

## Effects of D-pinitol on Activity and Gene Expression of $\alpha$ -amylase During Seed Germination and Seedling Development

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The hydrolytic enzyme  $\alpha$ -amylase (EC 3.2.1.1) is considered to be essential for seed germination because this enzyme converts starch to soluble sugar, enabling the seeds to germinate and grow, this way composed that stimulate the activity of this enzyme can influence the seed germination and seedling development. D-Pinitol is a member of the methoxylated inositol family and has been recognized not only do serve as osmoprotectants but also to protect membrane structure and preserve enzymatic activity. Previously work showed that D-pinitol was able to accelerate *Canavalia ensiformis* (Jack bean) germination and seedling development. In this work we showed that D-pinitol stimulated the growth of *Phaseolus vulgaris*, *Glycine max* and *Vigna unguiculata* hypocotyl-radicle axis and epicotyls and this treatment promoted an increase in  $\alpha$ -amylase activity from *Phaseolus vulgaris*, *Canavalia ensiformis*, *Glycine max* and *Vigna unguiculata* cotyledons. D-pinitol was added into the reaction mixture for  $\alpha$ -amylase assay, but the activity of  $\alpha$ -amylase was not affected by the presence of this compound in the assay mixture, indicating that D-pinitol do not increase  $\alpha$ -amylase activity directly. By qRT-PCR we showed that the increase in  $\alpha$ -amylase activity was accompanied by an increase in the relative expression of  $\alpha$ -amylase gene. D-pinitol also promoted thermal stability for  $\alpha$ -amylase activity at 100°C.

Key words:  $\alpha$ -amylase, D-pinitol and germination.