REVIEW ARTICLE

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The Practice of Ethnomedicine in the Northern and Southern Provinces of Oman

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ABSTRACT

Studies related to ethnomedicines investigate the way people manage illness and diseases because of their cultural perspective. Fields like ecology, epidemiology, and medical history jointly contribute to the broad field of ethnomedical study. The knowledge gathered by traditional healers in the villages and tribal communities on natural medicines remains unfamiliar to the majority of scientists and the general population. The study of ethnomedicine principally involves the compilation of empirical data, particularly the patterns of illness and treatments from folklore. Due to deforestation, and urbanization of the desert jungles, many valuable medicinal plants present in the study areas appear to be facing extinction in the near future if no proper conservation plans are carried out. This survey documented 33 different herbs used by the natives of Oman for various ailments. Parts of a particular plant, fresh or dried, might be crushed and drunk as an infusion or used externally as a poultice, ground into a paste, or inhaled as smoke. The survey identified 22 plant families, and 18 traditional treatment groups.

In Oman, the information on traditional ethnomedicine practice is not transferred from generation to generation in written form but is verbally inherited from the elder members of the family. Traditional medicine is still widely used to treat minor illnesses like colds, fevers, stomach problems, and headaches, even with the availability of primary and secondary healthcare. The elders or trained traditional healers have the right to administer traditional medicines in the society.

The *Unani tibb* is the base of traditional Islamic medicine and depends on the humoral system, a Graeco-Arab style of medicine.[1,2] It is believed to be derived from the ancient Greek medicinal system where the four elements (earth, water, air, and fire) correspond to blood, phlegm, yellow bile, and black bile in the body. A healthy body is considered to have an equilibrium between the four humors and any imbalance may result in sickness. The Greek physician Hippocrates linked the four humors to four basic temperaments and evolved the ancient medical concept of humorism.[3,4] These temperaments were sanguine (element: air, people: social type), choleric (element: fire, people: short tempered and extroverts), melancholic (element: earth, people: serious and introverts), and phlegmatic (element: water, people: relaxed and peaceful)

In some Omani villages, when doctors are rare, a *hakim* (wiseman) dispenses herbal and other forms of medication. The practice is based on practical, common-sense cures derived from some empiric knowledge. Traditional Omani healers base their diagnosis and treatment on the ancient Greek ideas of health and illness as described by Aristotle[5] and adapted by medieval Arab medical practitioners. The West used the Greek model for centuries too.

The Oman Animal and Plant Genetic Resource Center (OAPGRC)[6] was established in 2012 and has been involved in making action plans for the conservation and maintenance of Oman's genetic resources like animals, medicinal plants, marine species, and microorganisms. The first Indian Ocean Rim Association's meeting on medicinal plants was conducted in July 2014, during which the participating countries signed the Salalah Declaration on Applied Research, Technology Transfer and Commercialization of Medicinal Plants and Traditional Medicine.

The hilly ranges at Jebel Akdhar and Dhofar are rich with remarkable flora and fauna and comprise of migratory birds and valuable medicinal plants. The Jebel Akdhar area in Oman, from which medicinal plant data was gathered, is situated at latitude 23.3° 19.8' N and longitude 57.88 ° 52.8' E and 2000 m above sea level. It is one of the highest points in Oman and surrounded by the Al-Hajar mountain range. Dhofar occupies the southernmost province of Oman, famous for its frankincense (*luban*) trade.

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Figure 1: *Teucrium mascatense* found in the Jebel Akdhar region. The water extract of the leaves and stem is useful as a febrifuge and antibacterial.

Figure 2: *Boswellia carteri* found in the Jebel Akdhar region. Oleoresin is collected from the bark of the tree and is used in asthma and for healing wounds and ulcers.

Salalah is the capital of Dhofar governorate. Dhofar is situated at latitude 18°, 23.8 ' N and longitude 54°, 26.1' E and 1200 m above sea level.

Survey methodology

We conducted this review between September 2013 and August 2014. Relevant information[6–9] was collected through a literature survey of the published ethnobotanical and biodiversity books, monographs or papers on herbal medicines found in the Jebel Akdhar and Dhofar regions of Oman

Additionally, interviews were conducted in villages with the traditional medicine people, folklore groups, and native informants to gather information on the inherited knowledge and empiric experiences about the healing properties of local plants. Each herbal traditional use/evidence was considered authentic only after validation through three or more informants from village localities and cross checking the information at different times. Samples of all medicinal plants were identified and authenticated by experts on plants' taxonomy at the Department of Science, Higher College of Technology, Muscat.

The mode of preparation of the crude drugs and the methods of their administration were recorded. Most plants are used as infusions, decoctions, pastes, or inhalants.

The Dhofar plains form a wide coastal belt between the mountain ridges and the Arabian sea and stretches around 20–25 km. They are composed of marine and aeolian sand and alluvial limestone gravels and are navigated by a network of several wadis that drain out from the mountains. The soils in such areas are shallow and support vegetation of xerophytic shrubs. The genus, species, and families of the identified herbs are arranged in alphabetical order [Table 1].

The majority of Omani traditional treatments include lime, honey, and garlic[10] as herbal additives for treating wounds, the common cold, throat infections, diabetes, and obesity.

Aqueous decoctions of the herbs like cinnamon bark,[11] cloves,[12] true myrtles,[13] frankincense,[14] and ginger[15] are used to treat infections of the respiratory tract and stomach disorders. Leaf and stem decoctions of the plant *Teucrium mascatense* are used in traditional Omani medicine as a febrifuge [Figure 1].[16,17]

The traditional wisdom accumulated over generations of trial and error may result in fatal errors due to ignorance of the toxicities of plant chemical compounds. For example, certain plant chemical compounds are more concentrated at particular times of day, due to diurnal variations, so preparing the correct concentration or dilution of natural herbal treatment is essential.

Rose water[18] is used in folk medicine mainly for eye disorders as well as an astringent and cardiac and cephalic tonic. Thyme[19] and juniper[20] are utilized for their carminative, digestive, diuretic, and spasmolytic properties. Hemp[21] or *al keef* is used in traditional medicine as an astringent, sedative, anesthetic, and retentive. *Solanum incarnum*[22] or bitter apple is used for earache and hemorrhoids. Myrtle or *Myrtus communis*,[23] which is called *yas* in Arabic, grows on the banks of the wadis (valleys that are dry except following rains), and is used for

Figure 3: *Calotropis procera* found in the Jebel Akdhar region. The milky sap extract of this plant is used in the treatment of arthritis.

Figure 5: *Euphorbia larica* found in the Dhofar region. Latex from the tree stem is used for the treatment of bites, boils, burns.

the cure of ulcers, burns, and scorpion stings. Senna leaves (*Sana makki*)[24] are used widely as a laxative. *Ocimum basilicum*,[25] otherwise known as sweet basil, is an important plant rich in its thymol content. The sweet basil is used widely in Oman by local healers as a cure for the common cold, eye infections, and sore throat. The oil is made by boiling the leaves of juniper and wild olives with fixed oils are used effectively by the local *hakims* for the treatment of pain from mountain climbing. The aqueous leaf extract of *Euryops arabicus*[26] or *kabouv* is used as an analgesic.

Cumin seeds (*kimoon*) are used to improve the appetite.[27] Papaya fruit juice is used to treat diarrhea and walnut leaf juice is applied topically for calm skin conditions like eczema. The leaves and seeds of papaya are used to treat diarrhea.[28]

Frankincense, otherwise known as *Boswellia carteri*[14] [Figure 2] is a useful Omani traditional remedy for bronchitis, and can be used as a tonic

Figure 4: *Acacia gerardii* found in the Dhofar region. The plant resins are used in the treatment of bites, boils, and burns.

for cleansing the digestive system, a mouth cleanser, for asthma and ulcers, and as a diuretic. The plant is found largely in the Dhofar region. *Solanum incanum*[29,30] is known as *sharinjiban* or *mazi* and used to treat hemorrhoids and eye and ear infections.

A decoction made from ginger roots[15] is used mainly to relieve stomach ailments in the traditional practices. Datura seed decoction[31,32] is used as a sedative or sometimes to treat asthma and the tree sap of *Ficus cordata* (*Tha'ab*)[36] is used in bites, boils, and burns.

Acridocarpus orientalis[23] is used by the locals of the Jebel Akdhar mountain range and also in the sandy plains of western Gulf countries like Oman, Yemen, and the UAE, for headaches. A poultice or paste is made from the crushed seeds and applied to the forehead to relieve headache. In Oman, villagers use the seeds of this plant as a source of yellow dye. *Citrullus colocynth*[22,34] is found scattered in the sandy soil of desert plains bearing green and yellow round gourd included in Cucurbitaceae family. The fruits have astringent and laxative properties. Traditional healers used the fruit juice as a remedy for insect and dog bites. The leaf juice of the walnut plant (*Joz* or *nakash*)[35,36] is used to treat skin infections and eczema.

In traditional practices, the smoke from the dried leaves of *harmal* (*Rhazya stricta*)[37] are inhaled to treat bronchial infections. *Harmal* is also used for treating eye infections, skin rashes, worm infestations, and in diabetes.

Moringa peregrina,[38] otherwise known as miracle tree or *shu,* is mainly used for nutrition, and the crushed seeds are used to cure constipation and other

Table 1: Traditional medicines of Oman

Name of the herb	Local name (Arabic)	Botanical name (family name)	Major chemical constituents	Uses	Reference	Herbarium accession number	Extraction methods/ decoctions used
Rose water	Ward	*Rosa damascena* (Rosaceae)	Citronellal, geraniol, methyl euginol, linalool, vitamin C, kaempferol, and quercetin	Astringent, cardiac and cephalic tonic. Used as eye drops.	10	DCHM/23	Aqueous water distillate.
Garlic	Thom, kurath	*Allium sativum* (Lilliaceae)	Aliin, allicin, diallyl trisulfide, S-allyl cysteine, ajoene S-allyl mercapto cysteine	Fever, pulmonary infections, rheumatism, hypoglycemic, purgative.	11	DC/HM/24	Water distillation.
Thyme	Zaater	*Thymus vulgaris* (Labiatae)	α -pinene, camphene, β-pinene, α-terpinene, thymol	Carminative, spasmolytic.	12	DC/HM/25	Extracted from the fresh or partly dried flowering tops and leaves of the plant by water distillation.
Acridocarpus	Qafas	*Acridocarpus orientalis* (Malpighiaceae)	Flavonoids morin, polyphenols, phenolics	Headaches and muscle pain.	13	DC/HM/26	Decoction made from crushed seeds.
Cinnamon	Qurfa	*Cinnamomum zeylanicum* (Laraceae)	eugenol, eugenol acetate, cinnamic aldehyde and benzyl benzoate	Infection of the respiratory tract, rheumatism, arthritis, general pains.	14	DC/HM/27	The water distillate/decoctions of the leaves and twigs or inner dried bark.
Clove	Qurnfel	*Eugenia caryophyllus* (Myrtaceae)	euginol, euginol acetate, iso-eugenol and caryophyllene	Acne, bruises, burns and cuts, for toothache, mouth sores.	15	DC/HM/28	Water distillate of clove buds.
Hemp	Al-keef	*Cannabis sativa* (Cannabinaceae)	Leaf: tetra hydro cannabinol Oil: rich in proteins and vitamins	Retentive, anesthetic, astringent, sedative.	16	DC/HM/29	The oil is expressed by applying pressure.
True myrtle	Yas	*Myrtus communis* (Myrtaceae)	myrtenyl acetate, 1, 8-cineole, limonene, linalool, methyl eugenol, terpineole, trans-carveole, geraniol	Used in scorpion sting, burns, sores and ulcers. Antiseptic, antirheumatic.	17	DC/HM/30	Myrtle oil is extracted from the leaves, branches, fruits and flowers through water distillation.
Senna leaves	Sana makki	*Cassia acutifolia* (Leguminosae)	Sennocides A,B,C,D	Laxative.	18	DC/HM/31	Leaf and root decoction.
Juniper	Arar	*Juniper excelsa* (Cupressaceae)	α-pinene, camphene, β pinene, 1,4-cineole limonene, camphor, linalool	Aromatic, stimulant, digestive, diuretic.	19	DC/HM/32	Juniper oil is extracted from dried, crushed or slightly dried ripe fruit or leaves by water distillation.
Frankincense	Mohor, Sheehaz mogar	*Boswellia carteri or B.sacra* (Burseraceae)	Limonene, verbenone, incensol	Asthma, wounds, ulcers, bronchitis, diuretic, tonic for cleansing the digestive system and for deodorizing the mouth.	20	DC/HM/33	Oleoresin is collected from cut made in the bark of the tree.
Mountain/felty germander or Cat thyme	Kalpooreh, qasba	*Teucrium mascatense* (Lamiaceae)	Flavonoids	Antibacterial, antinociceptive, antinflammatory, bitter tonic febrifuge.	21,22	DC/HM/34	Water extract of the leaves and stem.
Bitter apple	Sharinjiban, mazi	*Solanum incanum* (Solanaceae)	Steroid alkaloid, solanin, solasonine	Hemorrhoids, earache.	23	DC/HM/35	Water extract of the roots.
St Joseph's wort, sweet basil	Theemran zawab	*Ocimum basilicum* (Lamiaceae)	Thymol, euginol, 1,8 cineole	Colds and eye problems, insect bites.	24	DC/HM/36	Leaf extract.

Name of the herb	Local name (Arabic)	Botanical name (family name)	Major chemical constituents	Uses	Reference	Herbarium accession number	Extraction methods/ decoctions used
Jacobeastrum arabicum	Kabouv	*Euryops arabicus* (Compositae)	Volatile oil, secoeurabicanal	Analgesic.	25	DC/HM/37	Aqueous Leaf extract.
Cumin	Kimoon or Sanoot	*Cuminum cyminum* (Umbelliferae)	Cuminaldehyde, cymene	Enhancing appetite, boiling the ground seeds with lime and then drunk as a colic.	26	DC/HM/38	Decoction of the seeds.
Papaya fruits	Pawpaw or fifay	*Carica papaya* (Caricaceae)	Papain enzyme, lycopene, polyphenols	Diarrhea.	27	DC/HM/39	Leaves and seeds.
Walnuts	Joz or nakash	*Juglans cinerea* (Juglandaceae)	Nutrient-dense	Eczema.	28,29	DC/HM/40	Leaf juice.
Rhazya	Harmal	*Rhazya stricta* (Apocynaceae)	Alkaloids	Smoke from its dried leaves is inhaled from a pipe for chest ailments.	30	DC/HM/41	Dried leaf smoke, leaf juice.
Miracle tree	Shu	*Moringa peregrina* (Moringaceae)	Flavonoids rutin, quercetin β-sitosterol, β-amyrin	Seed oil is used for bone setting.	31	DC/HM /42	Crushed seed oil.
Aloe plant	Isqal,sabbar	*Aloe barbedensis A.dhofarensis*, *A.innermis* (Lilliaceae)	Anthracene glycosides	Purgative, eye infections, wound healing.	32	DC/HM/43	Dried or fresh leaf juice.
Lycium	gharqad	*Lycium shawii* (Solanaceae	Alkaloids, steroids, flavonoids	Detoxification, anti-inflammatory, for sore eyes	33	DC/HM/44	Decoction of stem.
Bitter apple	handal	*Citrullus colocynthis* (Cucurbitaceae)	Flavonoids, unsaturated fatty acids, alkaloids	Dog and insect bites.	34,35	DC/HM/45	Decoction of the berries, whole plant.
Spurge tree	Labna	*Euphorbia larica* (Euphorbiaceae)	Flavonoids	Bites, boils, burns.	36	DC/HM/46	Latex from the tree stem.
Rubber bush Camel weed	shakr	*Calotropis procera* (Asclepidaceae)	Cardiac glycosides	Arthritis.	37	DC/HM/47	Plant milky sap extract.
Thorn apple/ Night shade	Mazi	*Solanum incanum* (Solanaceae)	Steroidal glycosides, steroidal alkaloids	Hemorrhoids, eye and ear infections.	38	DC/HM/48	Leaves, whole plant.
Ginger	Zanjabil	*Zingiber officinale* (Zingiberaceae)	Oleoresins	Stomach ailments.	39	DC/HM/49	Rhizomes.
Angels trumpet	Tatorah	*Datura metel* (Solanaceae)	Tropane alkaloids	Sedative, used to treat asthma.	40,41	DC/HM/50	Decoction of seeds.
Namaqua fig	Tha'ab	*Ficus cordata* (Moraceae)	Polyphenols, flavonoids	Bites, boils, burns.	42	DC/HM/51	Tree sap.
Red thorn	Thbeean	*Acacia gerardii* (Fabaceae)	Polyphenols, catechins	Bites, boils, burns.	43	DC/HM/52	Plant resins.
Khejri	Ghaf	*Prosopis cineraria* (Fabaceae)	Polyphenols, catechins, Flavonoids, 5HT	Astringent, demulcent.	44	DC/HM/53	Gum and resins.
Dates	Nakhleh	*Phoenix dactylifera* (Arecaceae)	Flavonoids, tannins, vitamins, minerals, sterols	General tonic, cooling, aphrodisiac, bronchitis.	45,46	DC/HM/54	Fruits , leaves, seeds.
Caralluma	Qahr al-luhum	*Caralluma flava* (Asclepidaceae)	Pregnane glycosides, flavone glycosides	Tonic, stomach ailments, suppress hunger.	47	DC/HM/55	Aerial part, whole plant.

Figure 6: *Ficus cordata* found in the Jebel Akdhar region. The tree sap is used for relieving and treating bites, boils, and burns.

Figure 7: *Rhazya stricta* found in the Dhofar region. Smoke from the dried leaves is inhaled from a pipe for chest ailments.

Figure 8: *Citrulus colocynth* found in the Dhofar region. A decoction made from the berries and whole plant is used to treat dog and insect bites.

stomach ailments. The *shu* oil is used traditionally for bone setting by applying it to the skin. The milky sap extract from the *Calotropis procera* plant is used in folk medicine for arthritis [Figure 3].[39]

The dried *Isqal* juice obtained from the common garden aloe plants (*Aloe barbedensis*)[40] is used for its cleansing, antimicrobial and wound healing properties. The fresh juice obtained from the plant is useful for eye infections. A decoction of the stem of the plant *Lycium shawii*,[41] known as *gharqad*, is used to purify and detoxify the digestive and circulatory systems.

The folk medicine men of Oman frequently use resins, latex, and tree saps to dress wounds arising from burns, bites, and boils. The commonly used plants are *Acacia gerardii* [Figure 4],[42] *Euphorbia larica* [Figure 5][43] *and Ficus cordata*.[36]

Prosopis cineraria[44] is a very popular plant, the gum and resins of which are useful as an astringent and demulcent. Also, date palms (*Phoenix dactylifera*)[45,46] are considered a general tonic, rejuvenator, and cooling agent in traditional medicine practice. A xerophytic plant which can be found abundantly in the Al Fazayeh region of Dhofar is *Caralluma flava*.[47] Natives use these cactus varieties to suppress hunger, stomach ailments and as a general tonic.

Summary

This review focused on the folklore information available on medicinal plants in Oman. We identified 33 medicinal plants routinely used in the folk medicine practice. These plants are included in 22 plant families and 18 traditional treatment groups. Most of the plants are used as infusions, pastes, or inhalants.

Aloes and Senna are the most common laxatives used to relieve constipation in folklore medicine. Rose water, clove, *Teucrium* plants, and *Ocimum* herbs and shrubs are the major antimicrobial agents. Plants like garlic, cat thyme, arabicum, and *Lycium* are used for their antipyretic and antiinflammatory properties. *Acidocarpus*, *Euryops* and *Teucrium* are

Figure 9: *Solanum incanum* (*Mazi*) found in the Jebel Akdhar region. Water extract of the roots is useful for the treatment of colds, eye problems, and insect bites.

utilized for their analgesic activity, and the plant *Teucrium* is a good bitter tonic. Datura seeds, *Boswellia*, cinnamon, and garlic are utilized for respiratory tract infections. Plants like *Calotropis*, cinnamon, garlic and true myrtle are used as antiarthritic and antirheumatic agents.

Acacia gerardii, Ficus cordata [Figure 6], *Euphorbia larica*, and *Ocimum basillicum*, are used for bites, boils, and burns, and *Juglans cinerea* (walnut) for skin infections and eczema. Datura seeds and cannabis are used as sedatives. The smoke from the dried leaves of *Rhazya stricta* [Figure 7] is inhaled from a pipe for chest ailments. *Citrullus colocynthis* [Figure 8] are used for dog and insect bites, while *Myrtus communis* is used for scorpion stings. *Solanum incanum* [Figure 9] is utilized for its antihemorrhagic activity, and *Lycium shawii* is a traditional detoxifying agent.

CONCLUSIONS

The paper provides a report on ethnomedicinal uses of some important plants locally available for curing various ailments found in the Jebel Akdhar and Dhofar regions of Oman. The medicinal plants present in these areas are still not fully explored. The curative and palliative effects of some herbs, minerals, and animal parts are well acknowledged among the rural or tribal populations throughout the world, and this information is typically passed on from one generation to another in the folklore community.

In most instances, the traditional medicine acts as the basic level of contact for rural people when they require medical attention. It is important for governments to take urgent steps to introduce the use of traditional medicine to supplement primary health care. Deforestation at the scrub jungles may result in an added damage to the vegetation of the hilly areas and the valleys along with other environmental hazards. The valuable endangered medicinal plants present over these areas will be extinct in the near future if they are not conserved.

Ethnomedicine is considered the origin of all traditional and complementary systems of medicine and even for modern medicine. Ethnomedicine surveys are considered to be useful for the scientific community to provide basic evidence for the therapeutic value and safety of herbal medication.

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