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A study on the stability of Glucamylase from *Aspergillus niger* 1105 strain at room temperature

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Like many products, enzymes too are produced in one place, which have to be stored as well as transported for end use at ambient temperatures. Hence this study was mooted to investigate the preservation and storage stability of glucoamylase from *Aspergillus niger* 1105 strain at room temperature. The glucoamylase produced by solid-state fermentation was extracted in water in a screw press. The glucoamylase activity was 23.18 µmol/ml/min. And its protein concentration was 0.6mg/ml. The glucoamylase was assayed using starch (0.2%) as substrate at pH 4.0 in 0.02M acetate buffer. The reducing sugar released was determined by DNS method. The preservation & storage stability of glucoamylase was studied at room temperature (30°C). The effect of protein concentration on glucoamylase stability was critical. When the enzyme was diluted from 0.6mg/ml protein to 0.1mg/ml protein, the enzyme lost 20% of its activity initially during the first 24h and thereafter no loss of activity was observed up to 55 days. When the endogenous protein concentration was 0.3 mg/ml and above or addition of exogenous protein (egg albumin) prevented this initial loss of activity. Thus protein concentration of 0.3mg/ml is a minimum to prevent any loss of enzyme activity. The effect of varying concentrations of glycerol (5%, 15%, 25%, 40% & 50%) added to glucoamylase (0.6mg/ml protein) stored at 30°C was studied over 55 days. A concentration of 5% glycerol was adequate to stabilize and preserve the enzyme at 30°C. Increasing the glycerol concentrations above 5% didn't further increase the stability. The effect of increasing concentration of ammonium sulfate (0.5%, 1%, 2.5% and 5%) on glucoamylase activity was studied. The ammonium sulfate at all concentrations inhibited the glucoamylase activity or decreased its stability by 20% to 25%. The glycerol at 5%, 10%, and 15% didn't reverse the effect of ammonium sulfate on the stability of glucoamylase.