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## Suppression of extracellular invertase inhibitor gene expression improves seed weight in soybean (*Glycine max*)

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Cell wall invertase (CWI) and vacuolar invertase (VI) play multiple functions in plant growth. As well as depending on transcriptional and post-transcriptional regulation, there is growing evidence that CWI and VI are also subject to post-translational control by small inhibitory proteins. Despite the significance of this, genes encoding inhibitors, their molecular and biochemical properties, and their potential roles in regulating seed production have not been well documented in soybean (*Glycine max*). In this study, two invertase inhibitor isoforms, GmCIF1 and GmC/VIF2, were characterized to possess inhibitory activities in vitro via heterologous expression. Transcript analyses showed that they were predominantly expressed in developing seeds and in response to ABA. In accordance with this, surveys of primary targets showed subcellular localizations to the apoplast in tobacco epidermis after expressing YFP fusion constructs. Investigations using RNAi transgenic plants demonstrated marked elevations of CWI activities and improvements in seed weight in conjunction with higher accumulations of hexoses, starch, and protein in mature seeds. Further co-expression analyses of GmCIF1 with several putative CWI genes corroborated the notion that GmCIF1 modulation of CWI that affects seed weight is mainly contingent on post-translational mechanisms. Overall, the results suggest that post-translational elevation of CWI by silencing of *GmCIF1* expression orchestrates the process of seed maturation through fine-tuning sucrose metabolism and sink strength.

### Biography

Tao Su is an associate professor at the College of Biology and Environment, Nanjing Forestry University. In 2014, he obtained Ph.D. degree from Heidelberg University, Germany. He did his postdoctoral research at University of Alberta, Canada. He has published more than 12 research articles in Plant Molecular Biology and Ecophysiology field. He has been serving as a guest reviewer of Scientific Report and Bioinformatics and Biology Insights.