

Abstract Submitted  
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**Comparison of plasma generated nitrogen fertilizer to conventional fertilizers ammonium nitrate and sodium nitrate for pre-emergent and seedling growth** A. ANDHAVARAPU, W. KING, A. LINDSAY, B. BYRNS, D. KNAPPE, W. FONTENO, S. SHANNON, North Carolina State University — Plasma source generated nitrogen fertilizer is compared to conventional nitrogen fertilizers in water for plant growth. Root, shoot sizes, and weights are used to examine differences between plant treatment groups. With a simple coaxial structure creating a large-volume atmospheric glow discharge, a 162 MHz generator drives the air plasma. The VHF plasma source emits a steady state glow; the high drive frequency is believed to inhibit the glow-to-arc transition for non-thermal discharge generation. To create the plasma activated water (PAW) solutions used for plant treatment, the discharge is held over distilled water until a 100 ppm nitrate aqueous concentration is achieved. The discharge is used to incorporate nitrogen species into aqueous solution, which is used to fertilize radishes, marigolds, and tomatoes. In a four week experiment, these plants are watered with four different solutions: tap water, dissolved ammonium nitrate DI water, dissolved sodium nitrate DI water, and PAW. Ammonium nitrate solution has the same amount of total nitrogen as PAW; sodium nitrate solution has the same amount of nitrate as PAW. T-tests are used to determine statistical significance in plant group growth differences. PAW fertilization chemical mechanisms are presented.

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