

Purification and Characterization of a New Lipase from Walnut Seed

Yeşim Yeşiloğlu, Bora Demirkan

Department of Chemistry, Faculty of Science and Arts, Trakya University

Edirne, Turkey

Lipases (triacyl glycerol acyl hydrolase, E.C.3.1.1.3) are present at high activity in reserve tissue of many oilseed plants (1). Lipase enzymes are localized in the aleurone layer of the grain, whereas the fatty materials are dispersed in the sub-aleurone layer and the endosperm. Within the *Juglandaceae* family, *Juglans* are deciduous trees, the nuts are rich in oil. Walnut reduces the onset of dangerous inflammation and oxidation in the arteries after the meals, which were high in saturated fat. However, they also helped the arteries maintain their elasticity and flexibility, even in the participants with higher cholesterol.

In the present study, before the isolation of lipase from walnut seeds the oil was removed by a defatting process (2). The extraction of fatty material from walnut seeds was tested by using acetone. After lipid extraction, the remaining precipitate, which was called seed powder, was used in order to isolate the enzyme. Lipase from walnut seed was purified 28.6-fold with 31 % yield using Sephadex G-100 gel chromatography. Olive oil served as good substrate for the enzyme. The pH optimum was found to be 9.0 in the presence of this substrate. The temperature optimum was 70°C. The enzyme was stable between 30 and 80°C for 5 min. K_m and V_{max} values were determined as 48 mM and 23.06×10^{-3} U mg protein⁻¹, respectively. Also, metal ions effect on lipolytic activity, organic solvent stability and storage stability were investigated. Lipase was stable in presence of Mg²⁺ and Zn²⁺ whereas Cu²⁺, Hg²⁺, Mn²⁺, Ca²⁺ and Ni²⁺ were found to be inhibitory. The enzyme showed a good stability in organic solvents. Enzyme activity was maintained approximately 80% for one year at -20°.

References

- 1- Yeşiloğlu Y, Başkurt L (2008) Partial purification and characterization of almond seed lipase, *Prep. Biochem. Biotechnol.*, 38:397-410.
- 2- Villeneuve P (2003) Plant lipases and their applications in oils and fats modification, *Euro. J. Sci. Technol.*, 105:308-317.