

## **Development of a Suitable Gene Editing System in Peanut**

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Peanut (*Arachis hypogaea* L) is an important economical crop belonging to the Fabaceae family. As a legume, peanut is grown in the tropic and subtropics region of the world. In 2016, the world production was estimated at 44 million tones. Peanut seed is rich in fatty acid, high content of oleic acid have been found to be more desirable and nutritious for human consumption and health. The conversion from oleic acid to linoleic is catalyzed by the fatty acid desaturase 2 (*FAD2*) enzyme. Our aim is to decrease the content of linoleic acid and increase the content of oleic acid of peanut oil by gene editing. This study would allow us to better understand the expression, regulation and mechanism of *FAD2* gene. Designation of the suitable CRISPR/Cas9 system will not only for editing on *FAD2* gene but also for other desirable genes of interest. The coding as well as the promoter sequences of the *FAD2* have been analyze, several gRNA have been designed targeting at promoter region for repression of gene expression, while others gRNA have been targeting on the coding region for disruption of gene with insertion/deletion. Furthermore, we investigated the functionality of different constructs by developing protoplast, yeast, hairy root, and infiltration systems. Our testing results selected several functional constructs that are used in tissue culture to develop peanut lines with improved oil quality.