

Abstract

Project Code : MRG5680032

Project Title : Identification and genetic modification of ERF transcription factors for development of waterlogging-tolerant jatropha

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Project Period : June 2nd, 2013 – June 1st, 2015

Abstract:

Waterlogging usually creates low oxygen environment, which can adversely affect plant growth and production. This project concentrates on a family of ERF (Ethylene Responsive Factor) DNA binding transcription factors, which have been identified as key-regulators for low oxygen and submergence survival in *Arabidopsis* (*Arabidopsis thaliana*) and rice (*Oryza sativa*). Recent publications show that the stability of ERFs is regulated by N-end rule targeted proteolysis in an oxygen- dependent manner. The N-end rule regulation involves a conserved N-terminal amino acid sequence and mutation of this sequence resulted in improved submergence and hypoxia tolerance. Intriguingly, the genetic modification of ERF targets of oxygen-regulated N-end rule pathway turnover might be key factors to improve survival of crop plants under low oxygen condition.

The continuous depletion of petroleum resources stimulates a search for alternative energy. *Jatropha* (*Jatropha curcas*) is a drought-tolerant, non-food, oil-rich crop listed as a potential candidate for alternative fuel sources. However, *Jatropha* is known to awfully perform when grown on poorly-drained soil or frequently-flooded area. This project focuses on utilizing molecular analysis and transcriptome profiling approach to examine the mechanism underlying waterlogging response in *Jatropha*. The molecular objective is to identify waterlogging-regulated ERFs by gene expression analysis. These experiments will provide a foundation for genetic engineering of *Jatropha* to improve waterlogging tolerance.

Keywords : Waterlogging, Ethylene responsive factors (ERFs), *Jatropha curcas*