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GENE CHARACTERIZATION AND EXPRESSION ANALYSIS OF CALLOSE SYNTHASE FAMILY IN SOYBEAN DURING GERMINATION

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RESUMO

Callose is a polymer of β-1,3–glucan, found in the cell wall that is synthesized by glucan synthase-like (GSL) genes that are strictly related to intercellular water transport, growth, and the formation of protective barriers. However, in soybean seedlings, the role of this polymer in embryonic axes during germination is unknown. Accordingly, this study aimed to identify the genes involved in callose biosynthesis in the soybean genome and analyze the callose deposition in embryonic axes during germination. To identify GSL genes, the *Glycine max* genome database available in Phytozome v12 was searched through BLASTp algorithm using GSL hidden Markov model (HMM) as queries. Twenty-three GSL genes were identified in the soybean genome. To investigate expression changes of GSL genes, we used embryonic axis RNA-seq libraries in 0, 3, 6, 12, and 24 HAI available in the Soybean Expression Atlas. The data indicate that some genes are required throughout the germination process. In particular, the *Gm*GSL10 gene remained highly expressed throughout germination, while other genes such as *Gm*GSL18, *Gm*GSL14, *Gm*GSL17 and *Gm*GSL22 increased expression as germination proceeds, suggesting specific functions of these genes within 24h of germination. We also meausred the callose relative fluorescencein germinated soybean embryonic axes in 3 and 24h of germination. They were cut and stained with aniline blue and analyzed under an Axioplan microscopy. Our results show that embryonic axes of 24 HAI have higher callose fluorescence than the 3 HAI, which reinforces what was found in the expression profile of the embryonic axis. The expansion of GSL genes during whole-genome duplication events and their expression in the germination stage demonstrates that their functionality in the soybean genome can be broader. The dynamics of the callose polymer in the cell wall in the stages of germination could influence a viable seedling.

PALAVRAS-CHAVE: Cell wall, Glucan, RNA-seq

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