Research Article

Exploration of Ethnomedicinal Plants and Their Traditional Practices for Therapies During Holy Month of Ramadan İn Makkah, Saudi Arabia

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Abstract: **Background:** Traditional knowledge of medicinal plants is crucial for preserving biological variety and cultural practices. The ethnomedical knowledge of a society is influenced by various variables, including religious traditions. Among these religious customs is fasting during Ramadan. In Saudi Arabia, there is a lack of published data regarding the traditional customs and ethnomedicinal plants used during the holy month of Ramadan in Makkah. Here and for the first time, ethnomedicinal plants and their traditional practices for therapies during holy month of Ramadan in Makkah, Saudi Arabia are explored. **Objective:** The current research aims to explore and document data regarding traditional medical knowledge regarding the usage of therapeutic plants during the fasting month of Ramadan in Makkah, Saudi Arabia. **Methods:** An ethnobotanical survey was carried out in March and April of 2024, during the holy month of Ramadan. To record traditional knowledge, individual free-listing and semi-structured interviews were conducted with 75 local people, ages ranging between 20 and 75 years old. Data collected were entered as 'use reports' in Excel. The information from the database was summarized using descriptive statistics. **Results:** During the first and current Ramadan ethnobotanical survey in Makkah, 41 species of medicinal plants belonging to 23 families were identified. The most commonly used plant family in phyto-folk medicine in Ramadan was Apiaceae. The most popular species consumed during holy month of Ramadan were (*Mentha spicata* L. and *Pimpinella anisum* L.). New citation of medicinal plants is represented by *Corchorus olitorius* L. Leaves (39%) and (22%) seeds represent the main plant parts valorized. **Conclusion:** In Saudi Arabia, the month of Ramadan is distinguished by a wealth of medicinal plants legacy and concordant knowledge among informants, which is mostly derived from traditional intangible cultural heritage and popular practices. Thus, to preserve the ethnobotanical intangible heritage of Saudi Arabia, documentation efforts are urgent to avoid the extinction of this ethnobotanical heritage. Future research on potential synergies between the medical properties of medicinal plants and the health advantages of fasting is recommended.

Keywords: Herbal medicine, Folk medicine, Ethnobotany, Traditional knowledge, Intangible heritage

INTRODUCTION

Throughout the world, traditional medical systems heavily rely on medicinal plants. [1].From the beginning of this century, more focus has been placed on studies of medicinal plants and how widely they are used worldwide. [2-4]. The field of ethnomedical research has enormous potential and scope for the creation of novel medications. Numerous novel medications have been developed from conventional medications [5].Numerous studies suggest that in order to advance local healthcare and preserve medical knowledge for future generations and innovative drug development, it is imperative that it be reported [6].According to [4]. traditional knowledge of medicinal plants is crucial for preserving biological variety and cultural practices

The ethnomedical knowledge of a society is influenced by various variables, including religious practices [7].Ramadan fasting is one of these religious practices. One of the five main pillars of Islam, Ramadan fasting is required of all healthy adult Muslims. [8].Muslims fast from sunrise to sunset during the month of Ramadan, refraining from eating and drinking in accordance with Islamic law. This means that Ramadan is linked to important adjustments in food, physical activity, and sleeping patterns [9]. For example, in Saudi Arabia It was shown that during the month of Ramadan, one-third of Saudi families considerably decreased their physical activity [10].indicating that Muslim societies may be adopted particular physiotherapeutic practices [7]

In Saudi Arabia, few previous reports exist ethnomedicinal plants and their traditional practices. Therapeutic plants usage for treatment in traditional medicine in Makkah are documented in the literature [11,12]. However, there is a lack of published data regarding the traditional customs and ethnomedicinal plants used during the holy month of Ramadan in Makkah. Here and for the first time, ethnomedicinal plants and their traditional practices for therapies during holy month of Ramadan in Makkah, Saudi Arabia are explored. A promising approach to finding efficient remedies and preventive for diseases that contemporary medicine is unable to cure is an ethnomedical examination of medicinal recipes used during Ramadan. [7,13], particularly those associated with contemporary lifestyles like diabetes, obesity, and colonic illnesses. Furthermore, a useful method for the preservation and enhancement of plant biodiversity and its valuation is the documentation of traditional knowledge via scientific ethnopharmacological research [14]

MATERIAL AND METHODS

1. Study area

Four fifths of the Peninsula are contained inside the 2,250,000 square kilometre Kingdom of Saudi Arabia (KSA) [15]. The city of Makkah is the subject of this study (**Figure 1**). Makkah, the capital of the Makkah province, is situated in Saudi Arabia's western region, coordinates are 21°26′N and 39°46′E. In a valley situated on the Red Sea coast, roughly 80 km from Jeddah, within the subtropical dry zone [16]

Makkah is the most culturally diversified city in the Islamic world [11]. Every year, millions of Muslims from over 180 nations go to Makkah for the Hajj, one of the world's largest religious gatherings [17] Research on the floristic composition and vegetation of Makkah revealed that the Pinaceae (with 31 species) and Fabaceae (with 24 species) are the two most dominant families. The research area's most common species are those found in typical dry subtropical ecosystems. The floristic elements of Makkah are Sudano-Zambezian (16.22%), Irano-Turanian (17.91%), and Saharo-Arabian (27.70%). Medicinal plants account for the majority of plant applications in Makkah (24.57%), with grazing plants coming in second (23.88%; [19]
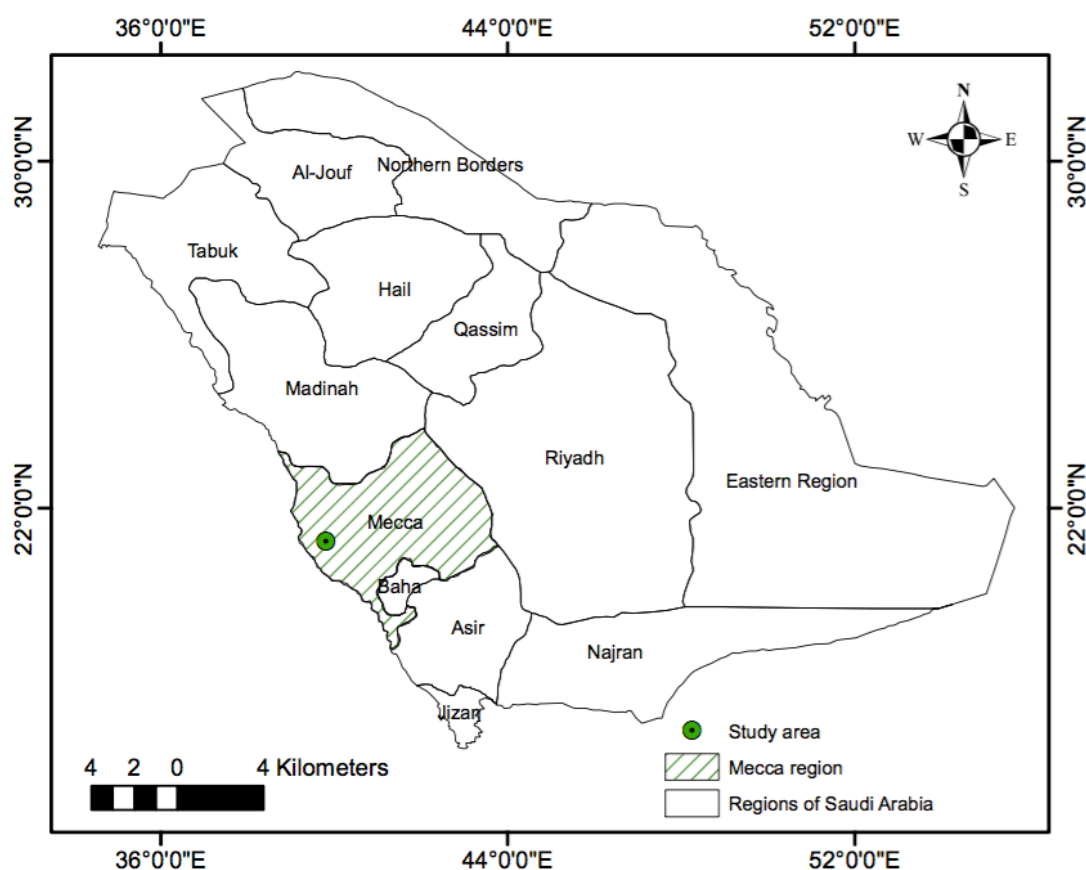

Figure 1. Saudi Arabian map with the research area highlighted [11]

2. Data collection and interviews

Ethnobotanical fieldwork took place over four weeks in Makkah from March to April 2024 and during the month of Ramadan. To record traditional knowledge, individual free-listing and semi-structured interviews were conducted during the month of Ramadan [19,20]. The field study on ethnobotany was conducted while paying close regard to ethical regulations. According to the Code of Ethics of the [21,22] ethical standards. Each participant gave written or verbal informed consent prior to the questionnaire and interviews. In total, 75 adults were interviewed, all of them are local (born in Makkah province), ages ranging between 20 and 75 years old (**Table 1**). Interviews were conducted in Arabic. The selection of informants who utilize medicinal herbs was done using targeted sampling [23]. During interviews, focus was put on documenting local names, local uses, plant used, administration and preparation, toxicity and adverse effects of employed plants, and plant mixes. Plant names were given in Arabic. According to [24] qualitative data were helpful in understanding people's attitudes, beliefs, and goals as well as in interpreting quantitative data.

Table 1

Code	Gender	Age	Marital status	Literacy	Number of children	Source knowledge	Number of plants listed
inf1	Men	20-25	Married	Primary education (Arabic)	1	Neighbors	1
inf2	Women	20-25	Single	Undergraduate (Arabic)	0	Mother	1
inf3	Women	46-50	Married	Undergraduate (Arabic)	3	Television	1
inf4	Women	26-30	Married	Undergraduate (Arabic)	2	Grandparents	1
inf5	Women	56-60	Divorced	Primary education (Arabic)	6	Mother	2
inf6	Women	46-50	Married	Secondary education (Arabic)	4	Grandparents	1
inf7	Women	56-60	Married	Primary education (Arabic)	8	Grandparents	2
inf8	Men	51-55	Married	Secondary education (Arabic)	1	Television	1
inf9	Women	36-40	Married	Secondary education (Arabic)	4	Internet	2
inf10	Women	41-45	Married	Secondary education (Arabic)	4	Internet	2
inf11	Women	36-40	Married	Secondary education (Arabic)	4	Internet	1
inf12	Women	31-35	Married	Secondary education (Arabic)	2	Mother	1
inf13	Women	Older than 75	Married	Illiterate (Arabic)	11	Neighbor's	1
inf14	Women	51-55	Married	Primary education (Arabic)	4	Grandparents	1
inf15	Women	46-50	Married	Secondary education (Arabic)	6	Personal experiences	1
inf16	Women	20-25	Single	Undergraduate (Arabic)	0	Mother	2
inf17	Women	46-50	Married	Undergraduate (Arabic)	3	Mother	1
inf18	Women	20-25	Single	Secondary education (Arabic)	0	Mother	1
inf19	Women	41-45	Married	Undergraduate (Arabic)	5	Mother	2
inf20	Women	51-55	Married	Secondary education (Arabic)	7	Grandparents	1
inf21	Women	41-45	Married	Undergraduate (Arabic)	6	Mother	5
inf22	Women	41-45	Married	Undergraduate (Arabic)	6	Grandparents	4
inf23	Women	20-25	Single	Secondary education (Arabic)	0	Grandparents	1
inf24	Women	51-55	Married	Undergraduate (Arabic)	5	Mother	2
inf25	Men	36-40	Single	Secondary education (Arabic)	0	Television	1
inf26	Women	20-25	Single	Undergraduate (Arabic)	0	Internet	2
inf27	Men	26-30	Married	Undergraduate (Arabic)	0	Mother	1
inf28	Women	26-30	Married	Undergraduate (Arabic)	0	Doctor	1
inf29	Women	31-35	Married	Postgraduate (Arabic)	2	scientific lectures	4
inf30	Women	36-40	Married	Undergraduate (Arabic)	3	School	1
inf31	Women	46-50	Married	Undergraduate (Arabic)	4	Mother	2
inf32	Women	41-45	Married	Undergraduate (Arabic)	2	Neighbor's	1
inf33	Women	31-35	Married	Undergraduate (Arabic)	2	Mother	1
inf34	Women	20-25	Single	Undergraduate (Arabic)	0	Neighbor's	1
inf35	Women	20-25	Single	Undergraduate (Arabic)	0	Grandparents	1
inf36	Women	51-55	Married	Primary education (Arabic)	4	Mother	1
inf37	Women	51-55	Married	Illiterate (Arabic)	10	Mother	1
inf38	Women	41-45	Married	Primary education (Arabic)	2	Mother	2
inf39	Women	20-25	Single	Undergraduate (Arabic)	0	Internet	1
inf40	Men	56-60	Married	Secondary education (Arabic)	2	Mother	1
inf41	Women	61-65	Married	Primary education (Arabic)	10	Mother	1
inf42	Women	41-45	Married	Undergraduate (Arabic)	4	Mother	2
inf43	Women	36-40	Married	Secondary education (Arabic)	4	Mother	2
inf44	Women	41-45	Married	Secondary education (Arabic)	4	Mother	1
inf45	Women	31-35	Married	Undergraduate (Arabic)	1	Mother	1
inf46	Women	41-45	Married	Secondary education (Arabic)	4	Internet	1
inf47	Women	36-40	Married	Secondary education (Arabic)	4	Internet	1
inf48	Women	51-55	Divorced	Undergraduate (Arabic)	5	Mother	2
inf49	Women	56-60	Widowed	Secondary education (Arabic)	6	Mother	1

inf50	Women	41-45	Married	Undergraduate (Arabic)	4	Mother	1
inf51	Women	36-40	Married	Undergraduate (Arabic)	3	Mother	1
inf52	Women	41-45	Married	Postgraduate (Arabic)	4	Mother	2
inf53	Women	31-35	Married	Undergraduate (Arabic)	3	Grandparents	1
inf54	Women	41-45	Married	Undergraduate (Arabic)	2	Mother	2
inf55	Men	20-25	Single	Undergraduate (Arabic)	0	Grandparents	1
inf56	Women	20-25	Single	Secondary education (Arabic)	0	Mother	1
inf57	Men	26-30	Single	Secondary education (Arabic)	0	Internet	1
inf58	Women	36-40	Married	Undergraduate (Arabic)	2	Television	1
inf59	Women	51-55	Married	Primary education (Arabic)	8	Grandparents	1
inf60	Women	41-45	Married	Secondary education (Arabic)	2	Grandparents	1
inf61	Women	36-40	Married	Undergraduate (Arabic)	5	Mother	1
inf62	Women	20-25	Married	Undergraduate (Arabic)	3	Mother	1
inf63	Men	51-55	Married	Undergraduate (Arabic)	2	School	1
inf64	Women	20-25	Single	Undergraduate (Arabic)	0	Mother	1
inf65	Women	36-40	Married	Undergraduate (Arabic)	3	Mother	1
inf66	Women	20-25	Single	Undergraduate (Arabic)	0	Mother	1
inf67	Women	36-40	Married	Undergraduate (Arabic)	3	Grandparents	5
inf68	Women	41-45	Married	Secondary education (Arabic)	7	Grandparents	4
inf69	Women	31-35	Single	Undergraduate (Arabic)	0	Grandparents	1
inf70	Women	26-30	Single	Undergraduate (Arabic)	0	Internet	1
inf71	Women	31-35	Single	Undergraduate (Arabic)	0	Grandparents	1
inf72	Women	51-55	Married	Primary education (Arabic)	5	Mother	1
inf73	Women	36-40	Married	Secondary education (Arabic)	3	Mother	1
inf74	Men	41-45	Divorced	Primary education (Arabic)	0	Grandparents	2
inf75	Men	56-60	Married	Secondary education (Arabic)	6	Grandparents	1

3. Plant collection and identification

The majority of voucher specimens came straight from informants. In situations where this was not feasible, they were purchased from nearby stores and supermarkets. Mounted plant specimens were placed in the herbarium of Umm Al-Qura University. Plant identification was carried out in the herbarium of Umm Al-Qura University using specimens of herbarium, the Flora of KSA [25] and Flora of KSA [15]. The author confirmed the identification. Families and nomenclature adhere to the 2015 Catalogue of Life.

4. Data analysis

The gathered data were entered into Excel as "use reports" (UR). One informant's citation of a plant's use, including its common name, component used, local use, preparation, and administration, is called a "use report." Utilizations were categorized based on disease categories using the International Classification of Primary Care. The information from the database was summarized using descriptive statistics.

RESULTS

1. Medicinal plants consumed during holy month of Ramadan

Out of 111 use reports, a total of 41 colloquial names for medicinal plants were recorded, belonging to 41 different medicinal plants (23 families; **Table 2**). Forty-one medicinal plants were identified at species level. Plant uses were documented for 14 therapeutic categories. The most diverse families were Apiaceae (20%; 8 species) and Lamiaceae (15%; 6 species) Amaranthaceae, Asteracea, Fabaceae, Lauraceae, Malvaceae and Zingiberaceae were represented by 2 species each (5%). Fifteen families were represented by only one species **(Figure 2)**. The most popular species consumed during holy month of Ramadan were (*Mentha spicata* L. and *Pimpinella anisum* L.), which have the highest frequency, followed by (*Zingiber officinale* Roscoe) and (*Cinnamomum cassia* (L.) Presl; *Thymus vulgaris* L.). New citation of medicinal plants is represented by *Corchorus olitorius* L. Plant parts that were most frequently employed were the leaves (39%), seeds (22%) and roots (15%). Fruits (10%), flowers (5%), bark (2%), resin (2%), peel (2%) and blub (2%; **Figure 3**).

Table 2 Comprehensive inventory of the plants consumed during holy month of Ramadan including the scientific name, vernacular name(s), family, part(s) used, preparation, administration therapeutic use categories, frequency of citation and voucher specimen.

	Scientific name	Family	Vernacular name		part used	Preparation	Administration	Therapeutic use categories	Frequency of citation	voucher specimen
1	*Alkanna tinctoria* (L.) Tausch	Boraginaceae	عشبة خوا جوا	Khawajua	Roots	Infusion	Place it directly	Skin	1	MPR 1
2	Allium sativum L.	Amaryllidaceae	ثوم	Thum	Blub	No preparation	Oral ingestion (food)	Pressure, Immune	2	MPR 2
3	*Aloe vera* (L.) Burm.f.	Asphodelaceae	صبار	Sabbar	Leaves	Take out the gel	Place it directly	Skin	1	MPR 3
4	*Apium graveolens* L.	Apiaceae	كرفس	Krfs	Leaves	Mix with water	Oral ingestion (drink)	Digestive	1	MPR 4
5	*Aucklandiacostus*Falc.	Asteraceae	قسط الهندي	Qasdhindi	Roots	Powder, mix with honey	Oral ingestion (drink, food)	Immune	1	MPR 5
6	*Beta vulgaris* L.	Amaranthaceae	الشمندر	Banjr	Roots	Mix with orange juice	Oral ingestion (drink)	Hair, Blood	2	MPR 6
7	*Camellia sinensis* (L.) Kuntze	Theaceae	شاهي الاخضر	Shay akhdar	Leaves	Decoction, infusion	Oral ingestion (drink)	Digestive	2	MPR 7
8	*Cinnamomum cassia* (L.) Presl	Lauraceae	قرفة	Qurfa	Bark	Decoction, infusion	Oral ingestion (drink)	Diabetes, Digestive, Period	6	MPR 8
9	*Cinnamomum tamala*(Buch.-Ham.) Th. G. G. Nees	Lauraceae	ورق الغار	Waraqalghar	Leaves	Mix with food	Oral ingestion (drink)	Blood	1	MPR 9
10	*Citrus limon* (L.) Burm. fil.	Rutaceae	ليمون	Limon	Fruits	Decoction, mix with food	Oral ingestion (drink, food)	Digestive, Immune	4	MPR 10
11	*Coffea arabica* L.	Rubiaceae	قشر	Qashralbun	Peels	Decoction	Oral ingestion (drink)	Immune	2	MPR 11
12	*Commiphoramyrrha* (Nees) Engl.	Burseraceae	مُر	Myrr	Resin	Decoction	Oral ingestion (drink)	Digestive	1	MPR 12
13	*Corchorus olitorius* L.	Malvaceae	ملوخية	Malukhia	Leaves	Mix with food	Oral ingestion (food)	Digestive	2	MPR 13
14	*Coriandrum sativum* L.	Apiaceae	كزبره	Kozbra	Leaves	Decoction	Oral ingestion (drink)	Diabetes	1	MPR 14
15	*Cucumis sativus* L.	Cucurbitaceae	خيار	Khiar	Fruits	Mix with food	Oral ingestion (food)	Digestive	1	MPR 15
16	*Cuminum cyminum* L.	Apiaceae	كمون	Kamun	Seeds	Decoction, mix with food	Oral ingestion (drink, food)	Digestive	4	MPR 16
17	*Curcuma longa* L.	Zingiberaceae	كركم	Karrakum	Roots	Decoction, infusion، mix with food	Oral ingestion (drink, food)	Digestive, Diabetes, Skin, Blood	4	MPR 17
18	*Daucus carota* L.	Apiaceae	جزر	Juzur	Roots	Juice, mix with food	Oral ingestion (drink, food)	Blood, Eye	3	MPR 18

19	*Foeniculum vulgare* Mill.	Apiaceae	شمر	Shamr	Seeds	Decoction, infusion	Oral ingestion (drink)	Digestive	2	MPR 19
20	*Hibiscus sabdariffa* L.	Malvaceae	كركديه	Karakadi	Flowers	Infusion	Oral ingestion (drink)	Pressure, Digestive	4	MPR 20
21	*Hordeum vulgare* L.	Poaceae	شعير	Shaeir	Seeds	Decoction	Oral ingestion (drink)	Digestive	1	MPR 21
22	*Linum usitatissimum*L.	Linaceae	كتان	Kitan	Seeds	Decoction, infusion، mix with food	Oral ingestion (drink, food)	Hair,Digestive-General and unspecified	3	MPR 22
23	*Matricaria chamomilla* L.	Asteraceae	بابونج	Babunj	Flowers	Decoction, infusion	Oral ingestion (drink)	Digestive	5	MPR 23
24	*Mentha spicata* L.	Lamiaceae	نعناع	Nena	Leaves	Decoction, infusion	Oral ingestion (drink)	Digestive	8	MPR 24
25	*Ocimumbasilicum*L.	Lamiaceae	ريحان	Rihaan	Leaves	Decoction	Oral ingestion (drink)	Digestive	2	MPR 25
26	*Olea europaea* L.	Oleaceae	زيتون	Zeetoun	Fruits	Mix with food	Oral ingestion (drink, food)	Digestive	1	MPR 26
27	*Origanum syriacum*L.	Lamiaceae	بردقوش	Bardaqush	Leaves	Decoction	Oral ingestion (drink)	Digestive	1	MPR 27
28	*Petroselinum crispum* (Mill.) Fuss	Apiaceae	بقدونس	Baqdunas	Leaves	Decoction	Oral ingestion (drink)	Urological	1	MPR 28
29	*Pimpinella anisum* L.	Apiaceae	يانسون	Yansun	Seeds	Infusion	Oral ingestion (drink)	Digestive, Respiratory, Period	8	MPR 29
30	*Salvia officinalis* L.	Lamiaceae	ميرميه	Maryamia	Leaves	Decoction	Oral ingestion (drink)	Diabetes	2	MPR 30
31	*Salvia rosmarinus*Schleid.	Lamiaceae	اكليل الجبل	Aklelaljabal	Leaves	Decoction, mix with food	Oral ingestion (drink, food)	Digestive	3	MPR 31
32	*Senna alexandrina* Mill.	Fabaceae	سنا مكي	Sana maki	Leaves	Decoction	Oral ingestion (drink)	Digestive	2	MPR 32
33	*Sesamum indicum* L.	Pedaliaceae	سمسم	Sesamum	Seeds	Mix with milk	Oral ingestion (drink)	Endocrine	1	MPR 33
34	*Spinacia oleracea* L.	Amaranthaceae	سبانخ	Sbankh	Leaves	Mix with food	Oral ingestion (food)	Hair, Skin	1	MPR 34
35	*Thymus vulgaris* L.	Lamiaceae	زعتر	zatar	Leaves	Infusion, mix with food	Oral ingestion (drink, food)	Immune, Digestive, Respiratory	6	MPR 35
36	*Trachyspermumammi* (L.) Sprague	Apiaceae	نانخة	Nankha	Seeds	Decoction	Oral ingestion (drink)	Digestive	1	MPR 36
37	*Trigonella foenum-graecum* L.	Fabaceae	حلبة	Helba	Seeds	Infusion	Oral ingestion (drink)	Digestive	3	MPR 37
38	*Vitellaria paradoxa*C.F.Gaertn.	Sapotaceae	شيا	Chia	Seeds	Mix with food	Oral ingestion (food)	Digestive	1	MPR 38
39	*Vitis vinifera* L.	Vitaceae	زبيب	Zabib	Fruits	Infusion	Oral ingestion (drink)	Blood	1	MPR 39

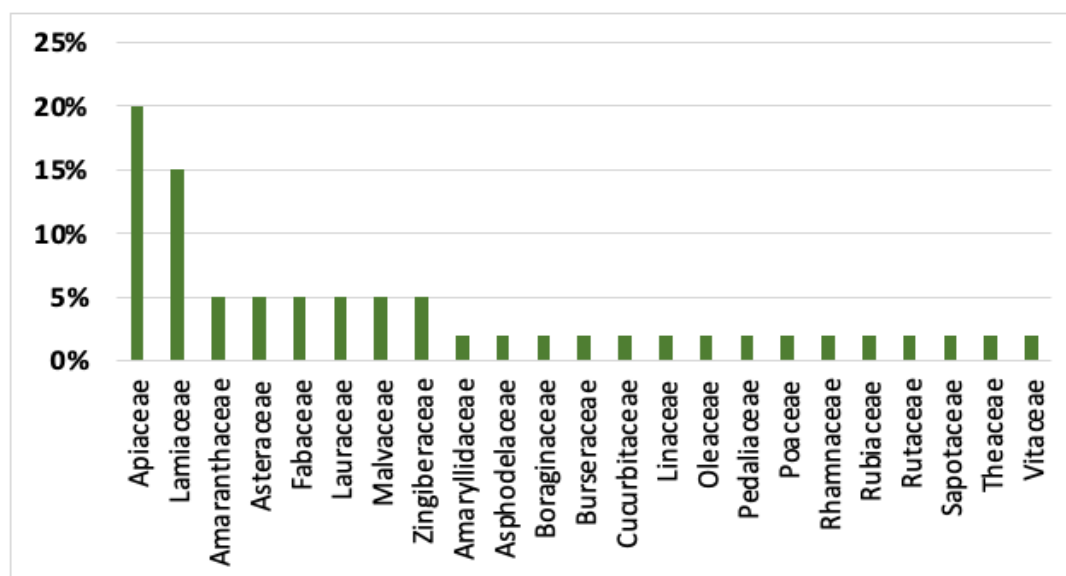| 40 | *Zingiber officinale* Roscoe | Zingiberaceae | زنجبيل | Zanajabil | Roots | Decoction, infusion | Oral ingestion (drink) | Digestive | 7 | MPR 40 |
| 41 | *Ziziphus spina-christi* (L.) Desf. | Rhamnaceae | سدر | Sader | Leaves | Mix with water | Place it directly | Hair | 1 | MPR 41 |

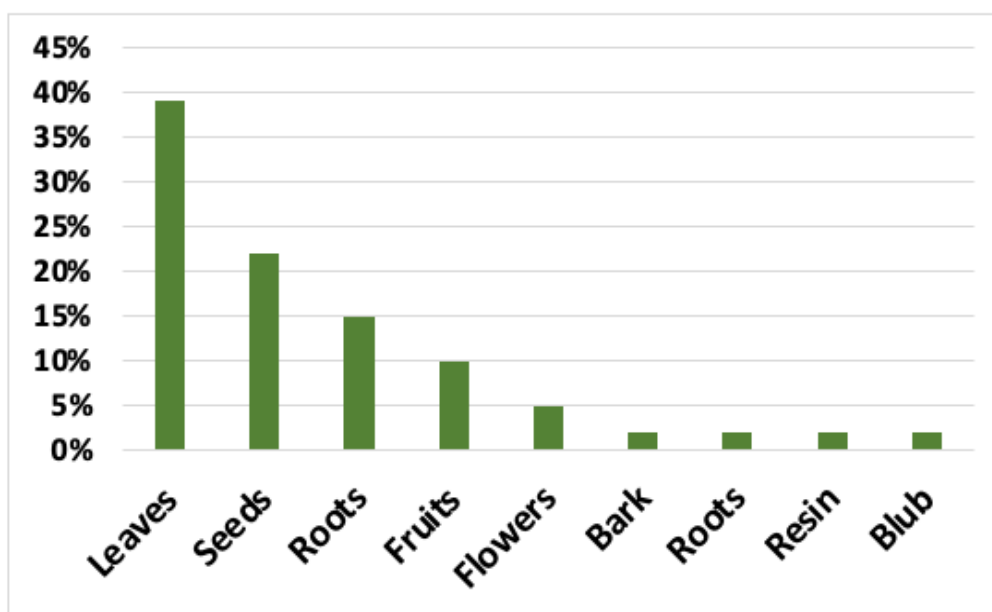**Figure 2** The most plant families consumed during holy month of Ramadan.

Figure 3 The most plant parts consumed during holy month of Ramadan.

DISCUSSION

Here and for the first time, ethnomedicinal plants and their traditional practices for therapies during holy month of Ramadan in Makkah, Saudi Arabia were explored. Due to the customs and cultural heritage of the community, particularly during the holy month of Ramadan, the majority of people pursue traditional rituals. The people of Makkah are primarily connected to folklore medicine.

Apiaceae and Lamiaceae have a high number of plant citations during holy Ramadan in Makkah and in different parts of KSA [11,26,27] as well as around the world [28.29]. Ethnomedically, many plants of these families are used as home-based treatments for treating different diseases. Such families have a variety of phytochemicals and secondary metabolites which are potential drug source [26] Plants from these families exhibit therapeutic qualities, and traditional medicine has made extensive use of them especially Cuminum cyminum and Foeniculum vulgare from Apiaceae [30] and Mentha spicata from Lamiaceae [31],which are present in the flora of KSA. Although, Zingiberaceae is not native in the flora of KSA, it is one of the most commonly cited families. This is in agreement with observations in Makkah [11]

The most popular species consumed during holy month of Ramadan are (*Mentha spicata* L. and *Pimpinella anisum* L.), which have the highest frequency. They are said to be nourishing and advantageous for gastrointestinal issues and the body's detoxification process. *Zingiber officinalen* L. was assigned the third most consumed during holy month of Ramadan. Known for its therapeutic qualities in conventional medicine, it is widely utilized throughout the world [29,32,33] to help treat a variety of illnesses, including pain, constipation, indigestion, nausea, vomiting, asthma, coughing, inflammation, and loss of appetite [34] New citation of medicinal plants is represented by *Corchorus olitorius* L. as it was not previously mentioned in Makkah [11,12] or even throughout Saudi Arabia [27,35] All plant parts were used to treat different diseases. The most plant parts used in the present study are leaves (39%) and seeds (22%), this corresponds with the studies carried out by [33,36,11,37] There have been prior reports from Saudi Arabia regarding the prevalence of leaves in traditional medicine. [11,26] and in other part in the world Morocco [38] Turkey [13,39] Based on prior ethnobotanical research, leaves are among the plant components most frequently employed in ethnomedicinal surveys conducted in the Indian Himalayas to prepare medicines [40] The preference for leaves may be because as the principal component of plants, they are the source of photosynthesis. In addition, it is easy to collect and use leaves [41,36] Additionally, they contain a lot of essential oils and secondary metabolites that have therapeutic value [42].While gathering roots or entire plants can pose a serious threat to the local flora, leaves have no negative influence on the survival of medicinal plants [37] The preference for seeds, this could be due to some plant seeds have the potential to be a source of useful medicines and to improve the health status of their consumers as a result of the existence of different compounds essential to good health [43]. According to [44] flavonoids, which are abundant in most seeds, are regarded to have health-promoting qualities because of their strong antioxidant activity and capacity to scavenge free radicals. Thus, they are important for human health [45] Less used plant material is bark. reported that fewer hard components of plants, including bark, were utilized.

Limitations

This study, while pioneering in documenting ethnomedicinal practices during Ramadan in Makkah, faces several limitations. First, the sample size of 75 participants, although adequate for initial exploration, may not capture the full diversity of ethnomedicinal knowledge across different demographics and neighborhoods in Makkah. The reliance on purposive sampling might have introduced selection bias, limiting the generalizability of the findings to other regions in Saudi Arabia or the broader Muslim community. Additionally, the study focused only on the traditional knowledge of plant use during one Ramadan season, making it susceptible to seasonal variations that may influence plant availability and usage patterns. Another limitation lies in the potential for inaccuracies in plant identification due to local dialects or linguistic variations in plant names, despite verification through herbarium specimens. Furthermore, the study primarily relied on qualitative interviews, which could be influenced by participant recall bias or cultural sensitivities that may affect the willingness to share information. Finally, while the study provides a descriptive overview of the therapeutic applications of medicinal plants, it did not conduct pharmacological assessments to confirm their efficacy, limiting the scientific validation of traditional claims. Future studies should aim for larger, more representative samples, year-round documentation, and integration of laboratory-based analyses to provide a more comprehensive understanding of ethnomedicinal practices during Ramadan.

CONCLUSION

This investigation listed the medicinal herbs that were ingested in Makkah during the holy month of Ramadan. This investigation identified 41 species that are utilized to treat 14 therapeutic categories and are spread throughout 23 botanical families. New citation of *Corchorus olitorius* L. was documented. In Saudi Arabia, the month of Ramadan is distinguished by a wealth of medicinal plants legacy and concordant knowledge among informants, which is mostly derived from traditional intangible cultural heritage and popular practices. In conclusion, to preserve the ethnobotanical intangible heritage of Saudi Arabia, documentation efforts are urgent to avoid the extinction of this ethnobotanical heritage. Future research on potential synergies between the medical properties of medicinal plants and the health advantages of fasting is recommended

REFERENCES

1. Heinrich, M. "Ethnobotany and its Role in Drug Development." *Phytotherapy Research* 14.7 (2000), **https://doi.org/10.1002/1099-1573(200011)14:7<479::AID-PTR958>3.0.CO;2-2**
2. Muthu, C., et al. "Medicinal Plants Used by Traditional Healers in Kancheepuram District of Tamil Nadu, India." *Journal of Ethnobiology and Ethnomedicine* 2.1 (2006), doi:10.1186/1746-4269-2-43.
3. Simbo, D. J. "An Ethnobotanical Survey of Medicinal Plants in Babungo, Northwest Region, Cameroon." *Journal of Ethnobiology and Ethnomedicine* 6.1 (2010), doi:10.1186/1746-4269-6-8.
4. Cheikhyoussef, A., et al. "Ethnobotanical Study of Indigenous Knowledge on Medicinal Plant Use by Traditional Healers in Oshikoto Region, Namibia." *Journal of Ethnobiology and Ethnomedicine* 7.1 (2011), doi:10.1186/1746-4269-7-10.
5. Posey, D. A., and Dutfield, G. *Beyond Intellectual Property: Toward Traditional Resource Rights for Indigenous Peoples and Local Communities*. Canada: International Development Research Centre, 1996.
6. Gertsch, J. "How Scientific is the Science in Ethnopharmacology? Historical Perspectives and Epistemological Problems." *Journal of Ethnopharmacology* 122.2 (2009), doi:10.1016/j.jep.2009.01.022.
7. Merouane, A., et al. "A Ethnobotanical Survey of Medicinal Plants Consumed During Holy Month of Ramadan in Chlef Region, Algeria." *Ethnobotany Research and Applications* 23 (2022), doi:10.32859/era.23.1-14.
8. Hassanein, M., et al. "Diabetes and Ramadan: Practical Guidelines 2021." *Diabetes Research and Clinical Practice* 185 (2022), doi:10.1016/j.diabres.2021.109185.
9. Aljaloud, K. S. "The Role of Lifestyle Changes to Diet, Physical Activity, and Sleep During Ramadan in Controlling Metabolic Syndrome in Adults: A Scoping Review." *Journal of Men's Health* 20.4 (2024), doi:10.22374/jomh.v20i4.1594.
10. Bakhotmah, B. A. "The Puzzle of Self-Reported Weight Gain in a Month of Fasting (Ramadan) Among a Cohort of Saudi Families in Jeddah, Western Saudi Arabia." *Nutrition Journal* 10 (2011), doi:10.1186/1475-2891-10-84.
11. Alqethami, A., et al. "Medicinal Plants Used by Women in Mecca: Urban, Muslim and Gendered Knowledge." *Journal of Ethnobiology and Ethnomedicine* 13.1 (2017), doi:10.1186/s13002-017-0168-0.
12. Qari, S. H et al. "Ethnomedicinal Evaluation of Medicinal Plants Used for Therapies by Men and Women in Rural and Urban Communities in Makkah District." *Saudi Pharmaceutical Journal* 32.1 (2024), doi:10.1016/j.jsps.2023.101881.
13. Palabaş Uzun, S., and Koca, C. "Ethnobotanical Survey of Medicinal Plants Traded in Herbal Markets of Kahramanmaraş." *Plant Diversity* 42 (2020), doi:10.1016/j.pld.2020.01.007.
14. Heywood, V. H. "Ethnopharmacology, Food Production, Nutrition and Biodiversity Conservation: Towards a Sustainable Future for Indigenous Peoples." *Journal of Ethnopharmacology* 137 (2011), doi:10.1016/j.jep.2011.03.037.
15. Chaudhary, S. A. "Flora of the Kingdom of Saudi Arabia, Riyadh: Minist." *Agric. Water. pp* (2001): 342-354.
16. Walter, H., et al. *Climate-Diagram Maps of the Individual Continents and the Ecological Climatic Regions of the Earth*. Berlin: Springer-Verlag, 1975.
17. Saeed, F., et al. "From Paris to Makkah: Heat Stress Risks for Muslim Pilgrims at 1.5 C and 2 C." *Environmental Research Letters* 16.2 (2021), doi:10.1088/1748-9326/abd07c.
18. Al-Eisawi, D. M., and Al-Ruzayza, S. "The Flora of Holy Mecca District, Saudi Arabia." *International Journal of Biodiversity and Conservation* 7.3 (2015), doi:10.5897/IJBC2014.0667.
19. Martin, G. J. *Ethnobotany: A Methods Manual*. London: Chapman & Hall, 1995.
20. Alexiades, M. N., and Sheldon, J. W. *Selected Guidelines for Ethnobotanical Research: A Field Manual*. New York: New York Botanical Garden, 1996.
21. International Society of Ethnobiology. "ISE Code of Ethics (with 2008 Additions)." Online, http://www.ethnobiology.net/code-of-ethics/.
22. American Anthropological Association. "Statement on Ethics: Principles of Responsibility." 2012, http://www.aaanet.org/profdev/ethics/.
23. Newing, H. *Conducting Research in Conservation: Social Science Methods and Practice*. London: Routledge, 2010.
24. Abbas, B et al. "The Ethnoveterinary Knowledge and Practice of Traditional Healers in Qassim Region, Saudi Arabia." *Journal of Arid Environments* 50.3 (2002), doi:10.1006/jare.2001.0897.
25. Migahid, A. M. *Flora of Saudi Arabia*. Riyadh: King Saud University Press, 1978.

26. Sayed-Ahmad, B., et al. "The Apiaceae: Ethnomedicinal Family as Source for Industrial Uses." *Industrial Crops and Products* 109 (2017).
27. Venkateshappa, S. M., and K. P. Sreenath. "Potential Medicinal Plants of Lamiaceae." *American International Journal of Research in Formal, Applied and Natural Sciences* 1.3 (2013).
28. Sujarwo, W., et al. "Ethnobotanical Study of Loloh: Traditional Herbal Drinks from Bali (Indonesia)." *Journal of Ethnopharmacology* 169 (2015).
29. Teixidor-Toneu, I., et al. "An Ethnomedicinal Survey of a Tashelhit-Speaking Community in the High Atlas, Morocco." *Journal of Ethnopharmacology* 188 (2016).
30. Kumar, G., et al. "A Review on Pharmacological and Phytochemical Properties of Zingiber Officinale Roscoe (Zingiberaceae)." *Journal of Pharmacy Research* 4.9 (2011).
31. Ullah, R., et al. "A Review on Ethno-Medicinal Plants Used in Traditional Medicine in the Kingdom of Saudi Arabia." *Saudi Journal of Biological Sciences* 27.10 (2020).
32. Ali, N. A., et al. "Ethnopharmacological Survey of Medicinal Plants in Albaha Region, Saudi Arabia." *Pharmacognosy Research* 9.4 (2017).
33. Tounekti, T., et al. "Ethnobotanical Study of Indigenous Medicinal Plants of Jazan Region, Saudi Arabia." *Evidence-Based Complementary and Alternative Medicine* 2019 (2019).
34. Eddouks, M., et al. "Ethnopharmacological Survey of Medicinal Plants Used in Daraa-Tafilalet Region (Province of Errachidia), Morocco." *Journal of Ethnopharmacology* 198 (2017).
35. Ranfa, A., and M. Bodesmo. "An Ethnobotanical Investigation of Traditional Knowledge and Uses of Edible Wild Plants in the Umbria Region, Central Italy." *Journal of Applied Botany and Food Quality* 246 (2017).
36. Bhat, J. A., et al. "Ecological Status and Traditional Knowledge of Medicinal Plants in Kedarnath Wildlife Sanctuary of Garhwal Himalaya, India." *Journal of Ethnobiology and Ethnomedicine* 9.1 (2013).
37. Akerreta, S., et al. "First Comprehensive Contribution to Medical Ethnobotany of Western Pyrenees." *Journal of Ethnobiology and Ethnomedicine*, 3.1 (2007).
38. Tripathy, S. "Importance of Plants and Animals in Medicine." *Journal of Experimental Zoology India* 18.2 (2015).
39. Ajayi, I. A., et al. "Preliminary Phytochemical Analysis of Some Plant Seeds." *Research Journal of Chemical Sciences*, 1.3 (2011).
40. Shirley, B. W. "Flavonoids in Seeds and Grains: Physiological Function, Agronomic Importance and the Genetics of Biosynthesis." *Seed Science Research* 8.4 (1998).
41. Yao, L. H., et al. "Flavonoids in Food and Their Health Benefits." *Plant Foods for Human Nutrition* 59.3 (2004).