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# ETHNOBOTANICAL INDICES BASED ETHNOVETERINARY PLANT PROFILE OF JABBAN HILLS, MALAKAND, HINDUKUSH RANGE, PAKISTAN

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**Abstract**

Seventy-one plant species of ethnoveterinary usage were reported during the survey conducted in 2016-17, from Jaban Hills, District Malakand, hindukush range, Pakistan. Highest usage value (8.66%) was found for plants used for relieving skin problems and as galactagogue in cattles. 7.87% of reported plant species were used for wound healing followed by species used as anti-dyspepsia (7.08%), anti-constipation (5.51%), anti-diarrheal, antitussive and anthelmintic (4.72% each), as diuretic and carminative (3.93% each). The percentage of plant used other veterinary usage like general tonic, febrifuge, analgesic, coolant, abortifacient, curing eye and udder disorders and releaving problems during after birth processes in cattles were ecorded a total of 40.15%. The most frequently used part was shoot (21.21%), followed by leaf (12.12%), whole plant (10.10%), fruit (9.09%), root (8.08%) and seeds (7.07%). Species with highest RFC values were *Ailanthus altissima* (0.5), *Ajuga bracteosa* (0.43), *Rumex hastatus* (0.33), *Dodonaea viscosa* (0.23), and *Melia azedarach* (0.21). Species with highest Use values include *Ailanthus altissima* (0.87), *Rumex hastatus* (0.73), *Ajuga bracteosa* (0.44), *Melia azedarach* (0.45) and *Dodonaea viscosa* (0.39). As this area is blessed with high number of ethnomedicinal plants and high usage of herbal drugs used for veterinary purposes may be accompanied with certain adverse effects therefore, further investigation is required to explore more informations and to determine safe usage of the herbal drugs.

**Key words:** Ethnoveterinary, Hinduksh range, Highest use value, RFC, Herbal drugs.

## Introduction

Plants have been reported to be used traditionally for the treatment of animal diseases; such type of human-plant relation is termed as ethno-veterinary uses of plants. Medicines used for curing livestock health are known as ethno-veterinary medicines (EVM). Plants therapeutic properties are used globally for treating the health issues of livestock. Locals of rural areas are normally more dependent on the ethno-veterinary medicines (Shen *et al*., 2010; Yirga *et al*., 2012; Gebrezgabiher *et al.*, 2013). Traditional systems of treatment animal diseases are more common in the underdeveloped countries especially in the areas where allopathic drugs are either expensive or not easily accessible. In such areas locals normally take the help of local healer who use herbal drugs for treating the health problems of livestock (Tanzin *et al*., 2010). Traditional herbal ethnoveterinary medicines are also significant in cattle health maintenance in developing countries. Ethnoveterinary medicines of plants origin plays a significant role in increasing livestock products by controlling veterinary diseases. The herbal drugs are best alternatives of synthetic drugs used for treating veterinary diseases because herbal drugs produce negligible side effects in comparison with the synthetic drugs (Yirga *et al*., 2012).

The ethno- medicinal information of plants is also helpful for experts in ecology, pharmacology, taxonomy, wild life management and other fields as it provides base line for further studies. Modern medicines have been derived in large number from natural sources particularly from plants. The plant based traditional system of medicines continue to play a vital role in health repair, about eighty percent animal growers and farmers are mainly relying on traditionally used medicines for giving treatment to their livestock (Lulekal *et al.*, 2008).

Supporting traditional medical knowledge by documentation is necessary to discover new drug sources (Teferi *et al*., 2009). Jaban Wartair Hills, District Malakand, Hindukush range, KPK is situated 71$^{o}$ 56' east longitude and 34$^{o}$ 37' north latitude in Pakistan (Fig. 1). The area is hilly and distributed into many small villages including Bijligar Jaba, Qadam Khela, Spero Gat, Sro Kando, Kamangara, Tora Panha, Kwanj and Dwabandai Wartair. Babasar and Zwarhandi Uba are the sites towards Batkhela city. The sources of economy are very rare, but farming, Gujar occupation and purchasing fuel wood are common sources of earning (Khan *et al*., 2011a, 2011b). Present study, therefore, tries to find ethnoveterinary medicinal plants used in curing of different livestock ailments in this area, which is blessed with high percentage of ethnomedicinal flora.

## Material and Methods

**Data collection:** The area was visited regularly in different seasons during 2016-17 to collect the information regarding the ethnoveterinary uses of plants. A total of 62 respondents were interviewed during the study. Most of the respondents i.e. 34 were elders (above 50 years). 16 respondents were in the range of 30-50 while 12 respondents were below 30 years of age (Fig. 2). The ratio of elders was quite large as compared to the young people. They were asked through open ended questionnaire about the plant local names, part used, its veterinary uses and conservation status etc. The data about an individual plant was considered authentic when at least 5 persons gave the same information.

**Specimen collection, preservation and identification:** The plant specimens were collected, dried, mounted on herbarium sheet and identified with the help of standard literature (Shinwari *et al*., 2011, Barkatullah & Ibrar, 2011). These specimens were then tagged with Voucher numbers and kept in the herbarium, Department of Botany, Islamia College, Peshawar, Pakistan.


Fig. 1. Map of Jaban Hills, Hindukush range, Malakand KPK, Pakistan.

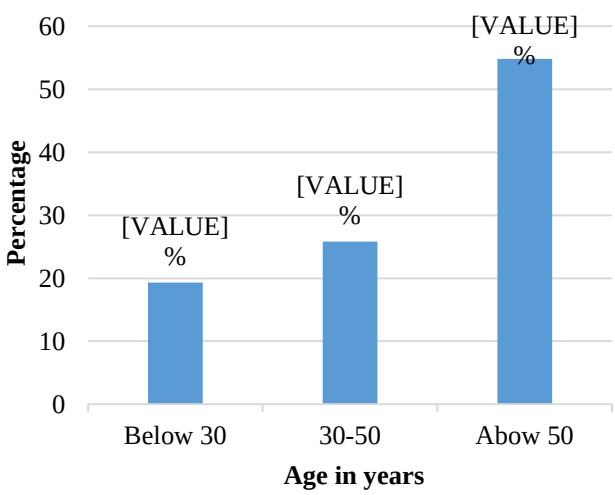


Fig. 2. Percentage of respondent groups.

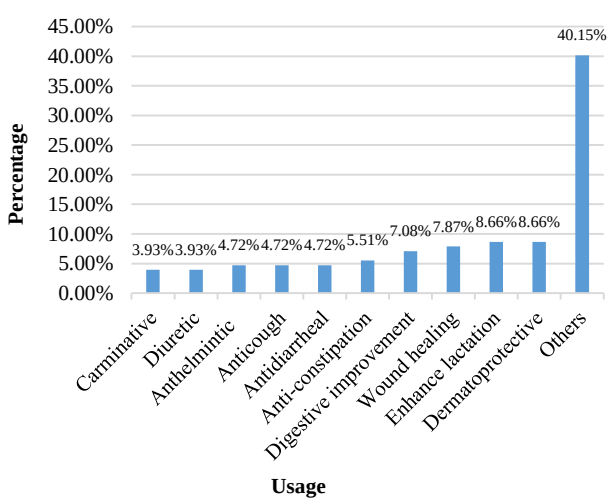


Fig. 3. Percentage of ethnoveterinary uses.

**Quantitative ethnobotanical analysis:** There are certain statistical formulae used for ethnobotanical study. Change of the qualitative data into measurable and quantitative data is crucial for hypothesis-testing, statistical authentication and comparative investigation (Hoffman & Gallaher, 2007; Barkatullah *et al.,* 2015). For this purpose following important indices were used for the present study.

**Frequency citation (FC):** The sum of informants stating the uses of individual plant during the survey is term as Frequency Citation**.**

**Relative frequency citation (RFC):** Relative frequency citation is defined as the ratio of the sum of times of an event happens to the total sum of events. An ethnobotanical study, we should say that it is the ratio of informants revealing the uses of a plant (FC) to the total sum of informants for all plants during the survey (N). It is calculated as "frequency citation (FC, the number of informants mentioning the usage of the species) divided by the sum of all informants (N), without seeing the use groups" (Kayani *et al.,* 2014; Barkatullah *et al.,* 2015). RFC is defined by the given formula:

$$\mathbf{RFC = FC/N}$$

The value of RFC ranges from '0' (none of the informant cites the plant as useful) to '1' (every informant reported the plant to be useful) (Sadeghi & Mahmood, 2014; Barkatullah *et al.,* 2015). In ethnobotanical study RFC indicates the local importance of plants species present in an area.

**Use value (UV):** UV is calculated by dividing total uses mentioned by all informants for an individual plant species (∑Ui) by the total number of informants (N) during the survey i.e.

$$\mathbf{UV = \sum Ui / N}$$

where as "Ui" is the sum of uses stated by each informant for in an individual plant species and ∑Ui is the sum of all uses mentioned by all informants for an individual species. Use value demonstrates the relative importance of locally known plants (Ong & Kim, 2014; Barkatullah *et al.,* 2015).

**Pearson correlation coefficient:** Pearson product-moment correlation coefficient is a numerical metric of the strength of the lined association between 2 variables (Barkatullah *et al.,* 2015). It is the ratio of the covariance between two variables to their standard deviations (Mukaka, 2012).

$$r = \frac{\sum_{i=1}^{n}(x_i - x)(y_i - y)}{\sqrt{\left[\sum_{i=1}^{n}(x_i - \bar{x})^2\right]\left[\sum_{i=1}^{n}(y_i - \bar{y})^2\right]}}$$

where r is the Pearson correlation coefficient for the assumed sample, x (RFC) and y (UV) are the variables, xi and yi are the values of x and y. The r value of 0

designates no association between the variables, whereas a value more than 0 designates a positive association. Higher absolute value designates higher correlation (Zhang *et al*., 2014). The square of correlation ($r^2$) is the metric of variability of cross species in RFC that is clarified by variance in UV (Bano *et al*., 2014; Barkatullah *et al.*, 2015).

## Results and Discussion

**Ethnobotanical data from informant reports:** In this study 71 plant species belonging to 40 families were reported for treating veterinary problems. Various ethnoveterinary uses are summarized (Table 1; Fig. 3). Plants usage for treatment of skin problem and enhance lactation (galactagogue) were recorded the highest (8.66%) followed by wound healing (7.87%), digestive tract disorders improvement (7.08%), anti-constipation (5.51%), antidiarrheal (4.72%), antitussive and anthelmintic (4.72% each), diuretic (3.93%) and carminative (3.93%). Other ethnoveterinary application included were tonic, febrifuge, analgesic, coolant, treatment of eye and udder diseases, delivery and for disorders after birth processes. The record the plants used by the locals is also summarized (Fig. 4). The most frequently used part of plants was shoot (21.21%), followed by leaf (12.12%), whole plant (10.10%), fruit (9.09%), root (8.08%) and seed (7.07%). Less reported part used included bark, twig, flower, tuber, rhizome and latex. *Ailanthus altissima* was reported to be used as anti-coolant and laxative, *Ajuga bracteosa* as carminative, *Rumex hastatus* as anticough, fever reducer and to treat scabies, *Dodonaea viscosa* as tonic and for wound healing, *Dalbergia sissoo* as antidiarrheal and in mouth infections, *Melia azedarach* as anthelmintic, anticough and anti-lice, ant-fever and to treat stomach problems. The rout of administration was reported to be oral (68.35%), paste (30.37%) and eye drops (1.26%). *Euphorbia hirta, Taraxacum officinale, Ficus palmata, Ficus carica* and *Acacia modesta* were the most usable species used as glactogauge. *Acacia nilotica, Agelops tavschii, Chenopodium album Datura innoxia, Dodonaea viscosa, Lactuca serriola* and *Micromeria biflora* were found to use mostly for wounds healing. 7.08% of the plants including *Acacia nilotica, Withania coagulans, Fagonia cretica, Verbena officinalis* and *Cannabis sativa* were the frequently usable species for improvement of digestive disorders. 5.51% usage of plants was anti-costipation. *Convolvulus arvennsis, Melilotus indicus, Morus alba, Morus nigra* and *Ricinus communis* were frequently used species for the treatment of constipation. Yirga *et al*., (2012) documented 22 species of plants used as veterinary medicines. Most of the medicinal plants with respect to cattle, were collected from the wild and the common part use was leaves. The veterinary medicinal preparations of plants were applied through diverse routes like oral, nasal, dermal, anal and ocular routes. Similarly, Musarrat *et al*., (2014) documented 43 plants distributed among 26 genera used for treatment of livestock disorders like in lactation and wound healing. The present study is much elaborated as compared to other workers including some new findings about glactgauge and wound healing both qualitatively and quantitatively.

Study reported that plants were used as antidiarrheal, anticough and anthelmintic (4.72% each). The most frequently used species as antidiarrheal were reported to be *Dalbergia sissoo, Verbascum thapsus and Withania coagulans. Aerva javanica, Calotropis procera, Morus alba* and *Morus nigra* were the species used as antitussive. Species mostly used as anthelmintic include *Melia azedarach, Ziziphus nummularia, Chenopodium botrys, Chenopodium album, Anagallis arvensis*. 3.93% of the plant usage was as diuretic. *Merrabilis jelapa, Silybum marianum* and *Solanum nigrum* were reported as diuretic and carminative (3.93%). *Mentha longifolia, Mentha arvences* and *Ajuga parviflora* were reported species to be used as carminatives. Yipel *et al.,* (2017) reported 67 plants species used in animal diseases. They stated that the medicinal plants were mostly used for gastrointestinal disorders (26%). Their stusy strengthens our finding about ethnoveternary usage.

Mostly used species for curing skin problems were *Rumex hastatus, Plantago lanceolata, Polygonum barbatum and Cannabis album. Acacia modesta* was found to be used making easy delivery, release of placenta. Species used for treatment of eyes disorders (watering eyes) comprised *Albizia lebbeck* and *Calotropis procera*. *Solanum surattense* was reported species for retaining pregnancy. Dhayapriya and Senthilkumar (2016) reported 25 plants species of 23 genera, used for the treatment of various animal disorders such as diarrhoea, dysentery, cut injury, fever, Haemarogic, Inflammatory etc. Ayeni and Basiri (2018) reported 30 plants species together with different animal diseases conditions they treat. The leaves (61.29%) were commonly used, bark (25.80%), root (6.45%) and fruits (6.45%). Similarly, Patil *et al.,* (2015) conducted 25 species of 25 genera distributed in 19 families which were used for 14 types of animal diseases which support our study.

**Quantitative ethnoveternary uses:** Quantitative value indices are useful tools for the analysis of ethnobotanical information. Various indices were used to analyze the data obtained in the present study. Species with highest RFC values (Fig. 5) were *Ailanthus altissima* (0.5), *Ajuga bracteosa* (0.43), *Rumex hastatus* (0.33), *Dodonaea viscosa* (0.23), and *Melia azedarach* (0.21). Species with highest Use values (UV) (Fig. 6) were *Ailanthus altissima* (0.87), *Rumex hastatus* (0.73), *Melia azedarach* (0.45), *Ajuga bracteosa* (0.44), *Dodonaea viscosa* and *Dalbergia sissoo* (0.39 each). These indices i.e RFC and UV are the statistical indicators of the ethnobotanical information of the native inhabitants of the area. Higher values for these attributes of some species validate the traditional knowledge about the usage of herbal medications. Pearson correlation coefficient "r" was calculated to be 0.852. This is a strong positive correlation, which means that high x variable (RFC) scores correlate with high y variable (UV) scores. The value of $r^2$, the coefficient of determination was 0.7259 (Fig. 7). The robust correlation implies that RFC and UV share a linear relation across species (Bano *et al.*, 2014; Barkatullah *et al*., 2015). The quantitative attributes provide support to novelty to the ethnobotanical information. Ethnobotanical indices based study reflects multiple aspects of the plants of the study area including vegetation structure, the ethnic uses, the dominant species and the conservation status. Various traditional information are rationalized by pharmacological bioassays, which revealed the novelty of the findings obtained from the area. This study generated a wealth of information worthy of guiding future course of action.

**Table 1. Plants with their Voucher numbers, family name, local name, veterinary uses, part used, rout of usage, Uf, RFC and UVs of Jaban Wartair Hills, District Malakand.**

| S. No. | Voucher No. | Species name | Family | Local name | Veterinary uses | Part used | Rout | Uf | FC | RFC | ∑Ui | UV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Muhsin-ICP-01 | *Acacia modesta* Wall. | Mimosaceae | Palosa | Ease labor and after birth processes, enhance lactation | Bark decoction, leaf | Oral | 3 | 9 | 0.15 | 19 | 0.31 |
| 2. | Muhsin-ICP-02 | *Acacia nilotica* (L.) Delile | Mimosaceae | Kikar | Improve digestion, wound healing | Bark decoction | Oral, paste | 2 | 12 | 0.19 | 14 | 0.23 |
| 3. | Muhsin-ICP-04 | *Adiantum venustum* D. Don. | Adiantaceae | Sunbal | Anthelmintic | Leaf | Oral | 1 | 5 | 0.08 | 9 | 0.15 |
| 4. | Muhsin-ICP-05 | *Aegilops tauschii* Coss. | Poaceae | Mastak | Wound healing | Leaf | Paste | 1 | 6 | 0.10 | 6 | 0.10 |
| 5. | Muhsin-ICP-06 | *Aerva javanica* (Burm.f.) Juss. Ex Schult. | Amaranthaceae | Kharbutey | Anticough, antidiarrhea | Leaf, flower | Oral | 2 | 6 | 0.10 | 10 | 0.16 |
| 6. | Muhsin-ICP-07 | *Ailanthus altissima* (Mill.) Swingle | Simaroubaceae | Laintus | Anti-coolant, laxative | Leaf, shoot, bark | Oral | 2 | 31 | 0.5 | 54 | 0.87 |
| 7. | Muhsin-ICP-08 | *Ajuga bracteosa* Wall. ex Benth | Lamiaceae | Booti | Carminative | Root, shoot | Oral | 1 | 27 | 0.43 | 27 | 0.44 |
| 8. | Muhsin-ICP-10 | *Albizia lebbeck* (L.) Benth. | Mimosaceae | Srikh | Treat eye diseases of cattle | leaf decoction | Drops into eye | 1 | 9 | 0.15 | 9 | 0.15 |
| 9. | Muhsin-ICP-11 | *Alhagi maurorum* Medik. | Fabaceae | - | Carminative | whole plant | Oral | 1 | 6 | 0.10 | 6 | 0.10 |
| 10. | Muhsin-ICP-14 | *Amaranthus spinosus* L. | Amaranthaceae | Ghanuganhar | Antidiarrhea, diuretic | Leaf, root | Oral | 2 | 5 | 0.08 | 8 | 0.13 |
| 11. | Muhsin-ICP-15 | *Amaranthus viridus* L. | Amaranthaceae | Ganher | Anti-stomachache, enhance immunity | Leaf, shoot | Oral | 2 | 8 | 0.13 | 14 | 0.23 |
| 12. | Muhsin-ICP-16 | *Anagallis arvensis* L. | Primulaceae | Ghatyali | coolant, anthelmintic | Leaf, fruit, shoot | Oral | 2 | 6 | 0.10 | 10 | 0.16 |
| 13. | Muhsin-ICP-20 | *Asphodelus tenuifolius* Cavan | Liliaceae | Piazakay | Anti-constipation | Leaf | Oral | 1 | 9 | 0.15 | 9 | 0.15 |
| 14. | Muhsin-ICP-21 | *Avena sativa* L. | Poaceae | Jamdar | Enhance lactation | Shoots | Oral | 1 | 6 | 0.10 | 6 | 0.10 |
| 15. | Muhsin-ICP-29 | *Calotropis procera* (Aiton) Dryand. | Asclepediaceae | spalmey | Anti-stomachache, anti-cold, anti-cough, treat swollen udder, watering eye and mouth | Flowers, leaf, stem, twig, root | Oral, paste | 5 | 11 | 0.18 | 34 | 0.55 |
| 16. | Muhsin-ICP-30 | *Cannabis sativa* L. | Cannabaceae | Bhang | Anti-rheumatism, wound healing, improve digestion | Dried or fresh Leaf | Oral, Paste | 3 | 7 | 0.11 | 13 | 0.21 |
| 17. | Muhsin-ICP-33 | *Carthamus oxyacantha* M.Bieb. | Asteraceae | Ghana | Anti-fever, treat skin infection | Flower, seed | Oral | 2 | 5 | 0.08 | 8 | 0.13 |
| 18. | Muhsin-ICP-38 | *Chenopodium album* L. | Chenopodiaceae | Sarmay | Wound healing, treat skin infection, anthelmintic | Whole plant | Paste | 3 | 7 | 0.11 | 16 | 0.26 |
| 19. | Muhsin-ICP-39 | *Chenopodium botrys* L. | Chenopodiaceae | Wrejakai | Anthelmintic, treat intestinal infection | Shoots | Oral | 2 | 5 | 0.08 | 12 | 0.19 |
| 20. | Muhsin-ICP-42 | *Clematis grata* Wall. | Rannunculaceae | - | Wound healing | Leaf | Paste | 1 | 5 | 0.08 | 5 | 0.08 |
| 21. | Muhsin-ICP-44 | *Convolvulus arvennsis* L. | Convolulaceae | Prewatkay | Anti-constipation | Whole plant | Oral | 1 | 8 | 0.13 | 8 | 0.13 |
| 22. | Muhsin-ICP-48 | *Cynodon dactylon* (L.) Pers. | Poaceae | Kabal | Treat udder tumors, wound healing, tonic | Whole plant | Oral, paste | 2 | 9 | 0.15 | 16 | 0.26 |
| 23. | Muhsin-ICP-50 | *Cyperus rotundus* L. | Cyperaceae | Drab | Anthelmintic, anti-stomachache | Tuber | Oral | 2 | 5 | 0.08 | 9 | 0.15 |
| 24. | Muhsin-ICP-51 | *Dalbergia sissoo* DC. | Fabaceae | Shawa | Antidiarrheal, treat mouth diseases | Leaf | Oral, paste | 2 | 13 | 0.21 | 24 | 0.39 |
| 25. | Muhsin-ICP-53 | *Datura innoxia* L. | Solanaceae | Daltura | Wound healing for goat | Grinded fruit | Paste | 1 | 5 | 0.08 | 5 | 0.08 |
| 26. | Muhsin-ICP-54 | *Debregeasia salicifolia* (D.Don) Rendle | Utricaceae | Ijalai | Antidiarrheal | Leaf | Oral | 1 | 6 | 0.10 | 6 | 0.10 |
| 27. | Muhsin-ICP-57 | *Dodonaea viscosa* (Linn). Jacq | Sapindaceae | Ghwarhaskay | Tonic, wound healing | Leaf | Paste | 2 | 14 | 0.23 | 24 | 0.39 |
| 28. | Muhsin-ICP-62 | *Euphorbia helioscopa* L. | Euphorbiaceae | Mandaanu | Anthelmintic | Leaf | Oral | 1 | 5 | 0.08 | 5 | 0.08 |
| 29. | Muhsin-ICP-63 | *Euphorbia hirta* L. | Euphorbiaceae | Paybutey | Increase lactation and appetite | Whole plant | Oral | 2 | 7 | 0.11 | 12 | 0.19 |
| 30. | Muhsin-ICP-64 | *Euphorbia prostrata* L. | Euphorbiaceae | Wermaga | Reduce fever | Shoot | Oral | 1 | 5 | 0.08 | 5 | 0.08 |
| 31. | Muhsin-ICP-65 | *Fagonia cretica* L. | Zygophylaceae | Azghakay | tonic, appetite, stimulant, improve digestion | Whole plant | Oral | 4 | 6 | 0.10 | 11 | 0.18 |
| 32. | Muhsin-ICP-66 | *Ficus carica* Forssk. | Moraceae | Inzar | Enhance lactation, ease after birth processes | Leaf, latex | Oral | 2 | 5 | 0.08 | 9 | 0.15 |
| 33. | Muhsin-ICP-67 | *Ficus palmate* Forssk. | Moraceae | GhatInzar | Increase lactation, ease after birth processes, used to treat skin infection and indigestion | Leaf, latex | Oral | 3 | 7 | 0.11 | 18 | 0.29 |
| 34. | Muhsin-ICP-70 | *Fumaria indica* (Husskn). Pugsley | Fumaraceae | Paprha | Mastitis | Whole plant | Paste | 1 | 5 | 0.08 | 5 | 0.08 |

**Table 1. (Cont'd.).**

| S. No. | Voucher No. | Species name | Family | Local name | Veterinary uses | Part used | Rout | Uf | FC | RFC | ∑Ui | UV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35. | Muhsin-ICP-80 | *Justica adhatoda* L. | Acanthaceae | Baikan | Treat skin infection, laxative | Leaf | Paste | 2 | 6 | 0.10 | 10 | 0.16 |
| 36. | Muhsin-ICP-83 | *Lactuca serriola* L. | Asteraceae | - | Wound healing, Enhance lactation | Fruit, seed | Paste | 2 | 6 | 0.10 | 12 | 0.19 |
| 37. | Muhsin-ICP-85 | *Lathyrus cicera* L. | Papilionaceae | Marghaykhpa | Skin infection | Shoot | Paste | 1 | 7 | 0.11 | 7 | 0.11 |
| 38. | Muhsin-ICP-89 | *Malvastrum coromandelianum* (L.) Garcke | Malvaceae | Ghatkabal | Enhance lactation | Shoot | Oral | 1 | 8 | 0.13 | 8 | 0.13 |
| 39. | Muhsin-ICP-92 | *Melia azedarach* L. | Meliaceae | Torashanday | Used to treat stomach problems, anthelmintic, reduce fever, anti-tussive, anti-lice | Leaf, branches, seeds | Oral | 5 | 13 | 0.21 | 28 | 0.45 |
| 40. | Muhsin-ICP-93 | *Melilotus indicus (*L.) All. | Fabaceae | Lawanai | Anti-constipation of cattle | Leaf | Oral | 1 | 5 | 0.08 | 5 | 0.08 |
| 41. | Muhsin-ICP-94 | *Mentha arvensis* L. | Lamiaceae | Podina | Carminative | Shoot | Oral | 1 | 6 | 0.10 | 6 | 0.10 |
| 42. | Muhsin-ICP-95 | *Mentha longifolia* (L.) Huds. | Lamiaceae | Inalay | Carminative | Shoot | Oral | 1 | 9 | 0.15 | 9 | 0.15 |
| 43. | Muhsin-ICP-96 | *Merabilus jalapa* L. | Nyctaginaceae | Gulabbasy | Diuretic | Root | Oral | 1 | 12 | 0.19 | 12 | 0.19 |
| 44. | Muhsin-ICP-97 | *Micromeria biflora* (Buch-Ham. ex D. Don) Benth. | Lamiaceae | Nareyshamakey | Wound healing | Shoot (dried powder) | Paste | 1 | 7 | 0.11 | 7 | 0.11 |
| 45. | Muhsin-ICP-98 | *Morus alba* L. | Moraceae | Spin tut | Anti-constipation, anti-tussive | Shoot | Oral | 2 | 6 | 0.10 | 10 | 0.16 |
| 46. | Muhsin-ICP-99 | *Morus nigra* L. | Moraceae | Tor tut | Anti-constipation, anti- tussive | Leaf | Oral | 2 | 8 | 0.13 | 12 | 0.19 |
| 47. | Muhsin-ICP-103 | *Nasturtium offficinale* R. Br | Brassicaceae | Termira | Blood purifier | Shoot | Oral | 1 | 5 | 0.08 | 5 | 0.08 |
| 48. | Muhsin-ICP-105 | *Nepeta laevigata* (D.Don) Hand.-Mazz. | Lamiaceae | - | Treat urinary and intestinal problem | Shoot | Oral | 2 | 6 | 0.10 | 11 | 0.18 |
| 49. | Muhsin-ICP-111 | *Oxalis corniculata* L. | Oxalidaceae | Tarukey | Increase lactation, pain killer | Root, shoot | Oral | 2 | 8 | 0.13 | 14 | 0.23 |
| 50. | Muhsin-ICP-116 | *Phragmites australis* (Cav.) Trin. exSteud. | Poaceae | Nall | Improve pregnancy | Rhizome | Oral | 1 | 6 | 0.10 | 6 | 0.10 |
| 51. | Muhsin-ICP-117 | *Pinus roxburghii* Sarg. | Pinaceae | Nakhter | Treat skin infection, wound healing | Leaf | Paste | 2 | 9 | 0.15 | 16 | 0.26 |
| 52. | Muhsin-ICP-118 | *Plantago lanceolata* L. | Plantaginaceae | Jabay | Anti-inflammatory | Leaf | Paste | 1 | 6 | 0.10 | 10 | 0.16 |
| 53. | Muhsin-ICP-119 | *Polygonum barbatum* L. | Polygonaceae | Palpulak | Anti-inflammatory | Leaf, shoot | Paste | 1 | 7 | 0.11 | 7 | 0.11 |
| 54. | Muhsin-ICP-121 | *Portulaca olaracea* L. | Portulaceae | Warkharhy | Mastitis of cattle, carminative | Root, whole plant | Paste, oral | 2 | 5 | 0.08 | 10 | 0.16 |
| 55. | Muhsin-ICP-124 | *Ricinus communis* L. | Polygonaceae | Randa | Anti-constipation, wound healing | Seed (oil), dried leaf | Oral, paste | 2 | 6 | 0.10 | 11 | 0.18 |
| 56. | Muhsin-ICP-128 | *Rumex hastatus* D. Don | Polygonaceae | Tarukay | Anti-tussive, anti-phyretic, anti-scabies | Root, stem, leaf | Oral, paste | 3 | 21 | 0.33 | 45 | 0.73 |
| 57. | Muhsin-ICP-131 | *Sageretia thea* (Osbeck) M.C. Johnst. | Rhamnaceae | - | Treat skin diseases | Shoot | Paste | 1 | 6 | 0.10 | 6 | 0.10 |
| 58. | Muhsin-ICP-134 | *Salvia moocrofitiana* Wall. ex. Benth. | Lamiaceae | Kharghwag | Used to treat skin infection | Leaf, root | Paste | 1 | 4 | 0.06 | 4 | 0.06 |
| 59. | Muhsin-ICP-138 | *Silybum marianum* (L.) Gaertn. | Asteraceae | Kareza | Used to treat kidney and liver disorders | leaf | Oral | 2 | 5 | 0.08 | 9 | 0.15 |
| 60. | Muhsin-ICP-140 | *Solanum nigrum* L. | Solanaceae | Kachmachu | Diuretic | Shoot | Oral | 1 | 11 | 0.18 | 11 | 0.18 |
| 61. | Muhsin-ICP-141 | *Solanum surattense* Burm. f. | Solanaceae | Marghuny | Improve pregnancy | Fruit | Oral | 1 | 7 | 0.11 | 7 | 0.11 |
| 62. | Muhsin-ICP-142 | *Sonchus asper* (L.) Hill | Asteraceae | shawdapay | Increase lactation | Shoot | Oral | 1 | 6 | 0.10 | 6 | 0.10 |
| 63. | Muhsin-ICP-145 | *Tamarix aphylla* L. | Tamaricaceae | Ghaz | anthelmintic | Leaf | Paste | 1 | 5 | 0.08 | 5 | 0.08 |
| 64. | Muhsin-ICP-146 | *Taraxacum* Sp. | Asteraceae | Ziarhguley | Increase lactation, used to treat udder tumors | Whole plant | Oral | 2 | 7 | 0.11 | 12 | 0.19 |
| 65. | Muhsin-ICP-149 | *Tribulus terestris* L. | Zygophylaceae | Markundai | Anti-rheumatism, used to treat stomach problems, enhance lactation | Leaf, seed and fruit | Oral | 3 | 6 | 0.10 | 15 | 0.24 |
| 66. | Muhsin-ICP-151 | *Typha latifolia* L. | Typaceae | Luha | Appetizer | Root | Oral | 1 | 7 | 0.11 | 7 | 0.11 |
| 67. | Muhsin-ICP-152 | *Verbascum thapsus* L. | Scrophulariaceae | Khardag | Antidiarrheal | Whole plant | Oral | 1 | 5 | 0.08 | 5 | 0.08 |
| 68. | Muhsin-ICP-153 | *Verbena officinale* L. | Verbenaceae | Jarushamakay | Improve digestion | Shoot | Oral | 1 | 8 | 0.13 | 8 | 0.13 |
| 69. | Muhsin-ICP-157 | *Withania coagulans* (Stocks) Dunal | Solanaceae | Sperabutey | Antidiarrheal | Fruit with oil | Oral | 1 | 6 | 0.10 | 6 | 0.10 |
| 70. | Muhsin-ICP-159 | *Zanthoxylum armatum* DC. | Rutaceae | Dambara | Improve digestion, control vomiting, treat mouth infection | Fruit, leaf, seed | Oral | 3 | 7 | 0.11 | 18 | 0.29 |
| 71. | Muhsin-ICP-162 | *Zizyphus nummularia* (Burm. f.) Wight & Arn. | Rhamnaceae | Karkanra | Ease labor and after birth processes, anthelmintic | Leaf decoction | Oral | 2 | 8 | 0.13 | 14 | 0.23 |

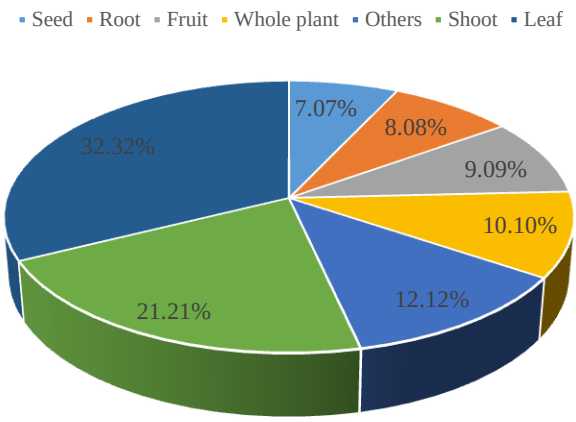


Fig. 4. Part used in percent.

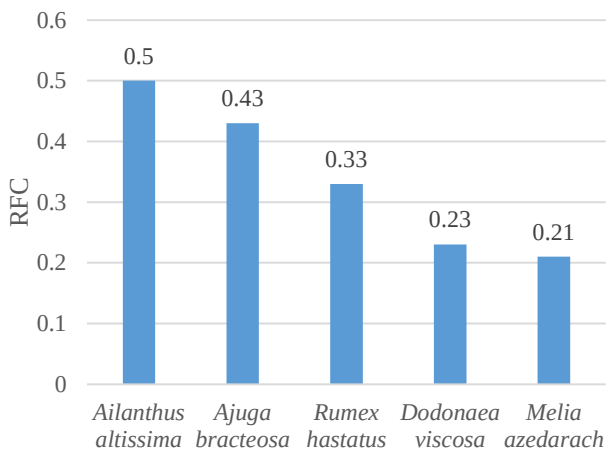


Fig. 5. Plants with highest RFC values.

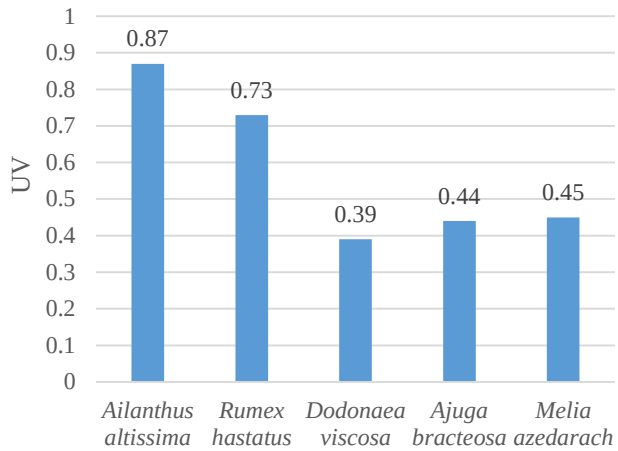


Fig. 6. Plants with highest UVs.

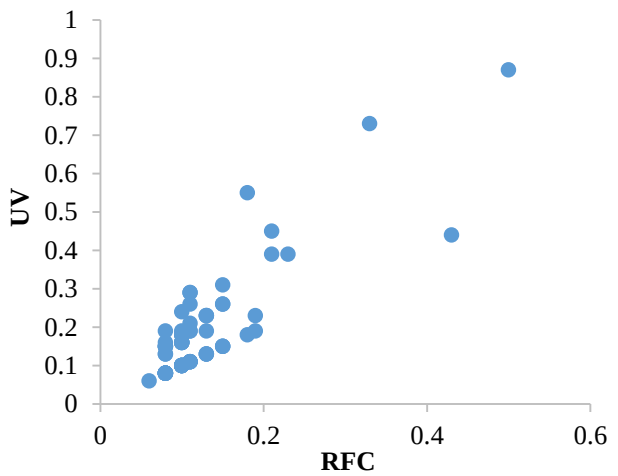


Fig. 7. Relationship between RFC (x- values) and UV (y-values) (Respondents interviewed=62).

## Conclusion

Most People of the area are dependent on livestock for their livelyhood. To keep animals healthy, traditional herbal practices are common which has been transferred orally from generation to generation in the areas. But due to change in life style and modernization the traditional knowledge is going to vanish. On the contrary, the folkloric usage of the medicinal plants is passed down from generation to generation, so they are presumed to be safe in general usage. Due to modernization, the traditional knowledge, is going to be eroded. This study generated a wealth of information worthy of guiding future course of action.

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