

Nutritional value improvement in soybean

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Soybean (*Glycine max*) is one of the most important crops in the world. Soybean serves as a high quality source of protein for the human diet and feed for livestock, as well as an oil seed crop and as a source for biofuel. Soybean lectins are one of the main anti-nutritional factors. In rat feeding studies, raw lectins were shown to be resistant to digestive enzymes and bind to the small intestinal brush boarder, causing increased weight of the small intestine and pancreatic hypertrophy. The main lectin is known as soy bean agglutinin (SBA). Together with the INIA (International Agricultural Research Institute) in Uruguay, CRISPR/Cas9 shall be used to knock-out SBA. Another target are genes which are affecting the seed size of the plant to improve the soybean yield.

Conventional stable expression of the CRISPR/Cas9 system will be compared to a new DNA-free system of preassembled CRISPR/Cas9 guide-RNA complexes. Using the DNA-free system will avoid the production and possible integration of recombinant DNA and therefore the existence of transgenic plants as intermediates. For screening and thorough evaluation of off-target effects, soybean gene orthologues from *Arabidopsis thaliana* will be addressed in the same way by stable and DNA-free transformation. Off-target effects are genetic modifications which occur unintended and outside from the target site and therefore might have an impact on a potential risk assessment of plants produced by Genome Editing.