containing trifoliate leaves along with yellow colored flowers formed in axillary racemes. It is a good source of quickly digestible protein to the vegetarian population of the country. Experimental chemical fertilizer was DAP (Diammonium Phosphate) which is an excellent source of phosphorus as well as nitrogen for plant nutrition. It is the world's most widely used phosphorus fertilizer which contains approximately 18% N and 46% P_2O_5 whereas, biofertilizer was PSB (Phosphate Solubilizing Bacteria) which have the capacity to transform inorganic

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