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## Effects of Ethyl Acetate Fraction from Pine Needle on Lipid Metabolism and Oxidative stress in Serum of SD Rats

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This study was designed to investigate the effects of ethyl acetate fraction of pine needle (*Pinus densiflora* Sieb et Zucc.) on lipid metabolism and oxidative stress in serum of Sprague-Dawley (SD). Male SD rats were fed basic diets (control group), and experimental diets (EtOAc-25, EtOAc-50, EtOAc-100 groups : ethyl acetate fraction of 25, 50 and 100 mg/kg BW/day added to basic diet) for 45 days. Body weights gain in these groups were dose-dependently lower than that in control group, but was significantly decreased only EtOAc-100 group. Total and LDL-cholesterol levels were significantly decreased (14.9% and 17.2%, 25.0% and 21.1%, respectively) in EtOAc-50 and EtOAc-100 groups, but HDL-cholesterol level was significantly increased about 10% in EtOAc-100 group only compared with control group. Lipid peroxide (LPO) formations were significantly inhibited (10.0% and 23.3%, respectively) in EtOAc-50 and EtOAc-100 groups, but hydroxyl radical ( $\cdot\text{OH}$ ) and nitric oxide (NO) formations were significantly inhibited about 10% in EtOAc group compared with control group. Superoxide dismutase (SOD) and catalase (CAT) activities were significantly increased (10.2% and 17.7%, 16.1% and 19.5%, respectively) in EtOAc-50 and EtOAc-100 groups compared with control group. These results suggest that chronic degenerative disease and aging process may be effectively modulated by improving a lipid metabolism and attenuating an oxidative stress of ethyl acetate fraction of pine needle.