

EFFECT OF UREA AND AMMONIUM SULPHATE ON GROWTH AND YIELD OF RICE (*Oryza sativa* L.)

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Abstract

Rice (*Oryza sativa* L.) is a staple crop worldwide. In Sri Lanka, rice farmers occupied approximately 34 percent (0.77 million ha) of the country's total cultivated area. Vital for its growth, rice requires ample mineral nutrients, particularly nitrogen, often supplied through urea fertilizers. However, disruptions caused by the *COVID-19* pandemic in global supply chains potentially affected urea availability. This shortage led to inflated prices, posing challenges for farmers in acquiring necessary inputs. Consequently, the cost of rice production may rise, impacting its market price in the foreseeable future. Ammonium sulfate gives plants the essential nutrients such as nitrogen and sulfur and has some potential agronomic and environmental advantages over conventional N fertilizer like urea. However, limited literature is available on the effect of ammonium sulfate on rice production in Sri Lanka. Therefore, this study was contemplated to compare the effectiveness of ammonium sulfate and urea as a source of nitrogen in rice and evaluate the efficiency of varying nitrogen sources on growth and yield parameters, along with nitrogen use efficiency. This study was conducted as a pot experiment filled with sandy regosol at the Eastern University of Sri Lanka from August to November 2022. The experiment was arranged in a Completely Randomized Design with five treatments (T1: control fertilizer, T2: urea (225 kg/ha), T3: ammonium sulfate (225 kg/ha), T4: ammonium sulfate (337.5 kg/ha), and T5: ammonium sulfate (450 kg/ha)) and four replications. The total number of tillers per plant was counted, chlorophyll content of the plant was gathered using a SPAD meter, Nitrogen Use Efficiency (NUE) was determined by a sulfuric acid and perchloric acid mixture along with the Kjeldahl method, at harvest the grain yield was determined. Minitab software (version 17) was used to analyze the collected data, and Turkey's test was used to make a mean comparison. According to the results, there were significant differences ($p < 0.05$) among treatments on grain yield, tiller number, chlorophyll content, and nitrogen use efficiency (NUE). Further, it was noted that grain yield increased by 88.6% over the control treatment, and nitrogen use efficiency (NUE) increased by 53% compared to urea fertilizer. Based on the results obtained in this experiment, 450 kg/ha of ammonium sulfate could be used as an alternative to urea fertilizer application to increase the growth and yield of rice plant.

Keywords: Ammonium sulfate, Growth parameter, Nitrogen Use Efficiency (NUE), Urea

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