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# Cloning and characterization of new raw starch digestion $\alpha$ -amylase from thermophilic *Anoxybacillus* sp.

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One of the most abundant natural polymers with multidimensional and multifaceted application is starch. Due to energy fuel sustainability concern, the world is focusing on renewable energy including energy from renewable biological materials like starch<sup>1</sup>. The importance of the enzymatic hydrolysis of granular starch below the temperature of gelatinization has been well recognized, mainly due to energy savings and the effective utilization of biomass, which reduces the overall cost of starch processing<sup>2</sup>. A new  $\alpha$ -amylase gene (*Amy35*) was cloned from newly isolated thermophilic *Anoxybacillus* sp. ST4 and expressed in *Escherichia coli*. The purified recombinant  $\alpha$ -amylase had a wide pH optimum range from 4.5 to 8.5 and optimum temperature of 75°C. The enzyme retained 95% of its activity after 3h of incubation at 50 and 60°C. Hydrolysis rates of potato, horseradish and corn starches, at 1% concentration were 20, 70 and 65%, respectively, in a period of 16 h. Analysis of the enzyme properties proved its high efficacy for the digestion of diverse raw starches below gelatinization temperature and, therefore, its potential commercial value for use as an industrial enzyme.

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