

## ABSTRACT

In the investigated area, District Kotli, Azad Jammu & Kashmir, a total of 401 plant species belonging to 104 families were recorded. Among these, single species of family Pinaceae represented gymnosperms, while rest of the plant species represented the dicot and monocot Angiosperms. Ethnobotanical survey of almost all the villages of District, Kotli was carried out by interviewing local people on the basis of random selection through a questionnaire during 2009-2011. People of this area had their distinct way of life, beliefs, traditions and the way of utilization of local plants for various purposes especially as medicinal plants over generations. Out of 401 plant species 209 (52.11%) were used as single-usage, 107 (26.68%) were two-usage, 68 (16.95%) were multi-usage and 17(4.23%) were plant species with no local human usage. The plants were photographed (Pl. 1-24), collected, properly pressed, mounted on the herbarium sheets, identified through taxonomic literature and deposited in Dr. Sultan Ahmed Herbarium, Department of Botany, GC University, Lahore as voucher specimens.

The Phytosociological studies were carried out by using Quadrat method, of six Hill-sites viz; Dungi Mansuh Hills, Nakiyal Maira Hills, Sney Bney Hills, Sarsawa Hills, Darguti Hills and Rajdahni Hills. A total of 25 plant Communities were recognized as a whole in the area. It was noticed that *Pinus roxburghii* Sargent commonly called Chir was a dominant tree species along with a grass, *Themeda anathera* (Nees.ex Steud.) Hack. locally called Bahari Ghass in almost all 25 plant communities. The associated species were *Olea ferruginea* Royle and *Acacia modesta* Wall. along with *Casearia tomentosa* Roxb., *Colebrookea oppositifolia* Smith., *Cotinus coggyria* Scop., *Dodonaea viscosa* (L.) Jacq., *Dalbergia sissoo* Roxb. ex DC., *Erioscirpus comosus* (Wall.) Palla, *Malvastrum coromandelianum* (L.) Garcke, *Mallotus philippensis* (Lamk.) Muell. Arg., *Micromeria biflora* Benth., *Otostegia limbata* (Bth.) Bioss., *Rubus fruticosus* Hk., *Trichodesma indica* (L.) R. Br., *Wendlandia exerta* (Roxb.)DC. and *Woodfordia fruticosa* (L.) S. Kurz. Some species needed protection and conservation due to their low I.V.I. such as. *Engelhardtia colebrookeana* Lindl., *Eremostachys superba* Royle ex.Benth., *Gloriosa superba* L., *Helinus lanceolatus* Wall. ex Brandis, *Holmskioldia sanguinea* Retz, *Melhaniania futteyporensis* Munro ex Masters, *Onosma thomsonii* C.B. Clarke and *Prinsepia utilis* Royle. Phytosociological data showed the degraded vegetation in the study area mainly due to over population by nomads.

In order to verify ethnobotanical data on practical lines the ethnopharmacological effects, such as antimicrobial including MIC and antioxidant activities of the crude extracts of two dicot plants; viz. *Helinus lanceolatus* Wall. ex Brandis (bark and leaves) and *Holmskioldia sanguinea*



Retz. (bark and leaves) and two monocot; viz. *Iris aitchisonii* (Bakar) Boiss. (whloe plant) and *Notholirion thomsonianum* (D.Don) Stapf (whole plant) were investigated using Gram-positive and Gram-negative bacteria and fungi. The maximum zone of inhibition was produced by aqueous extracts of *Iris aitchisonii* against *Aspergillus niger* (fungus) and methanolic extracts of *Helinus lanceolatus* against *Escherichia coli* with  $57 \pm 1.0$ mm and  $50 \pm 1.15$ mm respectively. The Minimum Inhibitory Concentration (MIC) was most significant in *Iris aitchisonii* against *Staphylococcus aureus* and *Pseudomonas aeruginosa*, i.e.  $0.002 \mu\text{g/ml}$  and  $0.008 \text{mg/ml}$  of *Helinus lanceolatus* against *S. aureus* and *P. aeruginosa* while  $0.010 \text{mg/ml}$  of methanolic extract of *Holmskioldia sanguinea* against *Escherichia coli*. The resistance of methanolic extract of *Notholirion thomsonianum* was found potent against *S. aureus*, i.e.  $0.009 \mu\text{g/ml}$ . The significant  $IC_{50}$  values (concentration of sample required to scavenge 50% free radical) was observed in aqueous extract of *Helinus lanceolatus*, i.e.  $15.29 \pm 0.59$  as compared with BHT (standard antioxidant) which was  $12.52 \pm 0.89$ . It was observed that Petroleum ether extract of *Iris aitchisonii* has highest total antioxidant activity, i.e.  $1.1820 \pm 0.33$  followed by Petroleum ether extract of *Holmskioldia sanguinea*, i.e.,  $1.142 \pm 0.34$ . The Petroleum ether extract of *Helinus lanceolatus* showed highest FRAP value ( $90.66 \pm 4.54 \mu\text{g}$  of trolox equivalent). Total phenolic compounds were highest in petroleum ether extract of *Helinus lanceolatus*, i.e.  $56 \pm 1.91 \text{ mg/g}$  followed by methanolic extract and petroleum ether extract of *Notholirion thomsonianum*, i.e.  $47 \pm 0.59 \text{mg/g}$  and  $45 \pm 0.85 \text{mg/g}$  respectively. The percentage of inhibition of lipid peroxidation was highest in methanolic extract which was  $59.11 \pm 0.12\%$ . Overall all four medicinal plants indicated reasonable antimicrobial and significant antioxidant activities, thus supporting their traditional medicinal practices/uses.

On the basis of the results, it can be concluded that the study area was under heavy deforestation, overgrazing and biotic interference. Low regeneration and high exploitation of economically and medicinally valuable plants exposed many species to risk of extinction. The recommendations are made for the sustainable utilization, proper management and conservation of the flora of the study area.