

Full Length Research Paper

Diversity of medicinal plants used in the treatment of skin diseases in Tabuk region, Saudi Arabia

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Saudi Arabia has a unique floral diversity due to its remarkable diversity in the ecological habitats. Many plant species are widely applied in traditional medicine to treat several diseases. In the present study, ethnobotanical survey of plant species in Tabuk Region (Saudi Arabia) was carried out describing their uses in treating skin diseases. The results showed that a total of 51 plants species belonging to 40 genera and 28 families were reported. The richest families terms of number of species were Asteraceae, Boraginaceae and Chenopodiaceae (4 species, 7.84% for each) followed by Euphorbiaceae, Fabaceae and Zygophyllaceae (3 species, 5.88% for each). Most of the plant species collected in this study are in the life form of herbs and shrubs and comprise 74% of the plant species. On the other hand, the most frequent plant parts used to treat skin diseases are whole plant (51%) and leaf (24%). The flora diversity in Tabuk Region is obviously threatened by anthropogenic activities and the public authorities should start thinking seriously about the conservation of these important natural resources.

Key words: Flora, medicinal plants, Skin diseases, Tayma, Tabuk region, Saudi Arabia.

INTRODUCTION

Arabian Peninsula include many countries; it is acceptable fact that the biodiversity of plant species in Saudi Arabia is amongst the richest flora in Arabian Peninsula. This comprises a valuable and important genetic source for medical plants in the Middle East (Rahman et al., 2004). The diversity of plants in Saudi Arabia is due to its unique habitats that stretch along large spatial area. A total of 2250 species (including pteridophytes and gymnosperms) in 142 families are represented in the flora of the Kingdom of Saudi Arabia. Of these, there are 242 endemic and 600 rare and endangered species in the

wild (Collenette, 1999). However, the diversity of plants in Saudi Arabia and specifically Tabuk region is threaten by several human activities such as woodcutting, agriculture and the invasion of exotic species (Al-Mutairi et al., 2016).

Medical plants are considered an important economic resource of natural biodiversity. These medical plants can be exploited appropriately to produce essential drugs. Furthermore, these natural resources should be conserved and protected with sustainable management. The fact of using plants in traditional medicine started

thousands years ago and this knowledge has been inherited from one generation to another. There are several studies about the medicinal use of plants in treating different diseases (Rahman et al., 2004; Al-Sodany et al., 2013; El-Mawla et al., 2016; Al-Harbi, 2017; Shinwaikar et al., 2004), and many studies carried out in some Asian countries about using medicinal plants to cure skin diseases such as India (Sanjeet et al., 2012; Mudasir, 2014; Balaraju et al., 2015), while there are a few studies about using medicinal plants traditionally to treat skin diseases such as scabies, eczema and healing wounds in Saudi Arabia.

Due to the importance of the plants in the treatment of skin diseases and In the light of paucity of the information in this regard, this study was conducted to highlight on the wild plants and their medical uses to treat skin diseases in Tabuk region, Saudi Arabia.

MATERIALS AND METHODS

Study area

The surveying of plant species was carried out in several habitats (Sand dunes, valleys, mountains, gravel lands and coastal lands) of Tabuk region which is situated in the North west part of Saudi Arabia with approximate area of 117000 km². The climate in this region is extremely arid with very low annual rainfall of less than 40 mm/year. According to several floral and ecological studies conducted in this region, this region is characterized with unique habitats and remarkable plant diversity (Al-Mutairi et al., 2016).

Surveying the plants

The plant species of medical importance to treat skin diseases were surveyed in various sites of Tabuk region (Tabuk City, Tayma, Duba, Haql, Al-Wajh and Umluj) (Figure 1). And then the plant species were classified using the available taxonomical keys and description by Chaudhary (2001), Collette (1999), Migahid (1996) and Cope (1985). To Identify of the collected plants species for their uses to treat skin diseases was carried out using the description by Rahman et al. (2004), Al-Shanwani (1996), El-Mawla et al. (2016) and Al-Sodany et al. (2013).

Data collection

The study area was divided into six sites in each site there are five locations, in each location four plots were taken (10 m x10 m) for each plot, then the plant species were listed.

A total of 120 sample plots were selected in area under study (Tabuk region). Locations and sample plots were selected to represent a wide range of environmental variation. In each location, sample plots were selected randomly. The sampling process was carried out during the spring season 2016 when most species were expected to be growing.

Data analysis

The plant species were collected in this study were listed and species richness of the plant families, percentage of the plant parts and the percentage of the life forms of the plant species used to treat skin diseases were indicated.

RESULTS

Diversity of medicinal plants in the study area

In the study, a total of 51 species belonging to 40 genera and 28 families were reported for their traditional medical application in Tabuk region, Saudi Arabia. Table 1 presented the number of the species in each family with percentage of their contribution to total number of plant species recorded. The families of Asteraceae, Boraginaceae and Chenopodiaceae were the richest families (4 species, 7.84% for each family). Therefore, these three families constituted almost 25% of the total number of plant species reported to treat skin disease in Tabuk region. However, the families; Euphorbiaceae, Fabaceae and Zygophyllaceae were reported secondly as richest families (3 species, 5.88% for each family).

The plant species reported in this study are widely known to be used to treat skin diseases in Tabuk region. Table 2 summarizes the percentage of the plant parts that is used for this purpose. Most of these medical plants are used as "whole plant" as the percentage of this application is 51%. Then, plant leafs were secondly important in their application to treat skin diseases in Tabuk region.

Plant parts used

Plant parts used to treat skin diseases in Tabuk region is given in Figure 2 and Tables 2 and 3.

DISCUSSION

Relationship between this study and the past studies

The present study aimed to survey plant species in Tabuk Region (Saudi Arabia), so it was carried out describing their uses in treating skin diseases, so it will be added and completed to the several studies that surveyed application of plants in treating different human diseases such as digestive system diseases (Rahman et al., 2004) described 86 plant species of medicinal importance with dominance of seven families. However, Al-Sodany et al. (2013) described 261 plant species which are commonly used in traditional medicine from Taif. In addition Korpenwar (2012), Egharevoa and Ikhatua (2008) Helene and Sandy (2013), Balaraju et al. (2015) and Manish et al. (2012) studied the role of medicinal plants to treat skin diseases.

Plant diversity

In this study, a total of 51 plant species belonging to 40 genera and 28 families were collected from Tabuk Region (North West of Saudi Arabia) and were identified



Figure 1. Map of the study area (Tabuk region) from Saudi Arabia.

for their traditional application to treat skin diseases. The number of plants species collected from Tabuk region that used to treat skin diseases is higher compared to other related studies. For instance Balaraju et al. (2015) and Erhenhi et al. (2016) reported only 21 plant species and Egharevba and Ikhatue (2008) reported 41 and Manish et al. (2012) reported 23 plant species which are used to treat skin diseases. In the present study, the life form of herbs was the most dominant and constitutes almost 45% followed by shrubs 29%. This is in agreement with the study of Egharevba and Ikhatue (2008) which reported 42% herbs and 26% shrubs, while it is not in agreement with the study of Erhenhi et al. (2016) which reported the life form trees was the most dominant life form followed by herbs.

Part used

According to the available information, the active

ingredients of these plants are certain phytochemical compounds that results in ultimate physiological action on human body. Some of these phytochemical compounds are plants alkaloids, saponin, tannins, flavonoids, carbohydrates and phenolic compounds (Edeoga et al., 2005). As shown in the present study findings, the most frequent plant part used to treat skin diseases in Tabuk is whole plant (51%) and leaf (24%), This corresponds with the study carried out by Helene and Sandy (2013) was showed that leaf 31%. This is despite the fact that for herbal medicine preparations, different parts of plants can be used such as leaves, bark, stems, roots, fruits and flowers (Egharevba and Ikhatue, 2008). According to Algasim et al. (2013), leaves are the most frequent part used to treat skin diseases in Zari and Zari (2015) and Korpenwar (2012) reviewed the application of four plant species; aloe (*Aloe vera*), oat (*Avena sativa*), turmeric (*Curcuma longa*) and chamomile (*Matricaria chamomilla*) applied to treat eczema. It was concluded that these four plant species have strong potential for treating eczema

Table 1. Species richness of the plant families that used to treat skin diseases in Tabuk region, Saudi Arabia.

Family	Number of species	Percentage
Acanthaceae	1	1.96
Amaranthaceae	2	3.92
Apocynaceae	1	1.96
Asclepiadaceae	1	1.96
Asteraceae	4	7.84
Avicenniaceae	1	1.96
Boraginacea	4	7.84
Brassicaceae	1	1.96
Capparaceae	2	3.92
Cleomaceae	1	1.96
Chenopodiaceae	4	7.84
Cucurbitaceae	1	1.96
Euphorbiaceae	3	5.88
Fabaceae	3	5.88
Labiatae	1	1.96
Liliaceae	1	1.96
Moringaceae	1	1.96
Oleaceae	1	1.96
Orobanchaceae	1	1.96
Plantaginaceae	1	1.96
Poaceae	2	3.92
Portulacaceae	2	3.92
Resedaceae	2	3.92
Rhamnaceae	2	3.92
Sapindaceae	2	3.92
Solanaceae	2	3.92
Tamaricaceae	2	3.92
Zygophyllaceae	3	5.88

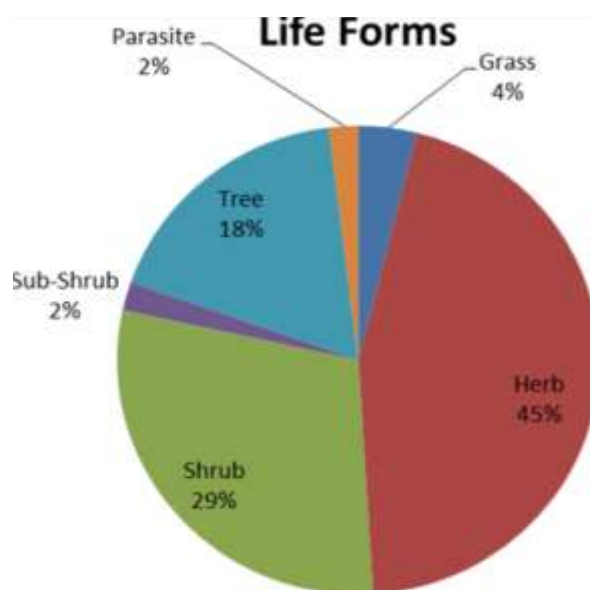
**Figure 2.** The percentage of the life forms of the plant species used to treat skin diseases in Tabuk.

Table 2. The Percentage of the plant parts used to treat skin diseases in Tabuk region, Saudi Arabia.

Plant parts	Percentage
Whole plant	51
Leaf	24
Bark	6
Oil	6
Root	3
Gum	2
Latex	2
Fruit	2
Stem and buds	2
Wax	2

Table 3. List of the medicinal importance of the identified plants species in the study area.

Family/species	Life form	Traditional and medical use	Parts used
Acanthaceae			
<i>Blepharis ciliaris</i> L.	Herb	To treat vitiligo, sores and wounds	Leaf, seeds
Amaranthaceae			
<i>Amaranthus spinosus</i> L.	Herb	To treat eczema	Whole plant
<i>Celosia rigyna</i> L.	Herb	To treat dermatitis	Whole plant
Apocynaceae			
<i>Rhazya stricta</i> Decne.	Shrub	To treat syphilis	Root, stem, leaf, flower
Asclepiadaceae			
<i>Pergularia tomentosa</i> L.	Shrub	To treat microbial skin diseases	Leaf
Asteraceae			
<i>Picris abyssinica</i> Sch.	Herb	To treat dermatitis	Leaf
<i>Pulicaria incisa</i> Lam.	Herb	To treat dermatitis and bleeding	Whole plant
<i>Pulicaria undulata</i> L.	Shrub	To treat hurts	Whole plant
<i>Sonchus oleraceus</i> L.	Herb	To clean sores	Plant juice
Avicenniaceae			
<i>Avicennia marina</i> Forssk.	Tree	to treat small pox	Bark
Boraginacea			
<i>Arnebia hispidissima</i> DC.	Herb	To treat Eczema	Whole plant
<i>Arnebia linearifolia</i> DC.	Herb	To treat sores	Whole plant
<i>Heliotropium digynum</i> Forssk.	Shrub	To treat many skin diseases	Leaf
<i>Heliotropium europaeum</i> L..	Herb	To treat wounds and snake bite	Whole plant
Brassicaceae			
<i>Brassica rapa</i> L.	Herb	to treat skin rash and vitiligo	Root, leaf, seed
Capparaceae			
<i>Capparis deciduas</i> Forssk	Shrub	To treat skin rash, sores and boil	Whole plant
<i>Capparis spinose</i> L.	Shrub	To treat dermatitis	Whole plant
Cleomaceae			
<i>Cleome chrysantha</i> Decne.	Herb	To treat wounds, sores and blisters	Leaf

Table 3 cont'd

Chenopodiaceae				
<i>Bassia muricata</i> L.	Herb	To treat Sores		Oil of seed.
<i>Haloxylon salicornicum</i> Mog	Shrub	To treat wounds, sores and dermatitis		Whole plant
<i>Suaeda aegyptiaca</i> Hasselq..	Shrub	To treat blisters and sores		Leaf
<i>Suaeda monoica</i> Forssk.	Shrub	To treat many skin diseases		Wax
Cucurbitaceae				
<i>Citrullus colocynthis</i> L.	Herb	To treat sores, swelling and vitiligo		Fruit
Euphorbiaceae				
<i>Euphorbia arabica</i> Hochst and Steud.	Herb	To treat Warts		Whole plant
<i>Euphorbia helioscopia</i> L.	Herb	To remove warts		Latex
<i>Ricinus communis</i> L.	Shrub	To treat a head skin		Oil of seeds
Fabaceae				
<i>Acacia arabica</i> Lam.	Tree	To stop bleeding		Bark, gum powder
<i>Acacia seyal</i> Forssk.	Tree	To stop bleeding		Gum
<i>Alhagi camelorum</i> Fisch.	Shrub	To treat dermatitis		Whole plant
Labiatae				
<i>Thymus vulgaris</i> L.	Subshrub	To treat many skin diseases		Whole plant
Liliaceae				
<i>Asphodelus fistulosus</i> L.	Herb	To treat dermatitis		Whole plant
Moringaceae				
<i>Moringa peregrine</i> Forssk.	Tree	To clean skin and elastic it		Leaf
Oleaceae				
<i>Olea europaea</i> L.	Tree	To treat skin pain		Oil
Orobanchaceae				
<i>Cistanche phelypaea</i> L.	Parasite	To treat sores		Whole plant
Plantaginaceae				
<i>Plantago major</i> L.	Herb	To treat blisters, boil and wounds		Whole plant
Poaceae				
<i>Cynodon dactylon</i> L.	Grass	To stop bleeding		Whole plant
<i>Eremopogon foveolatus</i> Del.	Grass	To treat wounds		Whole plant
Portulacaceae				
<i>Portulaca quadrifida</i> L.	Herb	To treat many skin diseases		Leaf, seeds
<i>Portulaca oleracea</i> L.	Herb	To treat many skin diseases		Whole plant
Resedaceae				
<i>Ochradenus baccatus</i> Del.	Shrub	To treat wounds		Stem, leaf, flower
<i>Oligomeris linifolia</i> Vahl	Herb	To treat breast skin		Plant extract
Rhamnaceae				
<i>Ziziphus jujube</i> Lam.	Tree	To treat many skin diseases		Leaf
<i>Ziziphus spina-christi</i> L.	Tree	To treat sores and wounds		Leaf, bark
Sapindaceae				
<i>Dodonaea viscosa</i> Jacq.	Shrub	To treat wounds and burns		Powder of leaf

Table 3 cont'd

Solanaceae			
<i>Datura stramonius</i> L.	Herb	To treat dermatitis, sores and vitiligo	Leaf, root
<i>Solanum forskalii</i> Dunal.	Herb	To treat sores	Whole plant
Tamaricaceae			
<i>Tamarix aphylla</i> L.	Tree	To treat eczema	Bark
<i>Tamarix nilotica</i> Bge.	Tree	To treat dermatitis	New stems and buds
Zygophyllaceae			
<i>Fagonia arabica</i> L.	Shrub	To treat wounds	Whole plant
<i>Fagonia bruguieri</i> DC.	Shrub	To treat dermatitis, swellings, scabies, blisters and vitiligo	Whole plant
<i>Tribulus terrestris</i> L.	Herb	To treat skin pain	Whole plant

according to the available literatures.

Conclusions

The present study reported 51 plant species belong to 40 genera and 28 families which are commonly used to treat skin diseases in Tabuk Region (Saudi Arabia). The survey of plant species applied to treat skin diseases can be considered as the first report that attempts to provide the basic information for future ethnobotanical studies in this region.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

- Algasim AM, Gabriel O, Is-Hag IU (2013). Plant remedies practiced by Keffi people in the management of Dermatitis. *J. Med. Plants Stud.* 1(5):112-118.
- Alhabri NA (2017). Survey of plant species of medical importance to treat digestive tract diseases in Tabuk Region, Saudi Arabia. *Journal of King Abdulaziz University*. In press
- Al-Mutairi K, Al-Shami S, Khorshid Z, Moawed M (2016). Floristic diversity of Tabuk province, North Saudi Arabia. *J. Anim. Plant Sci.* 26:1019-1025.
- Al-Shanwani M (1996). Plant used in Saudi folk medicine. King Abdul-Aziz city for Science and Technology (KACST), Riyadh, Saudi Arabia, 162.
- Al-Sodany YM, Salih AB, Hosny AM (2013). Medicinal Plants in Saudi Arabia: I. Sarrwat Mountains at Taif, KSA. *Acad. J. Plant Sci.* 6(4):134-145.
- Balaraju S, Ramamurthy N, Anand K, Suresh S (2015). Ethnomedicinal plants used to cure skin diseases by tribals of Mahabubnagar district, Telangana state. *J. Pharm. Bio. Sci.* 10:25-27.
- Balaraju S, Ramamurthy N, Konkala A, Suresh S (2015). Ethnomedicinal plants used to cure skin diseases by tribals of Mahabubnagar district, Telangana state. *J. Pharm. Boil. Sci.* 10:25-27.
- Chaudhary SA (2001) *Flora of the Kingdom of Saudi Arabia*. Riyadh: Ministry of Agriculture and Water. pp. 342-354.
- [http://www.scirp.org/\(S\(351jmbntvnsjt1aadkposzje\)\)/reference/ReferencesPapers.aspx?ReferenceID=1823368](http://www.scirp.org/(S(351jmbntvnsjt1aadkposzje))/reference/ReferencesPapers.aspx?ReferenceID=1823368)
- Collenette S (1999). *Wild Flowers of Saudi Arabia*. National Commission for Wildlife Conservation and Development, Riyadh. <https://catalog.hathitrust.org/Record/004095049>
- Cope TA (1985). A key to the grasses of the Arabian Peninsula (Studies in the Flora of Arabia XV)-Arab Gulf J. Sc. Res. Special Publ. 1(1):1-82.
- Edeoga HO, Okwu DE, Mbaebie BO (2005). Phytochemical constituents of some Nigerian medicinal plants, *Afr. J. Biotechnol.* 4(7):685-688.
- Egharevba R, Ikhatua M (2008). Ethno-medical uses of plants in the treatment of various skin diseases in Ovia North East, Edo State, Nigeria. *Res. J. Agric. Biol. Sci.* 4:58-64.
- El-Mawla AMAA, Maghrabi IA, Albarraq AA (2016). A survey on the use of medicinal herbs in the treatment of respiratory complaints in Al-Taif area, Saudi Arabia. *Spatula DD-Peer Rev. J. Complement. Med. Drug Discov.* 6(1):53-58.
- Erhenhi A, Lemy E, Okunbor R (2016). Medicinal plant used for the treatment of skin diseases in Edo State, Nigeria. *J. Med. Plant Herbal Ther. Res.* 4:25-29.
- Helene D, Sandy F (2013). Medicinal plants used for the treatment of various skin disorders by a rural community in northern Maputaland, South Africa. *J. Ethnobiol. Ethnomed.* 4(2):256-264.
- Korpenwar AN (2012). Ethnomedicinal plants used to cure skin diseases in Ambabarwa Wild Life sanctuary area of Buldhana District (M.S.), India. *Int. J. Rec. Trends Sci. Technol.* 2(3):36-39.
- Manish Y Khalid KK, Beg MZ (2012). Ethnobotanical plants used for curing skin diseases by tribals of Rewa district (Madhya Pradesh). *Indian. J. Sci.* 2(1):123-126.
- Migahid AM (1996). *Flora of Saudi Arabia*, Vols. I-III. Jeddah: King Abdul Aziz University Press.
- Mudasir YM (2014). Indigenous knowledge of using medicinal plants in treating skin disease by tribals of Kupwara, J&K, India. *Int. J. Herb Med.* 1(6):62-68.
- Rahman MA, Mossa JS, Al-Said MS, Al-Yahya MA (2004). Medicinal plant diversity in the flora of Saudi Arabia 1: a report on seven plant families. *Fitoterapia* 75:149-161.
- Sanjeet K, Jena PK, Sabnam S, Kumari M, Tripathy PK (2012). Study of plants used against the skin diseases with special reference to *Cassia fistula* L. among the king (Dongaria Kandha) of Niyamgiri: A primitive tribe of Odisha, India. *Int. J. Drug Dev. Res.* 4(2):256-264.
- Shinwaikar A, Rajendran K, Kumar C (2004). Oral antidiabetic activity of *Annona squamosa* leaf alcohol extract in NIDDM rats. *Pharm. Biol.* 42:30-35.
- Zari ST, Zari TA (2015). A review of four common medicinal plants used to treat eczema. *J. Med. Plants Res.* 9:702-711.