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Ethnopharmacological survey of medicinal herbs in Israel, the Golan Heights and the West Bank region

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Abstract

An extensive ethnopharmacological survey was conducted among the most well known Arabic indigenous herbal practitioners in Israel, the Golan Heights and the West Bank in order to evaluate the potential of local plants used in treating different diseases and illnesses. Thirty-one indigenous practitioners of Arabic traditional medicine ranging in age from 40 to 116 years, were interviewed using a previously prepared questionnaire. The current survey revealed that 129 plant species are still in use in Arabic traditional medicine for the treatments of various diseases. Among these plants, there are 40 species used for treating skin diseases, 27 species for treating kidney and urinary system, 26 species for treating diabetes, 23 species for treating digestive system including stomach and intestinal pain and inflammation, 22 species for treating liver diseases, 16 species for treating respiratory system and coughing, 13 species for treating forms of cancer and nine species for treating weight loss and cholesterol reduction. Additional findings and implications of this current survey including preparation methods and route of use are discussed in this report.

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1. Introduction

The hills and mountains of Israel, Palestine and the Golan Heights are covered with more than 2600 plant species of which more than 700 are noted for their uses as medicinal herbs or as botanical pesticides (Silva and Abraham, 1981; Dafni et al., 1984; Yaniv et al., 1987; Abu Bakr Ibn Wahshia, 1989; Palevitch and Yaniv, 1991; Ali-Shtayeh et al., 1998; Ali-Shtayeh and Abu Ghdeib, 1999). A preliminary classification of the healing potential of medicinal plants based on an ethnopharmacological survey conducted among 27 Bedouin informants living in the desert region of Israel (the Negev) showed that there were 81 species used for treating 115 different ailments and diseases (Friedman et al., 1986). A recent ethnopharmacological survey carried out among 102 informants living in the West Bank revealed that there were at least 63 reliable plant species

still in use for treating skin, urinary system, gastric system, prostate diseases as well as cancer and other ailments (Ali-Shtayeh et al., 2000).

The above data indicate a significant contraction in the variety and extent of medicinal plant usage in the Middle Eastern area, and suggest that the indigenous medicine of the area is diminishing and may disappear. This is paradoxical at a time when there is an increasing interest worldwide in herbal medicines. For example, there was a seven-fold increase in the number of people using herbal medicines between 1990 and 1997 in the U.S. (Eisenberg et al., 1998), and natural products are still a major source of new drug concepts: 65% of the drugs that were approved for marketing between the years 1983 and 1994 were based on natural sources (Soejarto, 1996; Cragg et al., 1997). Ethnobotanical and ethnopharmacological research is crucial in the development of drugs from natural sources. The information obtained on identification, preparation, clinical use, gathering, and preservation of medicinal plants dramatically facilitates the search for new drugs, and the time needed for drug development programs (Farnsworth

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Fig. 1

and Soejarto, 1985; Soejarto and Farnsworth, 1989). A diverse or wide collection of medicinal plant species and the knowledge concerning their medicinal use function as the raw material for such research. Therefore, the decline in the regional knowledge base concerning medicinal plants will severely limit the potential of ethnobotany and ethnopharmacology for drug discovery. This was one of our primary motivation for deciding to carry out a regional survey of medicinal plant uses. Furthermore, some 30% of the flora in Israel, the Golan Heights and the West Bank are considered rare, and many of these species are endangered (Palevitch and Yaniv, 1991; Shmida and Fragman, 1999). This gives an added sense of urgency to the task of recording their identity and uses, and initiating a program of preservation of the genetic resource of medicinal plants of the region. Most of the previous surveys conducted in Israel have targeted Bedouins living in the Negev desert (Bailey and Danin, 1981; Friedman et al., 1986) and have not included other practitioners and healers from this place. This study was set out to collect more extensive data from the most reliable and professional local practitioners of Arabic traditional medicine living in Israel, the Golan Heights and the West Bank (Fig. 1). The information obtained is currently employed in various projects dealing with the search of potential bioactive compounds of pharmaceutical significance.

2. Methodology

The current ethnopharmacological survey was conducted among 31 local Arab practitioners chosen among the most respected and popular of the region where 15 are living in the Galilee region of Israel, eight in the Negev desert, seven in the West Bank and one in the Golan Heights (Fig. 1). The choice of the individual informant to be interviewed was of fundamental importance to the reliability of the gathered information. We only selected practitioners who utilized medicinal plants as part or all of their therapeutic activity, and who were regarded as professional because they treated patients outside their immediate circle of family and friends. The selected practitioners were citizens of small rural communities with an average age of 60 years. The average length of practice was 20 years. In most cases, only one informant from each village was selected. In this survey, we requested detailed information from the practitioners concerning the nature and identity of the herbs, as well as their therapeutic uses and preparation. The questionnaire addressed to each practitioner in-

Fig. 1. Diagram of the Middle Eastern region including the areas where the ethnopharmacological survey was conducted.

Table 1

Latin and family (in parenthesis) names, local Arabic names, plant parts, preparation and the diseases treated by local medicinal plant species used within the Palestinian population in traditional Arabic medicine

Latin name	Local Arabic name	Part used	Medicinal use	Mode of preparation ^b
<i>Achillea fragrantissima</i> (Forssk.) Sch. Bip. (Asteraceae) (RDC 1001) ^a	قيسوم	Leaf and stem	Aching joints and fever	Decoction of leaves and stems are added to bath. Patient is immersed for 15 min
		Leaf and stem	High blood pressure, stomach aches and diabetes	Decoction of four tsp in 1 l water is taken orally
<i>Achillea millefolium</i> L. (Asteraceae) (RDC 1002)	أخليا ام الفبي ورقة	Leaf and flower	High blood pressure, stomach aches and diabetes	An infusion is prepared from one tsp in one cup water and taken orally
<i>Alcea setosa</i> (Boiss.) Alef. (Malvaceae) (RDC 1003)	خاتمية	Leaf, flower and root	Stomach and intestine pain, inflammation and asthma	A standard decoction of leaves, flowers and roots is prepared and taken orally, 150 cc, three times/day
		Leaf, flower and root	Skin allergy and wounds	A standard decoction of leaves, flowers and roots is prepared and taken orally, 150 cc, three times/day
<i>Alchemilla vulgaris</i> L. (Rosaceae) (RDC 1004)	كف الإسد	Leaf	Weight loss, stomach and intestine pain and inflammation	A standard decoction is prepared and taken orally, 150 cc, three times/day
<i>Alhagi maurorum</i> Medik. (Fabaceae) (RDC 1005)	قبار	Root	Kidney stones and diarrhea	A decoction of 100 g roots is prepared in 1 l water, 2–3 cups are taken orally a day until improvement occurs
<i>Allium cepa</i> L. (Liliaceae) (RDC 1006)	بصل الثم	Bulb	Diabetes, loss of appetite, liver diseases and prostate cancer	Juice is taken orally
		Bulb	Coughing	Bulbs are eaten after roasting, juice is mixed with honey and taken orally
		Bulb	External infections	Pieces of the bulb are placed directly on infected areas and bound with gauze
<i>Allium sativum</i> L. (Liliaceae) (RDC 1007)	ثوم بستاني	Bulb	Poisoning, asthma, blood circulation and muscle relaxation	Bulbs are eaten fresh (3–6 cloves) or as juice taken orally
<i>Ammi visnaga</i> (L.) Lam. (Apiaceae) (RDC 1008)	خلة	Flower and seed	Kidney inflammation and respiratory system (asthma)	A decoction of two tsp seeds or flower in 1 l is prepared, 2–3 glasses are taken each day until improvement occurs
<i>Amygdalus communis</i> L. (Rosaceae) (RDC 1009)	لوز	Fruit	Local paralysis and hair loss	Oil is applied externally
		Fruit	Stomach and intestine	Tsp of ground fruit is eaten with honey
		Leaf	Lung inflammation	Decoction of 50 g leaves in 1 l is taken orally three times/day
<i>Anabasis articulata</i> (Forssk.) Moq. (Chenopodiaceae) (RDC 1010)	أجرام	Leaf and stem	Ectoparasites and eczema	A decoction is prepared from 200 g green leaves and stems boiled in 1 l water for 15 min and applied externally with wash cloth
		Leaf and stem	Fever and headache	A decoction is prepared from 30 g of green leaves and stems in 1 l water and 3–4 tsp/day are taken internally until improvement occurs
<i>Anchusa strigosa</i> Banks and Sol. (Boraginaceae) (RDC 1011)	لسان الثور	Leaf	Skin diseases, arthritis and wounds	Juice from macerated leaves is applied externally
		Leaf	Respiratory infection, fever and diuretic	A standard decoction is prepared and taken internally, 5 cc, three times/day
<i>Arbutus andrachne</i> L. (Ericaceae) (RDC 1012)	قطلب	Leaf, fruit and root	Urinary system, blood tonic and cancer	A standard decoction is prepared from roots, leaves and fruit and 50–100 cc is taken 2–3 times/day
		Leaf and fruit	Urinary system, aching joint and wounds	Crushed roots and fruits (dry) are soaked in olive oil for 15 days then applied externally to affected areas

Table 1 (Continued)

Latin name	Local Arabic name	Part used	Medicinal use	Mode of preparation ^b
<i>Arum palaestinum</i> Boiss. (Araceae) (RDC 1013)	لوف	Foliage	Internal bacterial infection, cancer, poisoning and circulatory system	A decoction is prepared from 50 g plant parts in 1 l water for 15–30 min and taken internally, 30 cc, three times/day until improvement occurs
<i>Artemisia herba-alba</i> Asso. (Asteraceae) (RDC 1014)	شايح	Foliage	Nerve system, heart diseases, sexual weakness and diabetes	An infusion of 30 g foliage in 1 l is prepared and taken, 100 cc, two times/day
<i>Artemisia judaica</i> L. (Asteraceae) (RDC 1015)	بعيثران	Leaf, flower and root	Fever, menstruation regulator and nerve system (calming)	A decoction is prepared from two tsp plant parts boiled in 1 l water for 20 min, five tsp are taken daily until improvement occurs
<i>A. officinalis</i> L. (Liliaceae) (RDC 1016)	هليون	Shoots	Liver tonic, diabetes, urinary system, liver and lack of appetite	Young shoots are eaten or standard decoction of above ground parts is prepared and taken internally, 30 cc, two times/day
<i>Asphodelus microcarpus</i> Salzm. and Viv (Liliaceae) (RDC 1017)	عوصلان	Bulb and root	Ectoderm parasites, jaundice and psoriasis	Juice from bulbs and roots is applied locally two times/day until the condition improves. Tincture was made for oral administration for jaundice treatment
<i>Astragalus macrocarpus</i> DC. (Fabaceae) (RDC 1018)	خصي الثعالب	Fruit	Sexual weakness (men) and fever	A standard decoction is prepared from 50 g fruit in 1 l water and 100 cc is taken internally three times/day
<i>Atriplex halimus</i> Wright (Chenopodiaceae) (RDC 1019)	قطف	Leaves	Heart diseases and diabetes	A decoction of 50 g leaves are boiled for 30 min in 1 l water, one cup per day is taken orally
		Leaves	Rheumatism	Five hundred grams of leaves are boiled in 2 l water for 30 min and added to bath. Patient is immersed in the bath for 30 min
<i>B. aegyptiaca</i> L. Delile (Zygophyllaceae) (RDC 1020)	زقوم	Leaf and young branches	Wounds	Macerated plant parts are applied fresh as poultice
		Leaf and young branches	Aching joints and varicose veins	Oil is prepared by boiling plant parts and collected oil that rises is applied externally to affected areas
<i>Brassica napus</i> L. (Brassicaceae) (RDC 1021)	لفت	Leaf	Coughing, kidney stones and asthma	Juice is extracted from leaves and taken internally, 1–2 tsp, 2–3 times/day until improvement occurs
		Leaf and seed	Acne	A poultice of leaves and seeds is prepared and applied to face as cleanser, then washed with water. Repeated four times/day
<i>Brassica oleracea</i> L. (Brassicaceae) (RDC 1022)	ملفوف	Whole plant	Respiratory system, asthma, cancer, joint inflammation and bacterial infection	Juice from 500 g of hard parts of plant is extracted and 100 cc, three times is taken daily until improvement occurs
<i>Calotropis procera</i> (Aiton) W.T. Aiton (Asclepiadaceae) (RDC 1023)	تفاح سدوم	Fiber	Skin diseases, paralysis and coldness	Five drops of extracted sap are added to 1 l hot water and applied externally with wash cloth
<i>Calicotome villosa</i> (Poir.) Link (Fabaceae) (RDC 1024)	القنديل	Flower	Cardiovascular system, nervous system and blood dilution	An infusion is prepared from one tsp flowers in one cup boiling water and taken daily until improvement occurs
<i>Capparis spinosa</i> L. (Capparaceae) (RDC 1025)	قبار	Root	Deafness	Roots are boiled in olive oil and passed through sieve. Oil is then applied, one drop to the affected ear
		Stem and fruit	Back diseases	Stems and fruits are macerated, placed between gauze on aching area for 15 min

Table 1 (Continued)

Latin name	Local Arabic name	Part used	Medicinal use	Mode of preparation ^b
		Fruit, leaf and stem	Female infertility	Fruit, leaves, and stems are decocted for 15 min, 50 g in 1 l, three times/day for 2 months or until improvement occurs
<i>C. iberica</i> Trevir. ex Spreng. (Asteraceae) (RDC 1026)	مرار	Whole plant	Diabetes	A decoction of all plant parts is prepared from 50 g in 1 l and taken three times/day
		Flower	Antiseptic	A decoction of 50 g flowers in 1 l water is prepared and two cups/day are taken orally to help heal sores
<i>Ceratonia siliqua</i> L. (Fabaceae) (RDC 1027)	خروب	Leaf	Diabetes	A decoction of 50 g leaves in 1 l is prepared and taken 2–3 times as needed
		Fruit	Herpes and lip sores	Fruit syrup is applied externally
		Fruit	Digestive system, coughing and diarrhea	Fruit syrup one tsp, is taken internally, 2–3 times/day as needed
<i>Ceterach officinarum</i> Willd. (Pteridophyta) (RDC 1028)	عشبة الجراح, ذهبية	Whole plant	Joint diseases and wounds	Macerated plant parts are soaked in olive oil and applied with gauze externally
		Whole plant	Ulcers of duodenum	A decoction of 50 g in 1 l is taken, 2–3 glasses/day after meals
<i>Cichorium pumilum</i> Jacq. (Asteraceae) (RDC 1029)	علت	Whole plant	Poisoning	Fresh plant parts are eaten
		Leaves	Bacterial Infection, rheumatism	Decoction of 50 g fresh leaves in 1 l water is taken, one cup for three times/day
<i>Cistanche tubulosa</i> (Schenk.) Hook. f. (Orobanchaceae) (RDC 1030)	هالوك	Leaf and flower	Jaundice	Decoction of 30 g leaves and flowers in 1 l water is taken orally, one cup/day until the condition improves
		Roots	Urinary system (blockage)	An infusion of 20 g roots is soaked in 1 l water for a week, 2–3 cups/day are taken until improvement occurs
<i>Citrullus colocynthis</i> (L.) Schrad. (Cucurbitaceae) (RDC 1031)	حنضل	Seed	Liver diseases and diabetes	A standard decoction is prepared from 30 g seeds in 1 l water and taken orally, 50 cc, three times/day
		Fruit	Muscle relaxation	Ripe fruit is hollowed out. Olive oil is poured in and left to soak for 4 h. Afterwards, oil is applied externally to affected areas
<i>Clematis cirrhosa</i> L. (Ranunculaceae) (RDC 1032)	الرشا	Leaf and root	Erection and nervous system	A standard decoction is prepared from plant parts, 50 g in 1 l water and taken orally, 50 cc, three times/day
		Leaf and root	Wounds and aching joints	Fifty grams of leaves and roots are boiled in 1 l water for 5 min and applied to wounds with wash cloth or gauze
<i>Cleome droserifolia</i> (Forssk) Delile (Capparaceae) (RDC 1033)	سموه	Foliage	Skin diseases and open wounds	Foliage is boiled in olive oil for 5 min and applied externally to affected areas, then bandaged
<i>Coriandrum sativum</i> L. (Apiaceae) (RDC 1034)	كسبرة	Seed	Intestinal inflammation, weight loss and intestinal gas	A decoction is prepared from five tsp seeds, boiled in 1 l water for 5 min. 1–3 cups are taken daily until improvement occurs
<i>Coridothymus capitatus</i> (L.) Rechb. F. (Lamiaceae) (RDC 1035)	زعر فارسي زعر عسال	Foliage	Heart diseases, paralysis, diabetes, tract pain and inflammation and respiratory system	An infusion of one tsp foliage in a cup of water is made and taken 1–3 times/day until improvement occurs

Table 1 (Continued)

Latin name	Local Arabic name	Part used	Medicinal use	Mode of preparation ^b
<i>Crataegus azarolus</i> L. (Rosaceae) (RDC 1036)	زعرور	Fruit and flower	Cardiovascular diseases, sexual weakness, cancer and diabetes	A standard decoction of leaves and unripe fruits is prepared from 50 g in 1 l and taken orally, 100 cc, three times/day
<i>C. sempervirens</i> L. (Cupressaceae) (RDC 1037)	سرو	Fruit	Diabetes and nervous system	Decoction of 50 g fruit in 1 l water is prepared, 3–4 cups are taken/day
	زقوقيا	Fruit	Antiseptic	Decoction is applied externally to affected areas
<i>Cyclamen persicum</i> Mill. (Primulaceae) (RDC 1038)	صابون راعي	Leaf and bulb	Skin infections	A standard decoction is prepared and applied externally to affected areas, two times/day until improvement occurs
		Leaf and bulb	Ear infections	One drop from the standard decoction is applied to affected ear, two times/day until improvement occurs
<i>Cydonia vulgaris</i> Pers. (Rosaceae) (RDC 1039)	سفرجل	Leaf, fruit and seed	Coughing and lung inflammation	0.5 tsp of plant material is boiled in one cup water for 10 min and taken two times, 100 cc, each time until improvement occurs
<i>Cynara scolymus</i> L. (Asteraceae) (RDC 1040)	خر فیش	Leaf, flower and seed	Liver diseases and cholesterol regulator	A decoction of 250 g leaves, flowers and seeds is prepared in 1 l water and taken orally
<i>Daucus carota</i> L. (Apiaceae) (RDC 1041)	جزر بستاني	Root	Jaundice, anemia and urinary system	Juice is prepared and taken 2–3 times/day
		Leaf, root	Skin problems and acne	A poultice from leaves or roots is applied externally to affected areas
<i>Ecballium elaterium</i> (L.) A. Rich. (Cucurbitaceae) (RDC 1042)	فقوس حمار	Fruit	Liver diseases, jaundice and sinusitis	One drop of juice from the fruit is inhaled in each nostril
		Root	Skin diseases and muscle relaxation	A standard decoction is prepared from 50 g roots in 1 l and applied externally or 200 g roots are macerated and soaked in 1 l olive oil for 15 days and applied externally to affected areas
<i>Eremostachys laciniata</i> (L.) Bunge (Lamiaceae) (RDC 1043)	حزنبل	Root and flower	Allergy, headache and liver diseases	A standard decoction of plant parts is taken orally, 100 cc, two times/day until improvement occurs
		Leaf and fruit	Joint inflammations	A poultice is prepared from macerated leaves and fruits and applied externally
<i>Eriobotria japonica</i> L. (Rosaceae) (RDC 1044)	اكديا	Leaf	Stones in kidney, tooth and gum inflammation, cholesterol reduction and weight loss	A decoction is prepared from 7 to 8 leaves in 1 l water and taken orally, 150 cc, two times/day and taken for 14 days
<i>Eruca sativa</i> Miller (Brassicaceae) (RDC 1045)	جرجير	Leaf and seed	Sexual weakness	Fresh leaves are eaten as salad or seeds eaten fresh, or half tsp oil is taken daily
		Seed	Skin diseases and hair loss	Oil from seeds are applied directly to affected areas
<i>Eryngium creticum</i> Lam. (Apiaceae) (RDC 1046)	قرصعنه	Whole plant	Liver diseases, poisoning, anemia and infertility problems	A standard decoction is prepared from 50 g in 1 l water and taken orally, 200 cc, three times/day until improvement occurs
		Leaf	Snake bites	Fresh leaves are applied directly on wounds as decoction and taken orally simultaneously as mentioned above
<i>Euphorbia hierosolymitana</i> Boiss. ex Boiss. (Euphorbiaceae) (RDC 1047)	لبنه, حلبوب	Stem	Warts	One drop of stem sap is applied directly to affected areas only

Table 1 (Continued)

Latin name	Local Arabic name	Part used	Medicinal use	Mode of preparation ^b
<i>Ferula hermonis</i> (Boiss) (Apiaceae) (RDC 1048)	زلوع	Root and seed	Sexual weakness, infertility and asthma	A standard decoction is prepared from 50 g in 1 l water and taken orally, 150 cc, two times/day until improvement occurs
<i>Ficus carica</i> L. (Moraceae) (RDC 1049)	تين	Stem	Warts	Sap secreted from stems is applied on affected areas and repeated daily until the condition improves
		Fruit	Constipation	Fruits are eaten
		Leaf	Kidney stones, respiratory system, asthma and cholesterol	Decoction of leaves is taken orally
<i>Ficus sycomorus</i> L. (Moraceae) (RDC 1050)	جميز	Stem	Skin diseases	Stem milky sap is used externally until the condition improves
<i>Foeniculum vulgare</i> Mill. (Apiaceae) (RDC 1051)	شומר	Seed	Digestive system, obesity and headache	A decoction of 1–2 tsp seeds are boiled for 5 min in one cup water and taken orally
		Leaf and stem	Eye inflammation	Fresh juice from leaves and stems or standard decoction is applied to affected areas
<i>Geranium robertianum</i> L. (Geraniaceae) (RDC 1052)	ابرة الراعي	Leaf and root	Cholesterol	A standard decoction of 50 g roots and leaves is prepared and taken 150 cc, three times/day
		Root	Skin problems and acne	A poultice is prepared from macerated roots and applied directly to affected areas
<i>Glaucium corniculatum</i> (L.) Rudolph (Papaveraceae) (RDC 1053)	قطرة العين	Leaf and fruit	Eye inflammation	A decoction of 100 g leaf and fruit is boiled in 1 l water for 30 min and applied externally to affected areas
<i>Glycyrrhiza glabra</i> L. (Fabaceae) (RDC 1054)	سوس	Root	Fever, ulcer, kidney diseases and asthma	An infusion is made by soaking 200 g roots in 2 l water for 24 h, 4–5 cups may be taken daily until the condition improves
		Leaf and root	Skin diseases	A decoction of 200 g roots and leaves is boiled for 1 h and applied externally to affected areas
<i>Haplophyllum tuberculatum</i> (Forssk.) A. L. Juss. (Rutaceae) (RDC 1055)	ام جناح سكران, بنج	Leaf and stem	Nervous system, infertility and fever	Twenty grams of leaves and stems are boiled in 1 l milk for 2 min, one cup/day is taken until improvement occurs
		Leaf and seed	Backache, muscle-cramps and eye inflammation	Twenty grams of leaves and seeds are soaked in 1 l olive oil for 2 weeks. Oil is then applied externally to affected areas as needed
<i>Hypericum triquetrifolium</i> Turra (Clusiaceae) (RDC 1057)	حلاوه	Whole plant	Depression and sexual weakness	A standard decoction is prepared from 50 g plant material in 1 l water and taken orally, 150 cc, two times/day
		Whole plant	Skin diseases	A poultice is prepared from macerated leaves and applied externally to affected areas
<i>Inula viscosa</i> (L.) Ait. Inula (Asteraceae) (RDC 1058)	طيون	Foliage	Muscle relaxation and infertility	A decoction of 200 g plant material is boiled for 5 min in 5 l water. Decoction is then used as steam bath or added to regular bath
<i>Jasminum fruticans</i> L. (Oleaceae) (RDC 1059)	ياسمين	Flower	Allergy and tiredness	Inhalation of flowers or essential oil by placing flowers or essential oil in pot, adding hot water and covering patient with towel over head and pot. Inhalation is done for 10–15 min, 3–4 times/day

Table 1 (Continued)

Latin name	Local Arabic name	Part used	Medicinal use	Mode of preparation ^b
<i>Juglans regia</i> L. (Juglandaceae) (RDC 1060)	جوز	Leaf and flower	Diabetes, asthma and sexual weakness	A standard decoction is prepared from 50 g in 1 l and taken orally, 150 cc, two times/day
<i>Laurus nobilis</i> L. (Lauraceae) (RDC 1061)	غار, راند	Leaf	Skin diseases and cancer	Twenty grams of leaves are boiled for 15 min in 1 l water and applied as needed to affected areas
		Fruit and leaf	Hair loss	Oil is extracted from fruit, leaves and stems is massaged on scalp
		Leaf	Burns	Leaves are applied directly to affected areas and bandaged
<i>Lavandula officinalis</i> Chaix and Kitt (Lamiaceae) (RDC 1062)	خزامه	Flower	Urinary system, asthma and nerve system	An infusion of 30 g flowers is prepared in 1 l water and taken orally, 150 cc, 1–3 times/day
		Leaf, flower and seed	Skin diseases	Infusion is applied externally to affected areas, 2–3 times/day until improvement occurs
<i>Linum sativum</i> L. (Linaceae) (RDC 1063)	ناتك رذب	Seed	Ulcer and constipation	An infusion is prepared by soaking 50 g seeds in 1 l water at room temperature and taken orally, 150 cc, three times/day
		Seed	Skin diseases, acne and burn	An infusion is prepared as mentioned above. The resulting gel is applied externally to affected areas
<i>Lupinus varius</i> Gaertn (Papilionaceae) (RDC 1064)	ترمس الجبل	Seed	Diabetes and kidney stones	Two hundred grams of seeds are soaked in 0.5 l water for 24 h and taken orally, 50 cc, 2–3 times/day
		Seed	Skin diseases (hyperpigmentation)	A paste is made by grinding seeds and adding water then applying externally to affected areas
<i>Lycium europaeum</i> L. (Solanaceae) (RDC 1065)	عوسج	Root	High blood pressure and diabetes	A decoction is prepared from 10 g roots, boiled in 1 l water for 15 min, four cups/day are taken until improvement occurs
		Leaf	Hair loss, skin and eye irritation and wounds	A decoction of 100 g leaves in 1 l water is boiled for 15 min and applied externally to affected areas as needed
<i>Majorana syriaca</i> L. Rafin. (Lamiaceae) (RDC 1066)	زعترا	Leaf	Intestinal pain and inflammation and high blood pressure	An infusion is made from one tsp leaves in one cup boiling water, taken daily until improvement occurs. The leaves of 1–2 stems can be eaten fresh in place of the infusion
<i>Malva nicaeensis</i> All. (Malvaceae) (RDC 1067)	خببزه	Whole plant	Coughing, wounds and skin diseases	A decoction of 250 g plant material is prepared by boiling for 10–15 min in 0.5 l water, the decoction is taken internally, one cup/day or applied externally as needed
<i>Marrubium vulgare</i> L. (Lamiaceae) (RDC 1068)	عشبة القلب	Leaf	Stomach pain and inflammation, bronchitis, nervous system and asthma	An infusion is made from 4 to 5 leaves in one cup boiling water and taken orally, 1–2 times/day until improvement occurs
		Leaf	Eye inflammation	An infusion is made from 4 to 5 leaves in one cup boiling water. After cooling, two drops are put in the affected eye
<i>Matricaria aurea</i> (L.) Sch. Bip. (Asteraceae) (RDC 1069)	بابونج	Leaf and flower	Fever, coughing and heart diseases	An infusion is made from 1 to 2 tsp leaves and flowers in one cup water. 1–3 cups can be taken daily until improvement occurs

Table 1 (Continued)

Latin name	Local Arabic name	Part used	Medicinal use	Mode of preparation ^b
<i>Melissa officinalis</i> L. (Lamiaceae) (RDC 1070)	تورنجان	Leaf and flower	Stomach, intestine pain and inflammation, calming of nerves and headache	An infusion of 2–3 tsp leaves and flowers is prepared in one cup water. Infusion is taken 3–4 times/day until improvement occurs
<i>M. annua</i> L. (Euphorbiaceae) (RDC 1071)	عشبة الجارات	Leaf	Diabetes and cancer	A decoction of 50 g leaves is boiled in 1 l water for 20 min, one cup is taken three times/day
		Leaf	Skin diseases	A poultice from macerated leaves is applied externally to affected areas
<i>Micromeria fruticosa</i> (L.) Druce (Lamiaceae) (RDC 1072)	عشبة شاي	Foliage	Stomach, intestine pain and inflammation, fever, asthma and respiratory system	An infusion is prepared from one tsp plant material in one cup of boiling water, 1–3 cups are taken daily until improvement occurs
<i>Micromeria myrtifolia</i> L. (Lamiaceae) (RDC 1073)	زوفا	Foliage	Skin diseases, heart diseases, digestive system and asthma	An infusion of 20 g in 1 l is prepared and taken 3–4 times/day as needed until improvement occurs
<i>Moricandia nitens</i> (Viv.) Dur. and Barr. (Brassicaceae) (RDC 1074)	حاميم	Leaf and flower	Fever	A standard decoction is prepared from 50 g plant material in 1 l water and taken orally, 150 cc, three times/day
		Leaf and flower	Back diseases	Twenty-five grams of plant material are covered with olive oil for 2 weeks, then applied locally to affected areas
<i>Morus nigra</i> L. (Moraceae) (RDC 1075)	توت	Leaf, stem and fruit	Diabetes, teeth and gum inflammation and cholesterol	A standard decoction from plant material is prepared and taken orally, 150 cc, three times/day or gargled for teeth and gum problems
<i>Myrtus communis</i> L. (Myrtaceae) (RDC 1076)	آس, رييمان	Leaf	Stomach, headache, intestine pain and inflammation	A standard infusion of 50 g leaves in 1 l water is prepared and taken orally, 150 cc, three times/day
		Leaf	Skin diseases	Infusion is applied externally to affected areas
<i>Nerium oleander</i> L. (Apocynaceae) (RDC 1077)	دقلة	Foliage	Skin diseases	An infusion is prepared by placing 20–30 g plant material in bottle, covering with olive oil for 15 days and then using the oil externally on affected areas
		Wooden stem	Jaundice	A standard decoction from wooden stem is taken orally
<i>Nigella sativa</i> L. (Ranunculaceae) (RDC 1078)	قزحة, حبة سوداء	Seed	Blood pressure, heart diseases and sexual weakness	0.5 tsp seed oil in one cup water is taken orally, two times/day. A standard decoction is prepared and taken orally
		Seed	Skin diseases	Seeds are ground into paste with olive and applied externally
<i>Ocimum basilicum</i> L. (Lamiaceae) (RDC 1079)	حبق	Leaf and flower	Depression, migraine, stomach and intestinal ache	An infusion of 20 g in 1 l is prepared and taken three times/day as needed until improvement occurs
<i>Olea europaea</i> L. (Oleaceae) (RDC 1080)	زيتون	Leaf and fruits	Coughing, diabetes, high blood pressure and stones in kidney	Fruit oil or leaf decoction are taken orally
		Fruit	Coughing and muscle contractions	Oil is rubbed on the chest for coughing or on affected areas for muscle contraction
<i>Origanum majorana</i> L. (Lamiaceae) (RDC 1081)	مردقوش	Leaf and flower	Menstruation regulator, migraine and nerve system	An infusion of 20 g in 1 l is prepared and taken orally, one cup, 2–3 times/day until improvement occurs
<i>Parietaria judaica</i> L. (Urticaceae) (RDC 1082)	قزازه, قزاز	Foliage	Nerve system and respiratory system	A decoction is prepared by boiling 50 g in 1 l for 15 min and taken orally, one cup/day until improvement occurs

Table 1 (Continued)

Latin name	Local Arabic name	Part used	Medicinal use	Mode of preparation ^b
		Leaf	Wounds	A poultice of crushed leaves is applied externally to affected areas
<i>Paronychia argentea</i> Lam. (Caryophyllaceae) (RDC 1083)	رجل الحمام	Leaf and flower	Stones in kidney, diabetes and heart diseases	A standard decoction is prepared and taken internally, 150 cc, three times/day
<i>P. harmala</i> L. (Zygophyllaceae) (RDC 1084)	حرمل, حرملين	Seed	Skin diseases, wounds and lice	Fifty grams of seeds are covered with olive oil and infused for 2 weeks. Olive oil is then applied externally to affected areas, 1–2 times daily as needed
		Seed	Nervous system, coughing and obesity	Soaked seeds in vinegar and diluted in water is taken orally
<i>Petroselinum sativum</i> Hoffm. (Apiaceae) (RDC 1085)	بقونس قديه, قدحة	Foliage	Urinary system and stones in kidney, period regulator and immune system	A standard decoction is prepared and taken internally, 150 cc, three times/day
<i>Phagnalon rupestre</i> (L.) DC. (Asteraceae) (RDC 1086)	عشبه	Foliage	Toothache	A standard decoction is prepared. The patient then fills mouth with decoction and gargles 2–3 times
		Foliage	Antiseptic and astringent	A standard decoction is prepared and applied with gauze or cotton externally to affected areas
<i>Pimpinella anisum</i> L. (Apiaceae) (RDC 1087)	يانسون	Seed	Stomach and intestine pain, headache and fertility	A standard decoction is prepared from 50 g seeds in 1 l water and taken internally, 150 cc, three times/day
<i>Pinus halepensis</i> Mill. (Pinaceae) (RDC 1088)	صنوبر	Leaf and seed	Diabetes	A standard decoction of 50 g seeds or leaves is prepared and taken internally, 150 cc, two times/day
		Seed	Sexual weakness	Ten to 15 g of seeds is eaten daily
<i>Pistacia lentiscus</i> L. (Anacardiaceae) (RDC 1089)	سريس	Leaf	Jaundice and respiratory problems	An infusion of 50 g leaves is soaked in 1 l water for 24 h and taken orally, 50 cc, three times/day
	عليجيان	Leaf	Bed wetting	Three to four leaves are eaten at night
<i>Pituranthos tortuosus</i> (Coss.) Maire (Apiaceae) (RDC 1090)	زقوح	Young branch	Fever, endoparasites and halitosis	An infusion of 50 g young branches is prepared in 1 l water and taken orally, 100 cc, 2–3 times/day until the condition improves
<i>Polygonum aviculare</i> L. (Polygonaceae) (RDC 1091)	عقيدي	Leaf, stem and flower	Diarrhea, blood circulation, urinary system and menstrual regulator	A standard decoction of 50 g leaves, stems and flowers is prepared and taken orally, 150 cc, once/day or as needed until the condition improves
<i>Polygonum equisetiforme</i> Sibth. and Sm. (Polygonaceae) (RDC 1092)	مكسر النير	Root	Kidney diseases	A standard decoction of 50 g roots is prepared in 1 l water and taken orally, 150 cc, three times/day until improvement occurs
<i>Polypodium vulgare</i> L. (Pteridophyta) (RDC 1093)	سرخس حلو	Root	Influenza, fever and respiratory problems	A standard decoction is prepared from 50 g roots in 1 l water and is taken internally, 150 cc, three times/day
<i>Portulaca oleracea</i> L. (Portulacaceae) (RDC 1094)	فر فحينا	Foliage	Kidney stones	A standard decoction is prepared from 50 g foliage in 1 l water and taken orally, 150 cc, three times/day
		Foliage	Sun stroke	Fresh juice is mixed with olive oil and applied to skin to prevent sun stroke
<i>Prosopis farcta</i> (Sol. Ex Russell) J.F. Macbr. (Fabaceae) (RDC 1095)	ينبوت	Foliage	Menstrual cramps, kidney stones and diabetes	A standard decoction of the above ground plant parts is prepared, 50 g in 1 l water and taken orally, 150 cc, 2–3 times/day until improvement occurs
<i>Q. calliprinos</i> Decne (Fagaceae) (RDC 1096)	بلوط	Fruit and bark	Cancer, bed wetting, ulcer and diabetes	Fruits and bark are decocted, 150 g in 1 l boiled water for 30 min and taken internally, 150 cc, three times/day

Table 1 (Continued)

Latin name	Local Arabic name	Part used	Medicinal use	Mode of preparation ^b
<i>Quercus ithaburensis</i> Webb. (Fagaceae) (RDC 1097)	سنديان	Fruit and bark Stem, bark and fruit	Skin diseases Cancer, fever, bed wetting, high blood pressure and ulcer	A standard decoction is prepared and used externally A standard decoction is prepared from leaves, roots and bark, 150 g is boiled in 1 l for 30 min and taken internally, 150 cc, three times/day
<i>Raphanus sativus</i> L. (Brassicaceae) (RDC 1098)	فجل	Seed	Anemia, female and male infertility and sexual tonic	A standard decoction is taken orally, 150 cc, three times/day or one tsp seeds roasted, ground and mixed with honey and taken two times/day
<i>Retama raetam</i> (Forssk.) Webb and Berth (Fabaceae) (RDC 1099)	رتيم	Leaf	Aching joints back pain and skin bruises	A decoction of 200 g is prepared in 1 l water, boiled for 30 min and added to hot bath. Patient is then immersed in the bath for 15 min
<i>Rhamnus alaternus</i> L. (Rhamnaceae) (RDC 1100)	عشبة الصفار	Leaf	Liver diseases	A standard decoction is prepared and taken orally, 150 cc, three time/day until improvement occurs
<i>Rhus coriaria</i> L. (Anacardiaceae) (RDC 1101)	سماق	Fruit	Liver diseases, diarrhea and urinary system	A standard decoction is prepared and taken orally, 150 cc, three times/day until improvement occurs
<i>Ricinus communis</i> L. (Euphorbiaceae) (RDC 1102)	خروع	Seed Seed	Laxative Hair loss and skin diseases	One tsp of oil from seeds is taken in empty stomach once/day Oil is applied externally to affected areas and massaged
<i>Rosmarinus officinalis</i> L. (Lamiaceae) (RDC 1103)	حصلبان	Leaf	Kidney diseases, liver diseases, arteriosclerosis and anemia	An infusion is prepared from 30 g leaves in 1 l water and taken orally, 2–3 times/day until the condition improves
<i>Ruscus aculeatus</i> L. (Liliaceae) (RDC 1104)	عرف الديك	Leaf and stem	Kidney and gall bladder stones, lack of appetite and cholesterol	A standard decoction is prepared from 50 g stems and leaves in 1 l water and taken orally, 150 cc, three times/day
<i>Ruta chalepensis</i> L. (Rutaceae) (RDC 1105)	فيجن	Leaf and stem Leaf and stem	Arthritis, back ache, skin diseases, eye and ear infection Poisoning, nerve system	Leaves and stems are put in glass bottle. Bottle is then filled with olive oil, put in sunny location for 15 days and then applied externally to affected areas An infusion is prepared from 100 g in 1 l water and taken internally, 15–20 cc, 1–2 times/day
<i>Salvia fruticosa</i> Mill. (Lamiaceae) (RDC 1106)	ميرمية	Foliage	Stomach ache, intestinal gas and inflammation, diabetes and sexual weakness	An infusion of 50 g in 1 l is prepared and taken orally, 150 cc, 1–3 times/day until improvement occurs
<i>Sanguisorba minor</i> Scop. (Rosaceae) (RDC 1107)	عشبة الجراح	Whole plant Whole plant	Ulcer Skin diseases, burns and wounds	A standard decoction is prepared and taken orally, 150 cc, three times/day A standard decoction is prepared and applied externally to affected areas until the condition improves
<i>Saponaria mesogitana</i> Boiss. (Caryophyllaceae) (RDC 1108)	صابونيا	Root	Acne	Fifty grams of roots are ground. A standard decoction is prepared from 50 g roots and applied to affected areas on face with towel or cloth, 2–3 times/day until improvement occurs
<i>Sarcopoterium spinosum</i> (L.) Spach (Rosaceae) (RDC 1109)	بلان	Leaf and root Leaf, seed and root	Liver diseases, stomach ache, stones in kidney and urinary system and joint inflammation Diabetes	A standard decoction is prepared and taken orally A decoction of 100 g plant material in 1 l water is prepared and taken orally, 150 cc, three times/day

Table 1 (Continued)

Latin name	Local Arabic name	Part used	Medicinal use	Mode of preparation ^b
<i>Silene aegyptiaca</i> (L.) L. f. (Caryophyllaceae) (RDC 1110)	عونيه	Leaf and seed	Stomach pain, intestine pain and inflammation, kidney diseases and ulcer	A standard decoction is prepared from leaves and seeds and taken orally, 150 cc, three times/day
<i>S. aspera</i> L. (Smilacaceae) (RDC 1111)	جريح سموه, عنب	Whole plant	Fever	A standard decoction is prepared from whole plant and taken orally, 150 cc, three times/day
<i>Solanum nigrum</i> L. (Solana- ceae) (RDC 1112)	الثعلب زعر حمير	Fruit and root	Diabetes and poisoning	A standard decoction is prepared from 50 g fruit and roots and is taken orally, 150 cc, three times/day
<i>Satureja thymbra</i> L. (La- miaceae) (RDC 1113)	زعر رومي	Foliage	Skin diseases	A decoction is prepared from 100 g foliage in 1 l boiled water for 15 min, gauze or cotton is dipped in solution and applied externally to affected areas
<i>Silybum marianum</i> (L.) Gaertn (Asteraceae) (RDC 1114)	خرفيش جمال	Foliage	Heart diseases, paralysis, diarrhea and coughing	An infusion of 50 g of foliage is prepared in 1 l water and taken orally, 150 cc, three times/day
<i>Tamarix aphylla</i> (L.) H. Karst. (Tamaricaceae) (RDC 1115)	اتل	Flower and seed	Liver diseases, poisoning, infertility and sexual weakness	A decoction is prepared from 50 g boiled in 1 l water for 30 min and taken internally, 150 cc, four times/day until the condition improves
<i>Teucrium chamardrys</i> L. (Lamiaceae) (RDC 1116)	جعدہ	Leaf	Fever	A standard decoction is prepared from young leaves and taken orally, 150 cc, three times/day
<i>Teucrium polium</i> L. (Lamia- ceae) (RDC 1117)	بلوطيه	Leaf and seed	Eye inflammation	Decoction is applied to affected areas 2–3 times/day
<i>Teucrium polium</i> L. (Lamia- ceae) (RDC 1117)	جعدہ الصبيان	Foliage	Stomach, intestine pain and inflammation, lack of appetite and jaundice	A standard decoction is prepared from 50 g leaves and stems and taken orally, 100 cc, three times/day
<i>Teucrium polium</i> L. (Lamia- ceae) (RDC 1117)	جعدہ الصبيان	Foliage	Inflammation of tooth and gums	Decoction is gargled 3–4 times/day until improvement occurs
<i>Thymelaea hirsuta</i> (L.) Endl. (Thymelaeaceae) (RDC 1118)	ميتتان	Foliage	Kidney, liver diseases, diabetes, stomach and intestine pain and inflammation	A standard decoction is prepared from 50 g plant material and taken orally, 100 cc, three times/day
<i>Trigonella foenum- graecum</i> L. (Fabaceae) (RDC 1119)	حلبه	Foliage	Skin diseases	A paste is made from ash made from aerial parts mixed with water then applied locally to affected areas
<i>Trigonella foenum- graecum</i> L. (Fabaceae) (RDC 1119)	حلبه	Seed	Diabetes, sexual weakness, stomach and intestinal pain	A decoction is prepared from 30 g seeds in 1 l water and taken orally, 150 cc, three times/day until improvement occurs
<i>Trigonella foenum- graecum</i> L. (Fabaceae) (RDC 1119)	حلبه	Seed	Skin diseases	A standard decoction is prepared as mentioned above and used externally
<i>Triticum aestivum</i> L. (Poa- ceae) (RDC 1120)	كميه	Shoot	Cancer	A decoction is prepared from 200 g young shoots in 1 l water and taken orally, 200 cc, three times/day
<i>Triticum aestivum</i> L. (Poa- ceae) (RDC 1120)	كميه	Seed	Anemia	A decoction of 100 g seed is boiled for 1 h in 1 l and taken orally, 150 cc, three times/day
<i>Triticum aestivum</i> L. (Poa- ceae) (RDC 1120)	كميه	Seed	Skin diseases	Seeds are covered with water for 1 h then applied externally to affected areas
<i>Urginea maritima</i> (L.) Baker (Liliaceae) (RDC 1121)	بصل الفار	Bulb	Skin diseases	Juice extracted from bulbs is absorbed in gauze and applied to affected areas (externally) using gloves on hands to protect skin

Table 1 (Continued)

Latin name	Local Arabic name	Part used	Medicinal use	Mode of preparation ^b
<i>Urtica pilulifera</i> L. (Urticaceae) (RDC 1122)	قريص	Foliage	Cancer, stomach, intestine pain and inflammation, liver diseases and circulatory system	A standard decoction is prepared from 50 g plant material and taken orally, 150 cc, 3–4 times/day until the condition improves
		Seed	Bed wetting	One tsp seed is roasted, ground and mixed with one tsp honey and taken orally before sleep
<i>Varthemia iphionoides</i> Boiss. and Bl. (Asteraceae) (RDC 1123)	اكتيلا	Leaf and stem	Nerve system (tremors), heart diseases, stomach and intestine pain and inflammation	A standard infusion is prepared from leaves and stems and taken orally, 150 cc, three times/day or until improvement occurs
<i>Verbascum eremobium</i> L. (Scrophulariaceae) (RDC 1124)	بوصير	Foliage	Sexual diseases	A standard decoction is prepared from foliage and taken orally, 150 cc, three times/day
	برينا ,	Foliage	Eye diseases	Decoction is applied externally to affected areas
<i>Verbena officinalis</i> L. (Verbenaceae) (RDC 1125)	الحشيشه	Foliage	Liver diseases, stomach pain, fever and menstrual cramps	A standard infusion of foliage is prepared and taken orally, 150 cc, three times/day
<i>Viola odorata</i> L. (Violaceae) (RDC 1126)	المقتسج	Foliage	Respiratory system, stomach and intestine inflammation	A standard infusion is prepared from aerial parts and taken orally, 150 cc, three times/day
		Foliage	Skin diseases	A standard decoction is prepared and used externally
<i>Vitis vinifera</i> L. (Vitaceae) (RDC 1127)	الكرمه	Leaf	Menstrual cramps and period regulation	A decoction of 100 g leaves are prepared in 1 l water and boiled for 1 h. Decoction is taken orally, 150 cc, three times/day
		Leaf	Varicose veins	The decoction as prepared above is applied externally to affected areas
<i>Zea mays</i> L. (Poaceae) (RDC 1128)	ذره	Kernel and fiber	Urinary system and stones in kidney, blood pressure, prostate cancer, joint inflammation and weight loss	A standard decoction of kernels and fibers is prepared and taken orally, 150 cc, three times/day until improvement occurs
<i>Ziziphus spina-christi</i> (L.) Desf. (Rhamnaceae) (RDC 1129)	سدر , دوم	Leaf and fruit	Cholesterol reduction and cancer	A standard decoction is prepared from leaves and fruits boiled for 0.5 h and taken orally, 150 cc, three times/day
		Leaf and fruit	Eye inflammation and hair loss	Decoction is applied externally to affected areas as needed. For hair loss, decoction is massaged into scalp

^a Research and Development Center herbarium voucher number. The herbarium voucher as well as the seeds are preserved in the local gene bank.

^b A standard decoction is prepared by boiling 50 g dry plant material or 200 g fresh plant material in 1 l water for 15 min. Decoction is then stored and used as needed.

cluded several aspects such as herbal sources and of the medicinal plants, socio-economic situation in the communities, personal education, source and extent of his knowledge, and readiness to be organized into a local union. Each practitioner was asked first about the primary diseases he/she deals with, then which plant/s species is used for treating the particular disease. The practitioner was asked to identify the plant species from his own plant collection or from plants grown in the field. The identity of each plant species mentioned by a certain practitioner was checked and confirmed by a

professional botanist using live specimens and photographs. Informants with little knowledge concerning the identification of plant species in the field or from specimens were excluded from the survey and the information provided by them was discarded. A medicinal use was accepted as valid only if it was mentioned by at least three separate practitioners. Samples of these herbs were collected and stored at our center. Seeds were also collected for plant preservation. Some of the plant species used are known to be rare or endangered species, so they were not easy to find during the survey.

3. Results

The results of the survey indicate that there are 129 medicinal plant species still in use in Israel, the Golan Heights and the West Bank (Table 1). Most of these species grow naturally in the different regions and their properties are important in traditional Arabic medicine. The average number of herbs used by each practitioner is 18. The minimum number of herbs used by any individual practitioner is five, and some of them used more than 20 species separately or in association such as plants used for treating coughing or stomach and intestinal pains and inflammations. Among the plants listed in Table 1, 40 species (31% of the total plants) are used for treating skin diseases, 27 species (21%) for treating kidney and urinary system, 26 species (20%) for treating diabetes, 23 species (18%) for treating digestive system including stomach and intestinal pain and inflammation, 22 species (17%) for treating liver diseases, 16 species (12%) for treating respiratory system and coughing, 13 species (10%) for treating forms of cancer and nine species (7%) for weight loss and cholesterol reduction. Some plant species were used in treating other ailments such as ulcer, diarrhea, burns, wounds and inflammations in eyes, teeth and gum. According to our survey, the practitioners administer their remedies in forms of standard decoction prepared by boiling plant parts in hot water, infusion in water or oil, juice, syrup, roasted material, fresh salad or fruit, macerated plant parts, oil, milky sap, poultice, paste or inhalation of essential oils. The remedies were administered orally or externally according to the treated disease and preparation method. In Arabic traditional medicine, alcohol is not used as extraction solvent for religious reasons. According to the current survey, only in some extraordinary cases wine or alcohol was used as extraction solvent such as the case with *Asphodelus microcarpus* where tincture was used. In some cases, the used plant material contained toxic ingredients and vinegar or oil are used for detoxification purposes such as the case with *Peganum harmala*. Some medicinal preparations were essential oils extracted from plant parts: *Balanites aegyptiaca* and *Jasminum fruticans*. Milky sap was also extracted or collected from some plant parts especially fruits and used for treating different diseases. The posology of the used remedies varies among the different practitioners, therefore, we described in Table 1 the most administered dosages.

4. Discussion and conclusions

This current extensive survey carried out among practitioners of Arabic medicine living in Israel including the Negev desert, the West Bank and the Golan Heights reveals that many plant species are still in use

for treating various human diseases and ailments. The 129 species listed in Table 1 are widely used in traditional Arabic medicine in this region. Among these plants, there are 40 species used for treating skin diseases, 27 species for treating kidney and urinary system, 26 species for treating diabetes, 23 species for treating digestive system including stomach and intestinal pain and inflammation, 22 species for treating liver diseases, 16 species for treating respiratory system and coughing, 13 species for treating forms of cancer and nine species for weight loss and cholesterol reduction, in addition to other important diseases. Some species such as *Asparagus officinalis*, *Centaurea iberica*, *Cupressus sempervirens*, *Mercurialis annua*, *Quercus calliprinos*, and *Smilax aspera* are described for the first time for treating diabetes in a survey conducted in our region. Since many plant species are indicated as potential resource for treating various diseases such as diabetes, skin, liver, digestive and urinary system diseases, this should encourage further research in these fields. The current data will increase the genetic resources available in the area of research and represents a potential source of natural products for treating various diseases. The preservation of this knowhow and plant species is the first step toward developing efficacious remedies for various diseases.

More than 30% of these herbs are rare or endangered species in our region (Shmida and Fragman, 1999). This indicates that the medicinal plants require preservation as well as the ethnobotanical and ethnopharmacological knowledge recording. The preservation of these herbs and of the traditional knowledge of how to use them is an essential requirement for maintaining traditional Arabic medicine as a medicinal and cultural resource.

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