Evaluation of Ammonia Nitrogen Loss from Diammonium Phosphate Fertilizer under Field Conditions
(A Case Study of Sugarcane)

M. Alimohammadi, and E. Panahpour 1*

PhD student of soil science, College of Agriculture, Ahvaz Branch, Islamic Azad University, Ahwaz, Iran. m.alimohammadi@iauahvaz.ac.ir
Academic Staff Member, Department of Soil Science, College of Agriculture, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran. e.panahpour@iauahvaz.ac.ir

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Abstract

Diamonium phosphate is the basic fertilizer commonly applied to sugarcane cultivations. Under the climatic conditions in southern Khuzestan with its calcareous soils, a lot of the fertilizer nitrogen may become unavailable to the plant due to its loss as gaseous ammonia. This study was carried out to explore the effects of soil, time lapse, and weather conditions on nitrogen losses emitted in the form of gas. For this purpose, an experiment was conducted using plots in two sugarcane fields with different soil textures (Clay and Silty Clay Sand). To each plot, 300 kg ha⁻¹ of diamonium phosphate fertilizer was applied along sugarcane furrows (soil surface) using the stripping method. Samples of the fertilizer spread in the plots were taken over a period of six weeks to measure residual nitrogen in the samples. Soil samples were also taken before and after fertilizer application to determine soil physicochemical characteristics. The results obtained were analyzed in a randomized complete block design and the mean of treatments were compared using the Duncan method. No significant differences in gaseous nitrogen losses from diamonium phosphate fertilizer were observed between the soil of a silty clay loam texture and that with a clay texture. Time lapse and temperature changes, however, showed significant effects (α= 1%), with the highest nitrogen loss recorded from the third week onwards. It was concluded that shorter time intervals between fertilizer application (base fertilizer) and sugarcane cultivation might help prevent high nitrogen losses and improve upon fertilizer effects.

Keywords: Calcareous soils, Diammonium phosphate, Soil fertility, Volatilization.