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Isolation, Characterization and Expression Profiling of Glucanase from *Casuarina equisetifolia*

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Abstract

â-1,3-glucanases (EC 3.2.1.39) hydrolyze â-1,3-glucosidic linkages and are found in diverse forms of life including bacteria, fungi, algae and higher plants. Plant â-1,3-glucanases, included under pathogenesis-related (PR) proteins, PR-2 are potential antifungal enzymes. In the present study the gene encoding â-1,3-glucanase was isolated from the needles of *Casuarina equisetifolia* and was designated as *CeGlu1*. The full length coding domain sequence of the gene was 948 bp and encoded for a putative protein with 315 residues and harbored the conserved domain of glycosyl hydrolase. The sequence was submitted to GenBank and assigned the accession number JQ316122.1. The theoretical pI and molecular weight of the translated product are 8.9 and 34.33 kDa respectively. The expression of *CeGlu1* under biotic (fungal elicitor derived from *Trichosporium vesiculosum*) and abiotic (heat, salt, wound and drought) stress conditions was analyzed using qRT-PCR. The gene was significantly up-regulated by fungal elicitor, wound and heat stresses while down-regulation of the gene was observed during high salt and drought conditions. Further, *CeGlu1* was cloned into pET-28a vector and expressed in *E. coli*. Antifungal property of the recombinant protein was investigated. This is the first report on isolation of glucanase gene from *C. equisetifolia*, and the detailed functional analyses of *CeGlu1* will help in understanding its specific role in defence against pathogens in this tropical tree species.