The aqueous extract of *Verbascum mucronatum* Lam. along with its fractions and secondary metabolites were assessed for their antioxidant, acetylcholinesterase (AChE), and butyrylcholinesterase (BChE) inhibitory activities. The antioxidant activity was evaluated by three methods: as 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity, ferrous ion-chelating effect, and ferric-reducing antioxidant power (FRAP) tests. The AChE activity was determined by the Ellman method using an ELISA microplate reader. Phytochemical investigations revealed the presence of four iridoid glucosides, ajugol (1), aucubin (2), lasianthoside I (3) and catalpol (4), two saponins, ilwensisaponin A (5) and C (6), and a phenylethanoid glycoside, verbascoside (7), in *Verbascum mucronatum*. Their structures were elucidated by spectral techniques. The aqueous extract and fractions including the phenylethanoid glycoside 7 showed DPPH scavenger effect and had the best FRAP. Besides these results, one of the phenylethanoid fractions displayed the highest ferrous ion-chelating effect. While only 7 was found to possess moderate AChE inhibition, the extract, fractions, and all other tested compounds did not inhibit AChE and BChE.

**Key words:** Verbascum, Antioxidant Activity, Cholinesterase Inhibition