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ROLE OF GAMMA AMINO BUTYRIC ACID (GABA) - TRANSAMINASE IN LEAF SENESCENCE PROCESS

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Gamma Amino Butyric Acid (GABA) is known inhibitory neurotransmitter in mammalian system but the function GABA in plant system play important role when it is in stress condition. Among the stress conditions of plant, leaf senescence is highly regulated and complex developmental process that involves degradation of macromolecules as well as its recycling. Senescence process involves loss of chlorophyll, degradation of proteins, nucleic acid, lipid and mobilization of nutrients through its transport to the growing parts, developing fruits and seeds. Nitrogen is the most important nutrient to be recycled in senescence process. GABA-transaminase (γ-aminobutyric acid) is found to play very important role in nitrogen recycling process through GABA-shunt. GABA accumulates by key signaling metabolic GABA shunt pathway that consist of three enzymes Glutamate Dehydrogenase (GAD) that convert glutamate into GABA that further catalyzed by GABA Transaminase (GABA-T) into succinic semialdehyde, which is oxidized in to succinate by Succinic Semialdehyde Dehydrogenase (SSADH) and thus enters into tricarboxylic acid cycle. We have characterized GABA transaminase knock out mutant *pop2-1* that is transition mutant contains G to C transition in 3' splice site at exon 7 on chromosome 3 and *pop2-3* is T-DNA insertion mutant of *Arabidopsis thaliana*. The variations in phenotypic characters, i.e. leaf size, shape and number of leaf, height of the plant, flowering and seed formation with the age of the plants at different stages of *Arabidopsis thaliana* knock out mutant and wild type plants have investigated. Further we have reported that *pop2-1* and *pop2-3* mutants rapidly decreased the efficiency of leaf photosynthesis, chlorophyll content, GABA content, GABA-T, and GAD activity and on the other hand increase membrane ion leakage, Malondialdehyde (MDA) level at earlier stages as compare to wild type of *Arabidopsis thaliana*. GABA-transaminase plays a critical role in carbon and nitrogen metabolism during the plant development process and GABA-T mutant, which is defective in GABA catabolism, is ideal model to analyze the effect of GABA accumulation in different developmental stages. To understand the role of GABA transaminase further for it application, now we are working on vegetable crops to increase shelf life.

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