Abstract Submitted
for the DNP12 Meeting of
The American Physical Society

Production of ^{38}K Radioisotope for Plant Research IRENE ZAWISZA[1], C.R. HOWELL[2], A.S. CROWELL[3], TUNL, C.D. REID, Duke Biology Dept., D. WEISENBERGER, Jefferson Laboratory — Identifying and measuring the time scale of physiological responses to environmental changes provides information about mechanisms involved in the resource regulatory system of plants. Varying the amounts and types of nutrients and minerals available to a plant, the uptake and allocation of these resources are observed using Positron Emission Tomography (PET). Potassium is important to plant growth and maintenance in a number of areas. Among them is the K^+ and H^+ ion exchange provides the driving force for sugar loading into the phloem. A technique was developed for producing ^{38}K in a chemical form that can be absorbed by plants. The ^{38}K was created by the ^{35}Cl(α,n)^{38}K reaction using 14 MeV α-particles from the tandem accelerator at the Triangle Universities Nuclear Laboratory (TUNL). The target was a NaCl film about 20 mg/cm^2 thick that was evaporated onto a water-cooled tantalum disk. The irradiated NaCl film was dissolved in water and was transported to the Duke Plant Facilities (The Phytotron). The details of isotope production and demonstration of plant physiology measurement are presented.

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Date submitted: 03 Aug 2012 Electronic form version 1.4