

ABSTRACT

The present study was carried out to explore the palynomorph of the wetland plants of Punjab, Pakistan using light and scanning electron microscopy as well as to investigate the antioxidant activity of the crude extracts of pollen of some locally used, important medicinal wetland plants using different types of *In vitro* assays.

In first part of this study, morphological characteristics of pollen of 34 wetland plant species, belonging to 20 angiospermic families, including 13 dicotyledonous and 7 monocotyledonous, were accomplished using light and scanning electron microscopy. Takhtajan's system (1980) of classification was rendered to arrange families. The pollen characteristics were found quite distinct for the identification of all the plant species investigated. The pollens were found generally free in most of the plant species and rarely united in tetrads, such as in Juncaceae and Typhaceae. Most of the pollen were radially symmetrical, isopolar-apolar, often heteropolar, as in *Trapa bispinosa* Roxb., *Nymphaea alba* Linn., *Eichhornia crassipes* (Mart.) Roxb., while oblate-prolate spheroidal, infrequently prolate-subprolate as in *Nelumbo nucifera* Gaertn., *Ranunculus muricatus* Linn., *Spergularia marina* (Linn.) Crisob., *Alternanthera sessilis* (Linn.) DC., *Persicaria* species, *Nasturtium officinale* R. Br., *Centella asiatica* (Linn.) Urban etc. Non aperturate, poroid (false apertures), both simple (porate and colpate) and compound (colporate) apertures were observed in the pollen, whereas variations were recorded in tectum types, ranging from scabrate, reticulate to regulate, verrucate, echinate, striate, sub-psilate punctuate, finely reticulate with muri patterns, areolate and scabrate-areolate punctate. Four distinct types of pollen were recognized on the basis of tectum and apertural types, i.e. non-aperturate, porate, colpate and colporate.

The second part of this study comprised of the ethnopharmacological uses of the medicinal wetland plants of Punjab (Pakistan). Various visits of the study area were made during the years 2008-2011 to interview the local elderly, knowledgeable people and herbal healers to document the ethnobotanical data on wetland plants, which included local name, habit and habitat and traditional uses of these plants, with special emphasis on their therapeutic uses against different human diseases, ailments or disorders. A total of eighteen medicinally important aquatic and semi-aquatic plants belonging to three monocotyledonous and fourteen dicotyledonous families were reported and the pollen of some of these plants, viz; *Typha domingensis* Pers., *Centella asiatica* (Linn.) Urban and *Nelumbo nucifera* Gaertn. were explored for their antioxidant potential using Ferric Reducing Power, Metal Chelating Activity and Trolox Equivalent Antioxidant Capacity assays (TEAC). The antioxidant components in the crude extracts of pollen were initially extracted in methanol and further fractionated in solvents of different polarity, such as n-hexane, chloroform, ethyl acetate and water exhibited reasonable antioxidant activity. Trolox Equivalent Antioxidant Capacity (TEAC) ranged from 3.94 to 106.26 mM of Trolox equivalents and FRAP values ranged from 1.71 to 87.5 mM of FeSO₄ equivalents. Using total phenolic and flavonoid content assays ranged from 143 to 8150 mg/ml of gallic acid and 110 to 5800 mg/ml of quercetin respectively. The highest Trolox Equivalent Antioxidant Capacity (TEAC) value was found in the crude extract of *Centella asiatica*, whereas the total phenolic and flavonoid contents were significant in *Nelumbo nucifera*.