

Cardenolides source and therapeutic effects

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EDITORIAL

ARTICLE INFO

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DOI : 10.20885/JKKI.Vol8.Iss3.art1

The cardenolides and bufadienolides are the cardioactive glycosides which act on the human heart and produced by the adrenal cortex in mammals. Their structures are different where the cardenolides are C₂₃ steroids having an α,β -unsaturated γ -lactone (butenolide) ring, whereas bufadienolides are C₂₄ steroids having a doubly unsaturated six-membered lactone (α -pyrone or hexadienolide) ring.¹ Certain bufadienolides possess antitumour activity.²

In their glycoside form, cardenolides have cardiac properties. The class includes cardadienolides and cardatrienolides: digitoxin, acetyldigitoxins, digitoxigenin, digoxigenin, digoxin, acetyldigoxins, medigoxin, cymarins, neoconvalloside, ouabain, strophanthidin, strophanthins. Digitoxin is now rarely used in current Western medical practice whereas digoxin is used to treat atrial fibrillation, a heart rhythm disorder of the atria. Digoxin and its derivatives (acetyl- and methyl digoxin) inhibit the Na/K-ATPase to regulate heart contractions.³

In plants, cardenolides appear to be confined to the Angiosperms. It found in Apocyanaceae (*Asclepias*, *Pergularia*, *Calotropis*), Nymphales (*Danaus*), Scrophulariaceae (*Digitalis*, *Isoplexis*), Ranunculaceae (*Adonis*) and Convallariaceae (*Convallaria*, *Speirantha*). Recently, we reported cardenolides from *Salsola tetragona* (Amaranthaceae).⁴ *Oleandrin* and *oleandrigenin*, found in *Nerium oleander* L., are used to treat cardiac abnormalities in Russian and Chinese medicine.⁵ Unlike digoxin which is eliminated via the kidneys, *tardigal* is characterized by a longer half-life and by its elimination via the liver so it could be used in patients with poor or erratic kidney function.⁶ Cardenolides have also been reported to possess anti-cancer and anti-HIV properties.⁷⁻⁹

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