Pramjai Sakulkijpiboon 2006: Enzymatic Aqueous Separation of Oil from Sunflower Seeds. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Associate Professor Sukoncheun Sringam, Ph.D. 92 pages.
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In this research, oil separation from sunflower seeds was studied. Oil in sunflower seeds was leached out with water in emulsion form. Then enzyme was used to digest protein and free the oil. It was found that soaking or non soaking seeds overnight before grinding and extracting with water at pH 4, 5, 6 and 7 yielded higher oil and protein in extract when pH was increased. But at pH 7, soaking decreased oil yield from 45.03 to 38.07%. Grinding sunflower seeds with water to ≤ 0.14 mm. gave highest oil yields of 62.56 - 65.14% which were not statistically different. When the extract was concentrated by using cream separator and washed twice with water, and then diluted to 7.47, 9.61, 13.45 and 22.42% oil, the one with 13.45% oil gave highest oil yield when digested with papain, bromelain and alcalase enzymes. The highest yields of 10.79, 15.80 and 97.76% were obtained at 0.30, 0.15 and 0.50%, respectively. Therefore, the optimization conditions for oil separation were; grainding sunflower seeds with water to ≤ 0.14 mm., extracting at pH 7 30 minute, adjusting oil content of the extract to 13.45% oil and digesting with alcalase enzyme 0.50% to yield 61.82% oil based on oil in the seeds. Oil from enzymatic aqueous process (EA oil) and oil from screw pressing process (SP oil) had similar properties. Unsaponification matters were 1.21, 1.89%, free fatty acids were 1.74, 1.97% and peroxide values were 5.06, 9.20 respectively. The EA oil had more vitamin E than the SP oil, 128.21 and 88.29 mg/100g, respectively. When testing for oxidative rancidity with rancimat 679, EA oil and SP oil had induction time of 1.85 and 1.68 hrs., agreed with increasing of free fatty acid and peroxide value during storage for 16 weeks. Free fatty acid of the oils increased with the same rate from 1.74, 1.97% to 1.98, 2.22%, peroxide value increased from 5.06, 9.20 to 8.98, 15.86. Peroxide value of the EA oil increased with lower rate in the first 5 weeks. In conclusion, EA oil was more oxidative stable then SP oil.

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