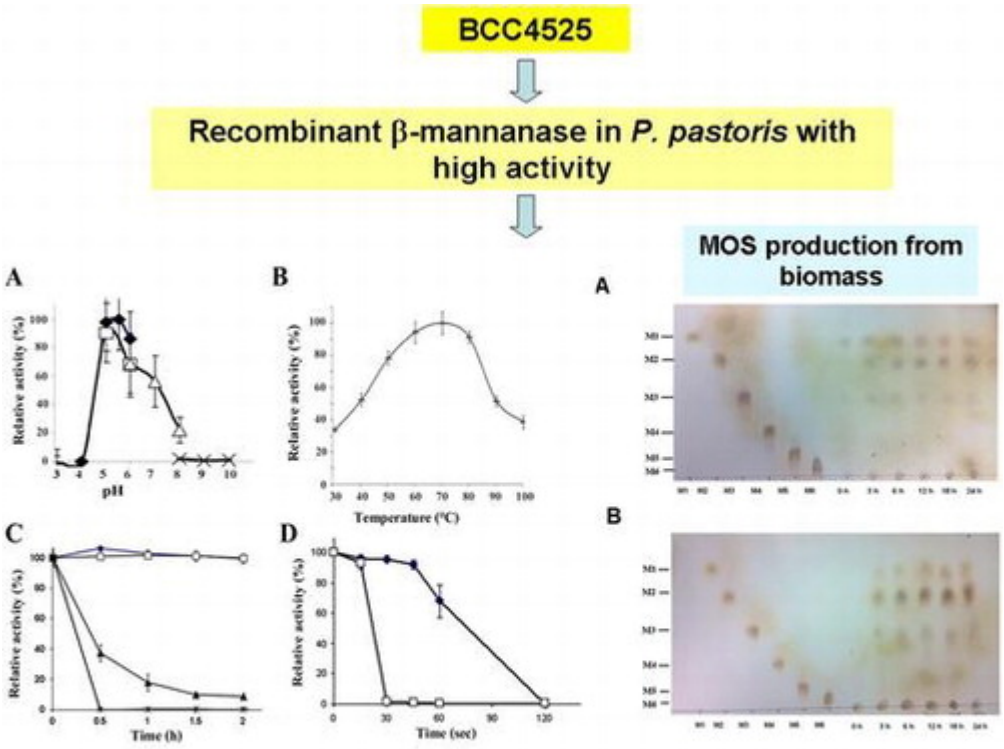
A cDNA encoding β-mannanase was cloned from *Aspergillus niger* BCC4525 and expressed in *Pichia pastoris* KM71. The secreted enzyme hydrolyzed locust bean gum substrate with very high activity (1625 U/mL) and a relatively high k_{cat}/K_m (461 mg^{-1} s^{-1} mL). The enzyme is thermophilic and thermostable with an optimal temperature of 70 °C and 40% retention of endo-β-1,4-mannanase activity after preincubation at 70 °C. In addition, the enzyme exhibited broad pH stability with an optimal pH of 5.5. The recombinant enzyme hydrolyzes low-cost biomass, including palm kernel meal (PKM) and copra meal, to produce mannooligosaccharides, which is used as prebiotics to promote the growth of beneficial microflora in animals. An *in vitro* digestibility test simulating the gastrointestinal tract system of broilers suggested that the recombinant β-mannanase could effectively liberate reducing sugars from PKM-containing diet. These characteristics render this enzyme suitable for utilization as a feed additive to improve animal performance.

A recombinant β-mannanase from *A. niger* BCC4525 exhibits high activity. It produces MOS from low-cost biomass and enhance the release of reducing sugars from diet.



Enzyme supplement level (Unit/g diet)	Reducing sugars released (mg/g diet)
0	81.47±2.26
1	88.76±2.55
2	88.28±0.73