

Production and Expression Analysis of Transgenic *Jatropha* Overexpressing Nuclear Transcription Factor Y

Ismail A. Mohammed¹, Shota Yuasa¹, Suguru Tsuchimoto¹, Hiroe Sakai¹, Hisashi Tsujimoto², Atsushi Tsunekawa², Kiichi Fukui¹

¹Department of Biotechnology, Graduate School of Engineering, Osaka University, Osaka, Japan

²Arid Land Research Center, Tottori University, Tottori, Japan

Abstract

Jatropha is considered one of the most highly promising oilseed crops for sustainable biodiesel production, because it can grow in marginal and semi-marginal lands. However, a few blemishes, especially low productivity under drought conditions, restrict its uses. Five *JcNF-YB1*-overexpressed *jatropha* plants (#20, #27, #28, #29, #30) were successfully produced. The highest expression level was detected in #20 and the expression of drought-inducible genes, *RD29B* and *RD17*, as well as ER stress-related *BiP3* gene, was highly induced in the transgenic *jatropha* under the non-stress condition. These results suggest that *JcNF-YB1* is involved in the regulation of the three genes. The *JcNF-YB6* gene was successfully identified, cloned, and sequenced, subsequently used for transformation to produce drought-tolerant transgenic *jatropha*. The putative *JcNF-YB6* transgenic plantlets were developed in the shoot regeneration media. The *JcNF-YB6* gene was induced by osmotic stress in non-transgenic *jatropha*, as well as *RD17*. The result suggests that the *JcNF-YB6* gene is a good candidate to overexpress for improving drought tolerance of *jatropha*.