

## **Aqueous Extraction of Sunflower Oil: Effect of Protease Treatment**

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In 2010 Turkey produced 530 000 metric tones of sunflower oil. Turkey ranks sixth in the sunflower oil producing nations. Sunflower oil is mostly extracted from seeds by hexane extraction. Because of the safety and environmental issues associated with the use of hexane, recently alternative methods for oilseed extraction have been proposed and employed, including aqueous, aqueous enzymatic, and enzyme-assisted solvent extraction methods.

The aim of this study was to investigate the effect of protease enzyme treatment on the yield of sunflower oil extracted by aqueous extraction. Bursa and Trakya origin sunflower seeds were used. Commercial enzyme, Alcalase® 2.5L was donated by Novozymes A/S (Bagsvaerd, Denmark). Effects of extraction parameters (pH, enzyme amount, and time) on the oil yield were studied.

Aqueous extractions were conducted in phosphate buffer solution of different pH taking 1:7 seeds-to-buffer ratio. Seeds (4g), buffer solution and proper amount of enzyme were charged into 50 mL polycarbonate centrifuge tube and incubated in an orbital shaker at 200 rpm and 50 °C for a prescribed period. The tubes were then centrifuged at 4000 rpm for 60 min for separation of solid and liquid phases. The amount of oil recovered from liquid phases was used to calculate oil extraction yield.

To see the effect reaction parameters on the oil extraction yield, enzyme concentration, buffer pH and, incubation time were varied from 0.25-0.75 mL enzyme per g of seeds, pH 4-8, and 4-28h, respectively. The best results were obtained with the two seed samples at pH 4.0 when 0.63-0.75 mL protease/g seeds was used for 24h. At these conditions the oil yield reached to almost 60%.