

## Folk Medicine, Pharmacological and Biological Activities

The extracts of the redroot pigweed (*Amaranthus retroflexus*) as well as of its terpenes (with a nerolidol skeleton) have been reported to possess antioxidant activity (Pacifico *et al.*, 2008; özen, 2010). The methanolic extract of the plant showed a strong dose-response antioxidant activity, while the pure nerolidol derivatives showed antioxidant capacities comparable to those exercised by  $\alpha$ -tocopherol (Pacifico *et al.*, 2008). The antimicrobial peptide, isolated from *Amaranthus retroflexus*, effectively inhibited the growth of different fungi tested: *Alternaria consortiale* Fr., *Botrytis cinerea* Pers., *Fusarium culmorum* (Smith) Sacc., and *Helminthosporium sativum* Pammel., King et Bakke; caused morphological changes in *Rhizoctonia solani* Kühn at micromolar concentrations and protected barley seedlings from *Helminthosporium sativum* infection (Lipkin *et al.*, 2005). The roots of the plant do not produce antifungal compounds, using a TLC bioassay with fungus *Cladosporium cucumerinum* (Schreiner and Roide, 1993). *Amaranthus retroflexus* had activity in inactivating pregnant mare serum gonadotropin as tested in rats (Graham and Noble, 1955).

In Nebraska *Amaranthus retroflexus* is reported to be a cause of bloat, which possibly has not been confirmed, for stock have been known to die after eating large amounts of the plant. The plant is said to be relished by cattle and is regarded as non-poisonous. It is possibly that poisoning may have developed in the horse and in cattle because of a high potassium nitrate content in the plant (Watt and Breyer-Brandwijk, 1962). Marshall *et al.* (1967) reported that ingestion of *Amaranthus retroflexus* caused perirenal disease in swine, in Iowa (USA), but it is not known whether the oxalate or the nitrate content of the plant or both are responsible. The production of perirenal edema in swine-caused by ingestion of *Amaranthus retroflexus* has been also reported (Osweiler *et al.*, 1969; Sanko, 1975). There are reports about *Amaranthus retroflexus* (redroot pigweed) poisoning in cattle (*e.g.* Stuart *et al.*, 1975; Castele *et al.*, 1994; Torres *et al.*, 1997; Kerr and Kelch, 1998; Zadnik *et al.*, 2008). Clinical findings included depression, muscle tremors, increased heart and respiratory rates, hypocalcemia, hypomagnesemia, hyperkalemia, azotemia, and elevated creatinine phosphokinase (Kerr and Kelch, 1998). Postmortem examination of affected cows and calves revealed amber-colored fluid in peritoneal cavities and retroperitoneal perirenal edema. Histological examination of kidney sections revealed widespread degeneration and necrosis of proximal and distal tubules. It was concluded that ingestion of the aerial and leafy portions of pigweed by cattle in drought situations does not necessarily lead to nitrate-induced sudden death associated with consumption of the nitrate-containing stems (Casteel *et al.*, 1994).

The importance of *Amaranthus retroflexus* pollen in causing respiratory allergy has been well ascertained in many countries including Iran with a high rate (69%) among Iranian allergic patients. Several allergenic components of the *Amaranthus retroflexus* pollen extract were recognized (Tehrani *et al.*, 2010, 2011).

The bioactivity of the volatile allelochemicals (and in particular the compounds mentioned above) was reported. These volatiles usually categorized as components of flavor, fragrance, and/or insect attractant mixtures, are also important factors in allelopathy and soil chemical ecology (Connick *et al.*, 1989).