MALTING OF RICE AND STUDIES ON ITS AMYLASE

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Cereal malts are important sources of amylases, which could be used in the food industry. This paper presents the extraction and kinetic studies carried out with rice malt amylase. Germination of rice grains was carried out by soaking the grains in distilled water containing 0.10g l^{-1} sodium metabisulphite for 12 hours, then drained and allowed to germinate in a moistened bag and kept in dark at room temperature for five days. The starch hydrolyzing activity started to increase on the 2^{nd} day and continuously increased for 7 days (the measurement was carried out for seven days). Since, the enzyme activity difference between fourth and fifth days was insignificant, it was decided to arrest the germination on the fourth day. The malted rice was dried in the sunlight and powdered at room temperature in a domestic grinder. The amylase from rice malt powder (1.0 g) was extracted by suspending it in 10.0 ml of distilled water at 9.0g l^{-1} NaCl, 1.0g l^{-1} $CaCl_2$ and 0.01M buffer separately. High activity of amylase was achieved in 11g l^{-1} NaCl. Then, the kinetic properties of the rice malt amylase was studied. The optimum pH and temperature for the activity of malt amylase were 5.0 and 60^0C respectively. To determine the best buffer for malt amylase activity, citrate - phosphate (pH 5.0) and acetate (pH 5.0) buffers having the same ionic strength or concentrations were used. The enzyme activity was best in acetate buffer. Addition of 0.1g l^{-1} $CaCl_2$ to the acetate buffer (pH 5.0), enhanced the malt amylase activity. This enzyme was stable at 4 and 30^0C for 3 days, and lost 50% of the initial activity at 50 on the third day while 100% of the activity was lost on the 1^{st} day at 60^0C. The stability of rice malt amylase was increased in the presence of $CaCl_2$. At the optimized conditions, the malt amylase activity showed zero order kinetics for 25 mins. The Km and Vmax of the malt amylase were 4.5g l^{-1} and 127.78 Units respectively.