

# FAO/IAEA International Symposium on Plant Mutation Breeding and Biotechnology



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## ESTABLISHMENT OF CRISPR/CAS9-MEDIATED GENE EDITING APPROACHES IN JATROPHA CURCAS

*Jatropha curcas* L. is an undomesticated perennial plant belonging to the Euphorbiaceae family. It is native to America, but is distributed widely in the tropical and subtropical areas. The high production of oil bearing seeds makes it a potential candidate for a sustainable biofuel crop. To achieve a competitive biofuel producing cultivar it is necessary to eliminate existing deficits by improving the genetic background of the plant. The current work aims at establishing the molecular tools to modify the biosynthetic pathways related to commercially important traits by CRISPR/Cas9 knockout constructs. Genes related to fatty acid, protein and toxin biosynthesis, were selected. The gene structures were analysed, the number of isoforms identified and guide RNAs for potential target sites were designed. We successfully introduced the Cas9 gene, the gRNA expression cassettes and the nptII selectable marker to *J. curcas*. In each gene of interest frameshift inducing INDEL mutations could be detected at the expected positions. *J. curcas* leaf discs were transformed via *Agrobacterium tumefaciens*. Plants will be regenerated from mutant lines and the successful gene knockout validated by phenomic and genomic analyses. This work provides the fundamental knowledge to construct gene knockout constructs for *J. curcas* based on the CRISPR/Cas9 system. The designed gRNAs make it possible to fine-tune the expression of selected genes. Furthermore, the established tool set can lead to a better understanding and improvement of commercially important genes of *J. curcas*.

### Country or International Organization

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