

APPLICATIONS OF RADIOTRACER IN PLANT BIOLOGY

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ABSTRACT

A radioactive tracer (radiotracer) is generally defined as a radioactive isotope that is used as a tracer, which can be followed or tracked within a system of interest. The use of radiotracers involves the substitution of a radioactive isotope for one of the naturally occurring isotopes of a particular element. Radiotracers have a wide range of application due to two unique features: a high level of detection sensitivity, and an ability to integrate into living systems. These features make the use of radiotracers particularly useful for studying the dynamic processes that comprise metabolic activity. This work focuses on the use of radiotracers to identify and follow specific biological pathways to facilitate our understanding of plant biology. All of the plants used in this work are *Arabidopsis thaliana* plants (wild type, *col-0* and its different mutants).

Plants are the most common living organisms on earth and have critical roles for the global environment, including human societies. Plants are able to reduce the problem of pollutions, such as uptake contaminants from soils and waters. Also, plants are the basic food producers for other living organisms, which are not only the ones above ground, but also belowground in the rhizosphere (microorganisms). Therefore, if the plant systems are disturbed, it could affect the ecosystem dramatically. In this dissertation, we are trying to use radiotracers to explore the mechanisms of the basic physiology and metabolisms in plants.