

## Documents

Mohamed, S.A.<sup>a b</sup>, Al-Malki, A.L.<sup>a</sup>, Kumosani, T.A.<sup>a</sup>

**Partial purification and characterization of five  $\alpha$ -amylases from a wheat local variety (Balady) during germination** (2009) *Australian Journal of Basic and Applied Sciences*, 3 (3), pp. 1740-1748. Cited 5 times.

<sup>a</sup> Biochemistry Department, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia

<sup>b</sup> Molecular Biology Department, National Research Centre, Cairo, Egypt

### Abstract

A local Saudi Arabian wheat (*Triticum aestivum*) variety (Balady) showed high levels of amylolytic activities at different stages of germination. The activity of  $\alpha$ -amylase increased from day 0 to day 6 of germination, where it exhibited its highest level (2300 units/g seeds), followed by decrease of activity till day 16. Chromatography of 6 days old wheat seedlings of germination on DEAE-Sepharose column showed five forms of  $\alpha$ -amylase activities ( $\alpha$ -amylases AI, AII, AIII, AIV and AV). The apparent Km values of isoenzymes for hydrolyzing starch were 1.42 mg, 2.0 mg, 1.1 mg, 2.5 mg and 1.7 mg, respectively.  $\alpha$ -amylases AI, AII, AIII, AIV and AV were found to have sharp and broad pH optima of 5.5, 5.5-6.5, 5.0-6.0, 5.0-6.0 and 7.0, respectively. The temperature optima of wheat amylases are the same at 50°C. Thermal stability study showed that  $\alpha$ -amylases AI, AIV and AV were stable up to 50°C after incubation for 15 min, while  $\alpha$ -amylases AII and AIII were stable up to 40°C. The affinity between substrate and enzyme was detected only for glycogen and starch compared with other carbohydrates tested, where glycogen had more affinity than starch. Various metal ions such as Ca<sup>2+</sup>, Zn<sup>2+</sup>, Ni<sup>2+</sup>, Hg<sup>2+</sup>, Zn, Ni, Hg and Cd<sup>2+</sup> at 2 mM were tested for amylase activation/inhibition effect. Ca<sup>2+</sup> is found to have activating effect as indicated by increased activity for all isoenzymes except of AII which is inhibited. In conclusion, these  $\alpha$ -amylases from wheat have interesting characteristics such as low km value, broad pH optimum, high optimum temperature, high affinity toward starch and glycogen and activation by some metal as calcium. Therefore, these characterization meet the prerequisites need for food industry. © 2009, INSInet Publication.

### Author Keywords

$\alpha$ -amylase; Characterization; Germination; *Triticum aestivum*; Wheat

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