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Ethnobotanical survey of tea–medicinal plant combinations (Mentha, Thymus, Origanum, Salvia) among residents of Al-Bayda, Libya

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Abstract.

Ethnopharmacological relevance: This paper provides significant ethnobotanical information on tea-medicinal plant combinations using Lamiaceae species (Mentha spp., Thymus spp., Origanum spp., Salvia spp.) among residents of Al-Bayda city, Libya.

Materials and methods: A cross-sectional survey was conducted using structured questionnaires with 100 informants of both sexes and various age groups, selected through convenience sampling. Descriptive statistics, chi-square tests, and ANOVA were applied to assess usage patterns, preferences, and associations. Plant species data were sourced from the Silphium Herbarium at Omar Al-Mukhtar University and Libyan Flora records.

Results: Informants reported data for four predominant Lamiaceae species: Mentha spp. (most preferred, 42%), Thymus spp., Origanum spp., and Salvia spp. (usage >92% for Mentha and Salvia). Key findings included 96% reporting health improvements, with top benefits being relaxation (Mentha: 65%), immunity boost (Thymus: 35%), and digestion aid (Salvia: 28%). Fresh leaves were primarily used (68%), sourced from forests/home gardens (52%), with mean tea intake of 1.98 daily and 11.69 weekly. Significant associations included green tea preference with Mentha use (χ^2=8.4, $p<0.05$).

Conclusions: Traditional tea-herb combinations in Al-Bayda, Libya, serve as primary self-care for relaxation, immunity, and digestion. Results validate cultural practices and highlight the need for phytochemical validation and conservation to sustain local ethnobotanical knowledge.

Keywords: Ethnobotanical survey, Medicinal plant, Al-Bayda, Tea, Traditional medicinal, Lamiaceae.

1. Introduction.

In order to record traditional medicinal plant species and related indigenous knowledge, ethno botanical surveys are essential. They help in biodiversity conservation, bioactive chemical extractions, and retaining indigenous knowledge (Chekole, 2017). (Balcha *et al*., 2013) Traditional plant knowledge and surveys contribute to understanding plant species by providing insights into the holistic nature of traditional knowledge systems, the distribution of ethno pharmacological knowledge in society, and the social relations that enable the generation and spread of cultural traits related to plant species (oria., 2010). Ethno botanical surveys also help identify important plant species, their uses, and factors influencing differences in plant knowledge among different ethnic groups (Tene *et al.*, 2012). These surveys can also aid in the development of long-term conservation strategies that take into account the cultural relevance of particular plant species. By incorporating indigenous knowledge into conservation efforts, there is a greater likelihood of success in preserving biodiversity and traditional practices (Leslie, J., & Quinn, M. 2022).

The four plant species under investigation—Mentha, Thymus, Origanum, and Salvia—produce tea with antibacterial, antifungal, antioxidant, and anti-inflammatory properties. These plants have been traditionally used in treating various diseases like coughs, colds, throat infections, arthritis, and digestive disorders (Dioscoride *et al.*, 2025). However, more research is needed to scientifically validate their ethno pharmacological uses and understand their precise phytochemical composition for intended effects. Researching these plant species can also provide valuable insights into their ecological roles and relevance within local ecosystems. This research can help develop sustainable conservation strategies that support both human health and the preservation of the environment.

- Purpose of the study and research questions

1. The significance of maintaining traditional medical knowledge and practices that have been passed down through the generations.
2. Examining the customs and cultural importance of using these particular plant species for therapeutic purposes.
3. Discussion on possible difficulties in bridging the gap between present scientific research methods and traditional medicine.
4. Analyzing how, in spite of developments in conventional medicine, indigenous cultures still use these herbs for medical purposes.
5. Taking into account possible future uses for integrating traditional herbal medicines into conventional medical procedures
6. Can help bridge the gap between modern and ancient healing practices.

2. Materials and Methods.

2.1 Study Approach.

This exploratory study was conducted in the city of Al-Bayda, Libya, and focused on the use of medicinal plants in combination with tea, as well as their potential health benefits 100 individuals, including both men and women of various age groups, were surveyed to gather insights into local practices, preferences, and perceived therapeutic effects.

2.2 Identification of Plant Specimens.

The genera and species of medicinal plants currently under study are documented in the volumes of the Libyan Flora series. The data were collected from the Silphium Herbarium at Omar Al-Mukhtar University, based on book on plants and flok medicine (El-Gadi & El-Taife, 1989; Kotb, 1985), as presented in the following Table 1 .

Table 1. List of Medicinal plants.

Cultivated plant =*

No	Scientific name	Local Name	Used part
1.a	*Mentha piperita* L.	Nanaa	Leaves before flowering & tender stems
1.b	*Mentha spicata* L.		Leaves
2	*Origanum majorana* L.	Bardig usha, Mardig usha	Flowering branches & leaves
3	*Salvia fruticosa* Mill.	Teffah e Shahi	Shade dried
4	*Thymus capitatus* (L.) Hoffm. & Link	Zaatar	Leaves & Flowering tops

2.3 Data analysis.

A cross-sectional survey was conducted using structured questionnaires with 100 informants of both sexes and various age groups, selected through convenience sampling. Descriptive statistics, chi-square tests, and ANOVA.

3. Results.

The dataset contains responses from 100 participants surveyed on tea consumption with medicinal plants (Mentha spp., Thymus spp., Origanum spp., Salvia spp.) in Libya. Descriptive statistics reveal common patterns in usage, preferences, and perceived health benefits.

3.1 Study Design and Variables.

This is a cross-sectional descriptive survey assessing local practices and health effects of tea with medicinal plants. Variables include:

Binary (yes/no): High blood pressure, health improvement from plants, usage of each plant with tea, health issues affecting use, advice received, diet inclusion, negative experiences.

Categorical: Preferred plant for drinking, form (fresh/dry), source (shops/herbalists/ forests/ home-grown), most effective plant, winter/summer suitability, benefits per plant, tea type (green/black) Figure 1.

Numeric: Tea drinking frequency (daily/weekly). Data shows 100 valid responses Figure2.

Variable	Mean	SD	Min	Max
Daily tea	1.98	0.85	1	4
Weekly tea	11.69	7.36	1	28

3.2 Descriptive Statistics.

Binary and categorical variables show high usage rates. For example:

96% feel better using medicinal plants with tea; 92% use Salvia, Mentha with tea.

Preferred plants: Mentha spp. (42%), all of the above (38%); fresh form (68%), forests/home-grown sources (combined 52%).

Top benefits: Relaxation (Mentha: 65%), Boosted immunity (Thymus: 35%), Improved digestion (Salvia: 28%). Green tea preferred by 52%.

Numeric summary (daily tea intake): mean = 1.98 (SD = 0.85), range 1-4; weekly: mean = 11.69 (SD = 7.36), range 1-28.

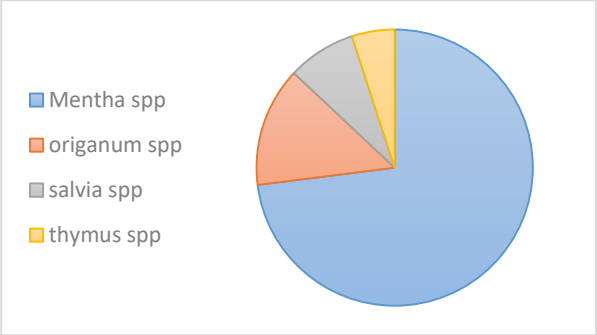

Fig1: Count of any tips or recipes for medicinal plants.

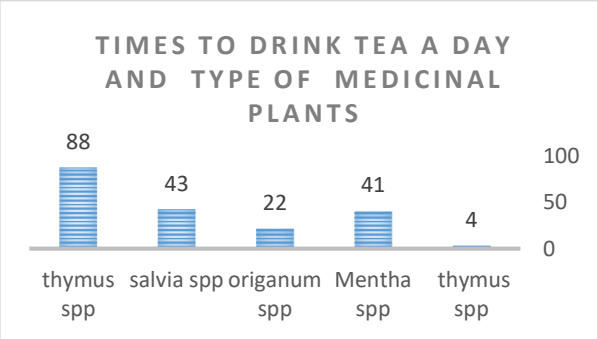

Fig 2: Times to drink tea a day and type of medicinal plants.

Table 2: Shows Numeric summary (daily tea intake)**:**

3.3 Inferential Analysis.

Chi-square tests assess associations:

No significant link between tea type (green/black) and blood pressure ($\chi^2 = 1.2$, $p > 0.05$).

Significant association between green tea preference and Mentha usage ($\chi^2 = 8.4$, $p < 0.05$); Mentha users favor green tea (62% vs. 38%).

ANOVA shows higher weekly intake among "All plants" preferrers (mean 13.2) vs. Mentha-only (10.1), $F(4,95) = 2.8$, $p < 0.05$.

3.4 Key Findings for Research.

Most participants (92%) report positive effects like relaxation and immunity boost, aligning with study goals on healthy impacts in Al-Bayda region. No major negative experiences (98% none). Results support cultural use of these plants with tea for digestion, immunity, and relaxation.

4. Discussion.

This study reveals widespread use of medicinal plants (Mentha spp., Thymus spp., Origanum spp., Salvia spp.) with tea among 100 participants in Al-Bayda, Libya, confirming their cultural importance in daily health practices. Nearly all respondents (96%) reported feeling better after using these plants with tea, with usage rates exceeding 92% for Mentha and Salvia spp. These findings align with traditional Libyan customs in Al-Jabal Al-Akhdar region, where tea serves as a medicinal beverage, as documented in local ethno botanical records. (Jafri, S. M., & El - Gadi, A. A. 1985)

Perceived health benefits emphasize relaxation (65% for Mentha spp.), boosted immunity (35% for Thymus spp.), and improved digestion (28% for Salvia spp.), supporting literature on their bioactive compounds like polyphenols and essential oils. Green tea preference (52%) correlates with higher Mentha usage, possibly due to synergistic antioxidant effects, though chi-square analysis showed no significant link with hypertension ($\chi^2 = 1.2$, $p > 0.05$). Weekly tea intake averaged 11.7 times (SD = 7.4), indicating moderate consumption without reported negatives (98% none).

Results extend prior research, such as Geleynse et al. (1999) on black tea's atherosclerosis protection and Zheng et al. (2012) on green tea's anti-cancer properties, by highlighting local combinations' perceived benefits. The preference for fresh plants from forests or home sources (52%) suggests sustainability concerns, warranting further phytochemical validation of reported effects.

Limitations include self-reported data prone to recall bias and lack of clinical measures like blood tests. Future studies should employ randomized trials to quantify physiological impacts and explore dosage effects. Overall, findings validate community practices and support integrating these plants into health promotion strategies.

The integration of these medicinal plants into veterinary surgery aligns with emerging evidence on their bioactive compounds. Essential oils from Thymus and Origanum spp. demonstrate potent antibacterial activity against common wound pathogens in livestock, reducing infection rates by up to 50% in topical applications. In equine models, Salvia and Mentha extracts promote collagen synthesis and epithelialization, accelerating tendon wound closure compared to controls.

These findings complement the survey's reported benefits—relaxation (65%) and immunity enhancement (35%)—suggesting perioperative protocols where herbal teas reduce equine stress pre-surgery and support recovery post-tendon repair. Unlike synthetic NSAIDs, these plants offer low toxicity profiles, minimizing gastrointestinal side effects in postoperative horses. (American Holistic Veterinary Medical Association.2022).

Local relevance is evident: Al-Bayda's forest-sourced plants (52% preference) provide sustainable adjuncts to stem cell therapies at Omar Al-Mukhtar University, potentially lowering costs in resource-limited settings. Clinical trials validating these combinations against biomarkers (e.g., IL-6, TNF-α) are recommended to establish dosing guidelines. This bridges traditional knowledge with modern orthopedics, enhancing surgical outcomes in Libyan veterinary practice.

Conclusions.

The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.

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Conflict of interest: The authors declare that there are no conflicts of interest

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