

## Functional Expression and Characterization of a Novel Indigenous Endo-Beta 1,4- Glucanase from *Apis mellifera*

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**Abstract :** *Apis mellifera* is an insect of immense economic importance lives on rich carbohydrate diet including cellulose, nectar, honey and pollen. The carbohydrate metabolism in *A mellifera* has not been understood fully, as there are no data available, on the functional expression of cellulase gene. The cellulose hydrolyzing enzyme is required for the digestion of pollen cellulose wall, to release the important nutrients (amino acids, minerals, vitamins etc.) from the pollen. A dissection of *Apis* genome had revealed that there is one gene present for the expression of endo-beta-1,4-glucanase, for cellulose hydrolysis. In the presented work, functional expression of endo-beta-1,4 glucanase gene is reported. Total soluble proteins of the honey bee were isolated and were tested cellulose hydrolyzing enzyme activity, using carboxy-methyl cellulose, as a substrate. *A mellifera* proteins were able to hydrolyze carboxy-methyl cellulose, confirming its endo- type mode of action. Endo beta-1,4 glucanase enzyme was only present in the gut tissues, no activity was detected in the salivary glands. The pH optima of the enzyme were in the acidic pH range of 4-5-5-0, indicating its metabolic role in the acidic stomach of *A mellifera*. The reported enzyme is unique, as endo-beta- 1,4 glucanase was able to generate non reducing sugar, as an end product. The results presented, are supportive to the information that the honey bee is capable of producing its novel endo-beta-1,4 glucanase. Further it could be helpful, in understanding, the carbohydrate metabolism in *A mellifera*.

**Keywords :** honey bees, Endo-beta 1,4- glucanase, *Apis mellifera*, functional expression

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