

Full Length Research Paper

Pharmaceutically important plants used in traditional system of Arab medicine for the treatment of livestock ailments in the kingdom of Saudi Arabia

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A study on the pharmaceutical importance of some medicinal plants used for the treatment of livestock ailments was conducted during summer 2010 in different parts of Saudi Arabia, where no such study has been conducted so far. The aim of the study was to identify and document the medicinal plants used for the treatment of different livestock ailments in the traditional system of Arab medicine. Ethno-veterinary information was collected through the show-and-tell/semi-structured method and personal interviews during field trips. The methodology is largely based on the Sustainable Livelihood Framework, which is based on the premise that livelihood is not about resource productivity but it is about people and their lives. The study revealed 24 plants species of ethno-veterinary importance. These were used for the curing of various livestock ailments such as gastrointestinal disorders, fever, cough, respiratory tract infection, urinary tract diseases, promote lactation, wound healing, placenta removal, deworming, carminative, paralysis and flatulence in Arab system of medicine. Some plants were used singly while many others were used in combination with other plants or edible items. Similarly, few plants species are considered for the treatment of only one specific disease while several other have multiple such uses. The detail local uses, local recipe preparation, application and disease treated were reported for each species. The study concluded that, the medicinal plant knowledge of the people is strongly influenced by Arab system of traditional medicine and that medicinal plants have exerted and continue to exert, a strong influence on the standardization of plant knowledge among rural populations in Saudi Arabia. However, distinct local use of plants also exists; indicating that plant knowledge specific to the local Bedouins is alive and practiced. The study recommends scientific validity and toxicity tests of the medicinal plants used in traditional Arab system of medicine.

Key Words: Medicinal plants, livestock, diseases, traditional system of medicine, local recipes.

INTRODUCTION

The current study is conducted in different parts in the Kingdom of Saudi Arabia having high ecological and economic significance. The Kingdom is about 1,969,000 square kilometers and covers two thirds of the Arabian subcontinent. The country is known to have different natural sites with great biological diversity and productivity and such sites are fundamental in the synergistic framework of associated ecosystems (Ahmad, 1991).

Medicinal plants showed some variations in its

distributional behavior in different countries, which may be attributed to changes in water resources, climatic factors, edaphic variables and anthropogenic pressures along the elevation gradient (Al-Quran, 2008).

The vegetation composition of Saudi Arabia reflects the geographical position of the Arabian Peninsula between Africa, Asia and Europe. Consequently, the flora has many elements of two of the eight global terrestrial realms; namely the Palaearctic (Europe and Asia) and the Afro-tropical (Africa south of the Sahara) as well as a smaller complement of elements from the Indo-Malayan terrestrial realm. It is thus, an area of ecological and academic significance (Ghazanfar, 2007). The general scope of ethno-botany, an area of human ecology, was

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well defined earlier as the interface between people and their plant resources, and offers clues needed for rural development based on sustainable yields of forest products (Ali et al., 2002).

The climate of Saudi Arabia can be characterized as arid (Al-Quran, 2008; Azaizeh et al., 2003). Ecologically, such zones are fragile and difficult to develop and use except in limited areas, the vegetation of arid areas is sparse and usually highly specialized both morphologically as well as physiologically. Hence, this region has been regarded as a natural reservoir for the collection of a variety of wild medicinal and aromatic plants (Sher et al., 2010b). Unfortunately, many such plant species are collected by local communities without any reference to conservation needs in Saudi Arabia; rather they collect and sell plants both in local as well as international market, just to earn some money to support their lives in mountainous and arid environment. Such practices in turn might cause irreversible damages in the fragile ecosystems in different zones of the country (Sher et al., 2004). In addition, conversion of natural habitats into agricultural land has greatly decreased the population size of many economically important medicinal plants and other forest resources in Saudi Arabia. As a result, many economically and pharmaceutically important plant species become rare and sparse in several parts of Saudi Arabia.

Plants have been used as a source of medicine throughout the world for more than 5000 years old and still continue to occupy important position in traditional as well as modern system of medicines (Sher, 2009). Interestingly, the traditional system of medicines using plants as a source of medicines have acquired greater impetus in the last two decade, as excessive use of synthetic drugs and antibiotics have been found to cause a number of side effects sometimes even proving fatal.

Ethnobotany allows the interaction between researchers with the local people that have the knowledge about the use of plants. These people manage and conserve significant amounts of biological resources useful for industry and world community (Hussain, 2005; Ozcan, 2005). Ethnobotany also can provide useful information in drug development, thus, saving time and money (Sher et al., 2010b; Joshi, 1982). Medicines made from plants with a history of traditional use, confirming the safety and effectiveness are used in many regulatory systems to guide the approval of commercial products.

The study of medicinal plants from traditional use by local people can lead to valuable information, allowing research to be done based on the empirical knowledge that should be tested scientifically. For that, there should be an analysis of medicinal plants in several aspects: anthropological, social, chemical, pharmacological, botanical, ecological, agronomical, and others (Sushila et al., 2010). Collection and processing of medicinal plants is a well recognized practice in Saudi Arabia with particular reference to the present study area. However,

the unregulated collection of medicinal plants for routine domestic use or its market sale have long been an important economic activity in the Arabian Peninsula, which is known to cause habitat loss of plant species survival, their genetic depletion and in an often-rapid downward trend of their populations. Therefore, the present endeavour was initiated with the aim to prepare an ethnoveterinary inventory of medicinal plants along with its current traditional uses in traditional system of Arab medicine for the treatment of different livestock ailments. The present study area is ethnobotanically unexplored and rich in plants resources. The finding may be of help for further research and for those working in and relevant disciplines of biodiversity conservation. Moreover, the documentation of plant knowledge will be useful also as a baseline for future questions related to poverty alleviation, such as whether the cultivation of medicinal plants could provide an additional income source for farmers in the area.

MATERIALS AND METHODS

A combination of quantitative and qualitative research methods was undertaken in various parts of the study. Qualitative data were particularly useful in understanding people's perspectives, meanings, attitudes, beliefs, goals and processes for interpreting quantitative data. The concepts of validity and reliability were applied for the integration of qualitative and quantitative techniques. The fieldwork was conducted during summer 2010 in various parts of Saudi Arabi.

A semi-structured questionnaire was devised to document the traditional knowledge of local people regarding medicinal plants. Generally, elder persons whose practical knowledge was respected by others and those who practice popular folk medicines for the curing of different livestock diseases were contacted and interviewed about the plants. Information about the local names, local uses, parts used, and time of collection, processing and recipe preparation were known and recorded from those local peoples. Plants specimens were collected dried preserved and mounted on standard herbarium sheets and were identified with the help of available literature (James, 1990; Chaudhary and Al-Jowaid, 1999) and The International Plant Names Index (The International Plant Names Index, 2008). The information on medicinal plants of the present study was compared with standard literature on medicinal plants in the Arabian Peninsula (Sher et al., 2010b). The nomenclature was later confirmed from Herbarium, King Saud and Riyadh, Saudi Arabia. The Plants were arranged and documented according to their evolutionary division.

RESULTS

The study revealed that, there were total of 24 plants species used in ethnoveterinary practices by the local people rearing different livestock especially cows, goats, sheep and camels. These 24 plants species were distributed among 20 families, out of which 18 were dicotyledons and 2 were monocots families. Medicinal plants of ethno veterinary importance are used either in isolation or in combination with other medicinal plants.

Similarly, few plants species were considered for the treatment of only one specific disease while several other have multiple such uses (Table 1). The results presented in Table 1 also showed that more than 12 different diseases, therapeutic indications and pharmacological actions were recorded while documenting plant remedies. The most often mentioned ailments were urinary tract infection, digestive system, fever, cold or flu inflammations, flatulence, removal of external parasites, deworming. The main uses coincided with the Arab Traditional System of Medicine descriptions, but, additional administrations and preparations were found in the study area.

Ethnoveterinary uses of some medicinal plants

Dicotyledons families

(1) Family: Asteraceae

A. *Artemisia scoparia* Waldst. and Kit.

Habit: Herb
Part used: Leaves and floral parts
Local name: Slika, Salmas
Voucher specimen number: H-KAU / 04-21

Local Uses: Powdered leaves and floral parts are mixed with wheat flour and are given in bolus form to camels and cows for improving their digestive power.

B. *Senecio asirensis* Boulos and JRI Wood

Habit: Herb
Part used: Root
Local name: Hashma
Voucher specimen number: H-KAU / 05-22
Local uses: Fresh or dried ground roots are mixed with wheat or corn flour, locally and is given to goats and sheep for the treatment of fever.

(2) Family Barbeyaceae

C. *Barbeya oleoides* Schweinf.

Habit: Tall Shrub
Part used: Root
Local name: Kathah
Voucher specimen number: H-KAU / 06-23
Local uses: Dried ground bark of the root is mixed with wheat flour and is given to cows, goats and sheep for improving digestion. It is also considered to maintain health.

(3) Family: Brassicaceae

D. *Lipidium sativum* L.

Habit: Herb
Part used: Fruit (Seed)
Local name: Rashaad
Voucher specimen number: H-KAU / 04-24

Local uses: A decoction of mature seeds is given orally to cows for curing colic problem. It is also considered as purgative.

(4) Family: Caryophyllaceae

E. *Stellaria media* (L.) Cyr.

Habit: Herb
Part used: Whole plant
Local name: Qazzaza
Voucher specimen number: H-KAU / 04-25
Local uses: The plant is mixed with other fodder crops and is considered as appetizer agent.

(5) Family: Flacourtiaceae

F. *Oncoba spinosa* Forssk.

Habit: Tree
Part used: Fruit
Local name: Unqab
Voucher specimen number: H-KAU / 04-26
Local uses: Powdered fruit is mixed with wheat or corn flour and is given to cattle for the treatment of urinary tract diseases.

(6) Family: Fumariaceae

G. *Fumaria abyssinica* Husskin

Habit: Herb
Part used: Whole plant
Local name: Shahtaraj
Voucher specimen number: H-KAU / 05-27
Local uses: Decoction of plants is given to all type of livestock for curing of fever and also considered as refrigerant agent.

(7). Family: Frankeniaceae

H. *Frankenia aucheri* Jaub and sapch

Habit: Shrub
Part used: Roots
Local name: Hamrah
Voucher specimen number: H-KAU / 05-28
Local uses: The powdered rhizome is mixed with milk and is given to cows and camels especially in winter to promote lactation.

(8) Family: Hypericaceae

I. *Hypericum revolutum* Vahl.

Habit: Herb
Part used: Root
Local name: Idhrar
Voucher specimen number: H-KAU / 06-29
Local uses: Dry powdered root is mixed with wheat flour and is given to cattle for the treatment of wounds.

(9) Family: Loranthaceae

Table 1. Medicinal plants used in ethnoveterinary practices in Saudi Arabia.

S/N	Family name	Botanical name	Local name	Disease treated	Animal
1	Aliaceae	<i>Allium sativum</i>	Tums	Gastrointestinal disorders	Camels, cows
2	Araceae	<i>Arisaema flavum</i>	Dakhaf	Cough and respiratory tract infection	Cows and camels
3	Asteraceae	<i>Artemisia scoparia</i>	Slika,	Gastrointestinal disorders	All types of livestock Sheeps, goats, cow and camels
		<i>Senecio asirensis</i>	Hashma	Fever	
4	Barbeyaceae	<i>Barbeya oleoides</i>	Kathah	Gastrointestinal disorders	Camels, cows, goats and sheep
5	Brassicaceae	<i>Lipidium sativum</i>	Rashaad	Gastrointestinal disorders	Cows and camels
6	Caryophyllaceae	<i>Stellaria media</i>	Qazzaza	Gastrointestinal disorders	All livestock
7	Flacourtiaceae	<i>Oncoba spinosa</i>	Unqab	Urinary tract diseases	Cows and camels
8	Fumariaceae	<i>Fumaria abyssinica</i>	Shahtaraj	Fever	All types of livestock
9	Frankeniaceae	<i>Frankenia aucheri</i>	Hamrah	Promote lactation	Cows and camels
10	Hypericaceae	<i>Hypericum revolutum</i>	Idhrar	Wound healing	Cows, Camels, goats & sheep
		<i>Oncocalyx schimperi</i>	Ghashiyah	Flatulence	Cow, camels and goats
11	Loranthaceae	<i>Plicosepalus curviflorus</i>	A'namah	Increase lactation	Cows, camels and goat
		<i>Tapinanthus globiferus</i>	Hadhal	For removal of placenta	Cows and camels
12	Malvaceae	<i>Alcea rosea</i>	Khatami	Carminative and deworming agent	Cows, camels goats and sheeps
13	Pittosporaceae	<i>Pittosporum viridiflorum</i>	AlHowarrada sb	Increase lactation and tonic	Cows, Camels and goats
14	Primulaceae	<i>Primula verticillata</i>	Khaa	Fever and body tonic	Camels
15	Polygonaceae	<i>Polygonum argyrocoleum</i>	Qorda'b	Paralysis	Cows, Camels and goat
16		<i>Rumex nervosus</i>	Aathrab	Constipation	Cows, Camels and goat
17	Ranunculaceae	<i>Ranunculus muricatus</i>	Shaqaiq	As deworming agent	All types of livestock
18	Sterculiaceae	<i>Glossostemon bruguieri</i>	Moghat	Gastrointestinal disorders	Cows, Camels, sheeps and Goats
19	Salvadoraceae	<i>Salvadora persica</i> L	Miswak plant	Gastrointestinal disorders, increase milk production	Goats, Cows and Camels
20	Tiliaceae	<i>Grewia gilletii</i>	Nasham	For killing ticks, lice etc	Cows and Camels
21	Urticaceae	<i>Urtica dioica</i>	Haraqa	Increase milk production	Cows and Camels

J. Oncocalyx schimperi (Hochst.ex A. Rich) M.G.

Habit: Shrubby Herb
 Part used: Leaves
 Local name: Ghashiyah
 Voucher specimen number: H-KAU / 05-30
 Local uses: Dried ground leaves are used locally in bolus form to relive flatulence in cattle.

K. Plicosepalus curviflorus (Benth)

Habit: Woody Parasite
 Part used: Stem
 Local name: A'namah
 Voucher specimen number: H-KAU / 05-31
 Local uses: Dried ground Stems are used to increase lactation in cattle.

L. Tapinanthus globiferus A.Rich.

Habit: Woody Parasite
 Part used: Stem
 Local name: Hadhal
 Voucher specimen number: H-KAU / 05-32
 Local uses: Fresh Stems are given orally to all types of livestock for the treatment of fever and removal of placenta after parturition.

(10) Family: Malvaceae

M. Alcea rosea L.

Habit: Herb
 Part used: Leaves and fruits
 Local name: Khatami
 Voucher specimen number: H-KAU / 05-33
 Local uses: The powdered leaves, young branches and fruits are locally mixed with wheat flour and used as a carminative and de-warming agent, in cattle.

(11) Family: Pittosporaceae

N. Pittosporum viridiflorum Sim.

Habit: Tall Shrub
 Part used: Roots
 Local name: Al-Howarradasb
 Voucher specimen number: H-KAU / 05-34
 Local uses: Powdered roots are given to cattle in bolus form, to increase lactation, and also as general body tonic.

(12) Family: Primulaceae

O. Primula verticillata Forssk

Habit: Herb
 Part used: Rhizome
 Local name: Khaa.Hainan
 Voucher specimen number: H-KAU / 05-35
 Local uses: The ground rhizome is given to the Camels in water to treat fever and as a general body tonic.

(13) Family: Polygonaceae

P. Polygonum argyrocoleum Ssteudel ex Kunze

Habit: Herb
 Part used: Root
 Local name: Qorda'b
 Voucher specimen number: H-KAU / 06-36
 Local uses: Fresh ground root is given to cattle in bolus for curing of paralysis in cattle.

R. Rumex nervosus Vahl.

Habit: Herb
 Part used: Leaves
 Local name: Aathrab
 Voucher specimen number: H-KAU / 04-37
 Local uses: Fresh crushed leaves are mixed with wheat flour for the treatment of constipation in cattle.

(14) Family: Ranunculaceae

S. Ranunculus muricatus L.

Habit: Herb
 Part used: Rhizome
 Local name: Shaqaiq
 Voucher specimen number: H-KAU / 05-38
 Local uses: The powdered rhizome is mixed with wheat flour and Dalda Ghee and is used as dewarming agent in cattle.

(15) Family: Sterculiaceae

T. Glossostemon bruguieri Desf

Habit: Herb
 Part used: Root
 Local name: Moghat
 Voucher specimen number: H-KAU / 04-39
 Local uses: Locally the dried leaves are crushed and mixed with wheat flour and are used to cure diarrhea in cattle.

(16) Family: Salvadoraceae

U. Salvadora persica L.

Habit: Tree
 Part used: Leaves
 Local name: Miswak Tree
 Voucher specimen number: H-KAU / 05-40
 Local uses: Dried ground leaves are given orally to the cattle for the removal of liver fluke and intestinal worms. Also used in stomach disorders.

(17) Family: Tiliaceae

V. Grewia gilletii Sebsebe and Mathew.

Habit: Shrub
 Part used: Shoot and leaves
 Local name: Nasham

Voucher specimen number: H-KAU / 05-41

Local uses: Locally the decoction is applied superficially on skin for killing the ticks, lice and other insects in the skin of cattle.

(18) Family: Urticaceae

W. Urtica dioica L.

Habit: Herb

Part used: Leaves

Local name: Haraqa

Voucher specimen number: H-KAU / 06-42

Local uses: The whole plant is mixed with other fodder crops in considerable amount for increase in milk production in cattle.

Monocot families

(19) Family: Aliaceae

X. Allium sativum L.

Habit: Herb

Part used: Bulb

Local name: Tums

Voucher specimen number: H-KAU / 05-43

Local uses: Locally, the ground bulb of *Allium sativum* is mixed with wheat flour and is given to camels and cows to combat digestive tract diseases and to enhance digestion. It is also used for heating the cows and camels.

(20) Family: Araceae

Y. Arisaema flavum (Forssk.) Schott

Habit: Herb

Part used: Rhizome

Local name: Dakhaf

Voucher specimen number: H-KAU / 04-44

Local uses: Its dry rhizome is boiled for a little while and then is crushed and given to cows and camels in small amount with wheat flour for curing of respiratory tract infections with cough.

DISCUSSION

The result of the present investigation can be applied to agriculture forestry in general and to some extent pharmaceutical industries in particular. The inhabitants of the area get significant benefits from forest which comes mainly in the form of vast array of forest products most of which are non timber forest products especially medicinal plants. In this context, ethno-veterinary knowledge deals with the traditional uses of plants in the indigenous system for the curing of different livestock ailments. The present study area is rich in plant diversity, which is most significantly associated with the life and practices of the hill side dwellers of the area. The present investigation revealed 24 plants species used for the treatment of

different livestock diseases. These plants are used to treat about 13 different types of livestock diseases. Among various classes of traditional uses, all across the globe, various types of gastrointestinal disorders are predominant, and a sizeable number of plant species have been discovered to cure such illness across different ethnic communities. Similar results have been reported (Sher et al., 2010a, 2010b; Yazicioglu and Tuzlaci, 1996) in other parts of the world and some of their documented medicinal plants species are different from our documented plants. The results of the present study was also supported by Davis (1995), who documented few plants species used in health care of livestock in different parts of Afghanistan. However, the documented plant species were different from our reported plant species. It was also observed that some plants had single medicinal use, while many others had multiple such uses. These were invariably used for curing various diseases and for earning livelihood. The finding of the present study are in line with the study of Abdillahi et al. (2010), Saganuwan (2010) and Trumble (2004), who reported that ethnobotanical study play a vital role in exploration of plants and human interaction and, therefore, explore the options for searching alternate source of income and medicine. However, the reported plants were severely grazed by the local livestock. Over-grazing has caused destruction, as green parts are being removed and damaged due to trampling. It therefore, becomes important to manage the grazing system and encourage the regeneration of medicinal plants (Goshi, 1997; Sher et al., 2010a). The present study therefore suggest that, some management measures should be taken with the participation of local communities through village organization to conserve medicinal plant resources from becoming extinct. The foremost important thing is to give awareness/training to local communities on multidimensional basis about sustainable exploitation of medicinal plant wealth in hillsides management for plant resources. Finally, the present study also recommends scientific validity and toxicity tests of the reported medicinal plants used for the treatment of different livestock ailments in traditional system of Arab medicine.

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