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TRADITIONAL KNOWLEDGE AND ETHNOMEDICINAL APPLICATIONS OF MENTHA IN MUZAFFARPUR DISTRICT

[1]Arunima, [2]Dr. Neelam Kumari

[1]Research Scholar, University Department of Botany, Babasaheb Bhimrao Ambedkar Bihar University , Muzaffarpur,Bihar
[2]Professor, University Department of Botany, Babasaheb Bhimrao Ambedkar Bihar University , Muzaffarpur, Bihar

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Abstract
Mentha (mint), a prominent genus in the Lamiaceae family, holds significant cultural and medicinal importance in Muzaffarpur District, Bihar, India. This study explores the traditional knowledge and ethnomedicinal uses of Mentha, focusing on its historical applications in local healthcare for treating various ailments. Through field surveys, practitioner interviews, and ethnobotanical data collection, the use of Mentha to address respiratory problems, digestive disorders, skin infections, and stress was documented. Despite its widespread use, comprehensive documentation and scientific validation of Mentha's medicinal properties in this region are lacking. The existing literature recognizes the value of traditional plant remedies, but the specific uses of Mentha in Muzaffarpur have been underexplored, underscoring the need for further research. This work aims to fill the gap by integrating traditional knowledge with modern health practices, with an emphasis on sustainable cultivation and use. The findings highlight the potential of Mentha-based remedies to connect traditional wisdom with modern scientific advances in healthcare.

Keywords: *Ethnomedicinal, botanists, gastrointestinal disorders, Decoctions, carminative.*

Introduction

Mentha (mint) species are aromatic herbs of the family Lamiaceae that are used in traditional medicine worldwide (Sharma, 2003). Mentha arvensis (often called pudina or corn mint) and M. × piperita (peppermint) are particularly important in South Asia. Because of their flavour and cooling properties, they figure prominently in Ayurvedic and folk remedies. For instance, menthol-rich mint extracts are traditionally used to treat digestive disorders, colds, fever, and hypertension (Mahendran & Rahman, 2020). In India, mint leaves are a culinary staple (e.g. chutneys, teas, curries) and also serve as folk remedies for stomach aches, headaches, and respiratory issues (Acharya & Shrivastava, 2008). Although communities in Muzaffarpur district of Bihar often rely on local plants for their healthcare needs, systematic documentation of medicinal plant knowledge is scarce. Previous surveys in the wider Bihar region provide valuable context: one study documented the use of M. arvensis ("pudina") for treating diarrhoea and dysentery (Tiwari & Sourabh, 2012), while another recorded the application of peppermint leaf extract for haemorrhoids (Priyadarshni & Arunima, 2014). While these reports indicated that Mentha is highly valued locally, a comprehensive survey in Muzaffarpur has yet to be conducted. Therefore, this study aims to systematically document the traditional uses of Mentha in Muzaffarpur, helping preserve knowledge that may be at risk of loss and providing a foundation for future pharmacological research.

Study Area And Methodology

Muzaffarpur District (26°N, 85°E) is situated in the northern Bihar plains along the Gandak River. The climate is subtropical, with hot, humid summers (April–June), monsoon rains (July–September), and mild winters (December–January). The terrain is largely flat, consisting of agricultural land with seasonal ponds and riverbanks, which support both cultivated and wild vegetation. Villages often have small home gardens and communal fallows where medicinal herbs such as Mentha grow. Traditional healing practices, hence, remain important for primary health care in this region. Fieldwork was conducted across villages and local markets in Muzaffarpur. Fifty informants (30 men, 20 women; aged 18–75 years)—including traditional healers, farmers, and homemakers were interviewed. Semi-structured questionnaires focused on Mentha utilization were used during these interviews: Mentha specimens were identified, local names were provided, and medicinal, culinary, or ritual uses were described by the informants. Voucher specimens were collected and identified by botanists at the University Department of Botany, B. R. Ambedkar Bihar University, Muzaffarpur. Details on the specific plant parts used, the methods of remedy preparation (for example, infusions, decoctions, or tinctures), and the ailments they address were documented. The documented records were subsequently tabulated to determine the relative citation frequencies—expressed as percentages—for each ailment category, mode of preparation, and plant part utilized. To ensure reliability, the documented remedies were cross-checked among multiple informants. Finally, the reported percentages for each type of remedy were included in the quantitative analyses.

Additionally, relevant ethnobotanical literature was reviewed to contextualize the findings. Ethical practice guidelines were adhered to: informant anonymity was preserved, and all traditional knowledge was reported with respect.

Traditional Knowledge And Use Of Mentha

Locally, Mentha is referred to as pudina (पुदीना in Hindi). People could clearly distinguish M. arvensis (called "chaal pudina" or "kisani pudina") from M. × piperita (peppermint, often "pep-mint" in local parlance). M. arvensis commonly grows wild along water channels and is frequently cultivated in kitchen gardens. In contrast, M. × piperita is less common and typically cultivated intentionally in household pots or small plots for its stronger aroma. Many households reported keeping a mint pot near the kitchen or courtyard, reflecting its role as a common culinary and medicinal herb. This pattern matches observations from nearby regions, where communities often cultivate mint in home gardens for flavouring food and herbal use (Ganesan, Suresh, & Kesavan, 2004). Knowledge about mint's uses is transmitted orally. Elderly informants recalled learning mint remedies from parents or grandparents. Traditional healers (vaidyas) described mint-based

treatments such as “adrak-pudina” (ginger-mint) tea for stomach pain. Female informants cited recipes taught to them by their mothers, such as mint chutney for indigestion and mint poultice for fever blisters. Conversely, many younger informants knew mint mainly as a culinary herb and had less awareness of its medicinal uses. This indicates that detailed ethnomedicinal knowledge is primarily held by older generations and may be at risk of being lost if not recorded. Beyond its medicinal uses, mint plays important cultural roles. Fresh mint leaves are widely used as a flavouring in local dishes (raita, chutneys, curries) and beverages (mint lemonade). Mint is popularly used as a culinary herb and is considered a staple flavouring in Indian cuisine. For example, mint chutney is commonly served with litti-chokha (a traditional Bihari snack). According to the community, mint has a “cooling effect” on the body; as a result, households frequently grow it to freshen the air. During the Hindu festival Chhath or after heavy meals, people drink a mint-infused beverage (“pudina sharbat”) to aid digestion. Mint leaves are also occasionally offered as part of puja (ritual worship) items, believed to impart purity. These practices show that Mentha is deeply ingrained in daily life and folk culture in Muzaffarpur.

Ethnomedicinal Applications

The survey identified numerous medicinal uses for Mentha, consistent with global ethnobotanical patterns. The main ailments treated with Mentha preparations were gastrointestinal and respiratory conditions. Overall, gastrointestinal disorders were the most cited category: about 30% of informants reported using mint for stomach-related problems (indigestion, acidity, diarrhoea, abdominal cramps). For example, several healers prescribed consumption of mint tea on an empty stomach to alleviate indigestion or a strong tea with jaggery for the management of diarrhoea. M. arvensis (pudina) is traditionally known for its antidiarrheal and carminative properties; in fact, Tiwari & Sourabh (2012) documented its use for diarrhoea and dysentery in Bihar. Similarly, Thakur et al. (2021) noted that M. arvensis is used for digestive ailments. The next most common category was respiratory and circulatory ailments (about 26% of uses). Mint was frequently used by informants to manage colds, coughs, sore throats, and asthma-like symptoms. The standard preparation consisted of a hot mint infusion (often with ginger or tea leaves), which was consumed to alleviate coughing and reduce nasal congestion. This practice is strongly supported by the qualitative data; as one elderly informant noted, 'We give peppermint tea during cough and cold – it helps clear the chest’. This practice aligns with the established literature on peppermint’s traditional use for the management of colds and throat ailments (Mahendran & Rahman, 2020). A few healers reported that mint helps ease breathing in asthma and reduces phlegm. Beyond respiratory applications, mint preparations were administered to manage mild hypertension, as noted by a few informants. They also noted that mint tea provided a soothing effect, especially during episodes of elevated blood pressure or palpitations. Although this is primarily a folk remedy, it highlights a common traditional belief: mint is frequently cited for cardiovascular support (Paul & Datta, 2011). Skin and wound care constituted approximately 14% of the reported uses. Fresh mint leaf paste was frequently applied topically to alleviate burns, rashes, insect bites, and minor cuts, with informants valuing its cooling and antiseptic properties. For example, a young mother described applying mint paste to her child’s mosquito bites to alleviate the itching. This practice aligns with the understanding that Mentha species contain antibacterial and anti-inflammatory compounds (Radhia et al., 2024). Specifically, M. arvensis essential oil is known to have antibacterial properties (Laftouhi et al., 2023). Several informants reported that mint paste helped heal boils and skin lesions resembling acne. Mint was not used to treat any serious dermatological conditions, but it did offer notable relief for minor skin issues. Other occasional uses included the management of fever (12%) and headaches (10%). For mild fever or flu, some informants gave children lukewarm mint tea with honey. A common remedy for headaches was to apply cool mint water or paste to the forehead. These uses highlight mint’s acknowledged analgesic properties in traditional medicine (Gedif & Hahn, 2003). Wei et al. (2023) observed that mint is used globally to treat fever, headache, and flu-like symptoms, aligning with previous findings. An interesting local remedy for haemorrhoids (piles) was noted, with about 5% of informants mentioning the topical use of peppermint oil or leaf extract on painful or bleeding piles. This aligns with Priyadarshni & Arunima's (2014) report of applying M.

piperita tincture externally for piles in Muzaffarpur. While not common, it demonstrates how mint is integrated into certain traditional treatments in the region.

Cultural Significance

Beyond its medicinal uses, Mentha holds a prominent place in local culture and diet. As mentioned, fresh mint is a daily staple for flavouring foods and drinks, highlighting its importance as a culinary herb. In Bihar, mint is an essential spice: mint leaves are crushed into chutneys, added to dals (lentil soups), rice dishes, and used in sweet treats like mint kheer. Its culinary significance is well known: encyclopedias describe mint (pudina) as “a staple in Indian cuisine." Regular presence in the kitchen probably reinforces its use as a household remedy; for instance, mothers often give children mint tea simply because it is easily available from the home garden. Symbolically, mint is linked to purity and freshness. Some villagers tie sprigs of mint to cattle's necks or hang them in storerooms to ward off insects and bad odours, a folk belief in its protective scent. During postpartum care, elders prepare mint-water baths for new mothers, following Ayurvedic cooling and antiseptic prescriptions. Therefore, Mentha’s role in Muzaffarpur spans daily nutrition, religious, and social practices, reflecting its importance to community identity.

Data Analysis And Charts

Quantitative analysis of interviews reveals the most common uses and practices. Figure 1 displays the frequency of Mentha use across different ailment categories (N=50 informants). Digestive issues (such as indigestion and diarrhoea) were reported by 30% of informants, making it the most prominent category. Respiratory problems (including cold, cough, and asthma) were reported by 26%. Skin conditions, fever, headaches, and other ailments accounted for smaller percentages (fig. 1). These findings align with existing research: Mentha arvensis is frequently used for diarrhoea, whereas peppermint is often used to treat colds and coughs.

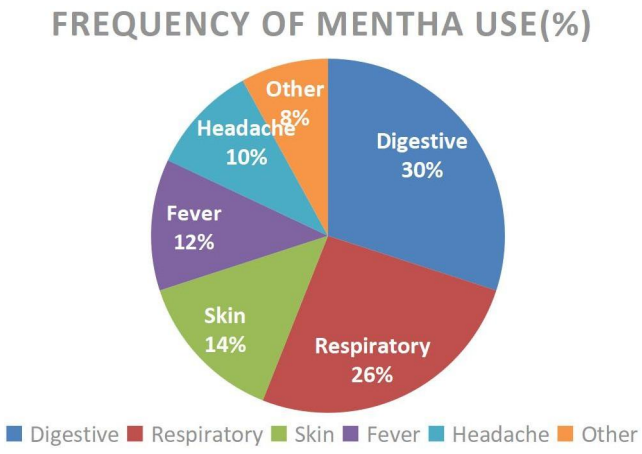

Figure 1. Frequency of Mentha use by ailment category (survey N=50)

Figure 1 illustrates the distribution of preparation methods. Most informants (44%) prepared mint tea as a hot infusion from fresh leaves. Decoctions, which involve boiling leaves in water, were used by 28% of informants, often for stronger digestive or respiratory remedies. In 14% of cases, fresh leaf juice or crushed extract was used, either mixed in warm water or applied directly. Dried mint powder and paste were used by 10% and 4% of informants, respectively. The preference for aqueous preparations such as tea and decoctions reflects traditional herbal practices aimed at extracting mint’s volatile oils.

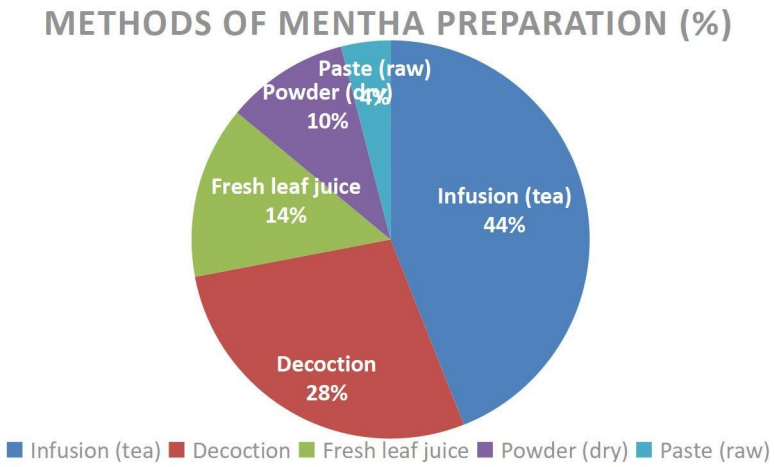

Figure 2. Methods of Mentha preparation (survey N=50)

similarly, Figure 2 shows that the leaf is the main part used, accounting for 90% of preparations. Informants consistently emphasized the aromatic leaves as the active medicinal component. The entire plant, including the stem, was used in 10% of cases, mainly for broad-spectrum herbal decoctions. Roots and flowers were not mentioned at all.



Figure 3. Mentha plant parts used (survey N=50)

Figure 3 shows the distribution of Mentha species mentioned. Around 70% of informants used M. arvensis (field mint), while 30% used M. × piperita (peppermint). This indicates that M. arvensis is more prevalent locally, probably because it grows in wet fields and villages. Peppermint, which has a stronger aroma, was mainly found in cultivated garden plots. No other Mentha species were reported. The prevalence of M. arvensis aligns with existing literature, as many Indian studies highlight field mint (Japanese mint) as the most common ‘pudina’.

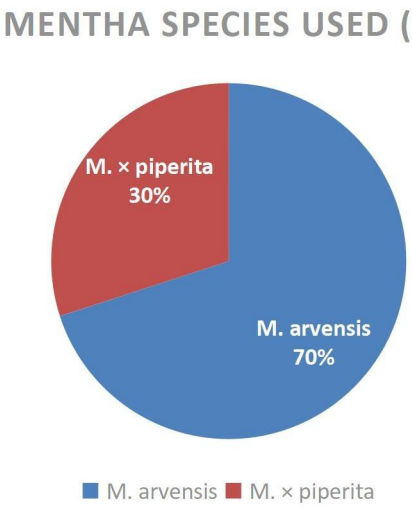

Figure 4. Mentha Species Used By Informants (Survey n=50)

Discussion

The data confirms that Mentha plays a diverse ethnomedicinal role in Muzaffarpur, similar to patterns observed in other regions. Its prominent use for digestive and respiratory issues reflects the widespread recognition of mint remedies. For instance, Wei et al. (2023) document mint treatments for cough, fever, headache, and gastrointestinal relief, aligning with the findings. These quantitative results are consistent with previous surveys from Bihar region (Tiwari & Sourabh 2012) and Assamese Lamiaceae studies (Barman, Gajurel, & Singh, 2024), supporting the validity of these uses. However, some practices seem locally specific; for example, peppermint extract for haemorrhoids is a notable remedy unique to this area, not commonly cited elsewhere. Conversely, traditional uses like migraine relief are mentioned less frequently here. Cultural influences likely shape these patterns: for instance, mint's integration into daily diet may reinforce its use for common ailments. Indeed, we observed that households that frequently use mint in cooking also use it for health purposes, suggesting a link between dietary habits and healing practices. A major concern is that this valuable knowledge is at risk of being lost, as much of it is held by elders, with few young adults able to articulate these traditional uses. Alum (2024) highlights that orally transmitted medicinal knowledge is vulnerable to erosion amid modernization. Increasing globalization and lifestyle changes are gradually replacing home remedies with modern alternatives, as many young people see mint only as a cooking ingredient rather than medicine. Without deliberate efforts to preserve this knowledge, these practices could disappear. Scientific validation of these remedies is also necessary. Often, local preparations vary in dosage and composition, guided by folk measures like "a handful of leaves." Ethnopharmacologists emphasize studying these practices under controlled conditions (Thesnor et al., 2024). For example, testing mint tea's effectiveness against diarrhoea or its antimicrobial properties could validate and improve these remedies. Collaborations with local healers to standardize formulations would help integrate these traditional treatments into broader healthcare systems. Additionally, sustainability remains a concern. M. arvensis thrives in moist soils, and heavy wild harvesting could threaten natural populations. While many farmers cultivate Mentha for commercial menthol production, home use often relies on wild or semi-wild plants. Overharvesting can deplete local supplies. Promoting community cultivation in home gardens or small farms could ease pressure on wild stocks, ensuring this resource remains available for future generations. In conclusion, Mentha-based remedies in Muzaffarpur are culturally significant and scientifically plausible. Documenting these practices helps preserve traditional knowledge and opens avenues for new therapies. Raising awareness among younger generations, promoting sustainable cultivation, and fostering collaborative research are essential steps to protect this valuable herbal heritage.

Conclusion

This study provides a comprehensive account of Mentha utilization in Muzaffarpur District. It was documented that M. arvensis and M. × piperita (pudina) are widely used for a spectrum of health problems, notably digestive and respiratory ailments, which reflects their established global ethnomedicinal reputation. To exploit their soothing, antiseptic, and carminative properties, the leaves are prepared as teas, decoctions, oils, and topical pastes. Furthermore, Mentha is incorporated daily as a culinary herb and is recognized as a symbol of purity and health within local customs. Importantly, the fragility of this traditional knowledge is highlighted by these findings: intergenerational transmission is weakening, and the risk of overharvesting is noted. Consequently, the systematic documentation of traditional remedies and the pursuit of scientific validation (reverse pharmacology) are strongly advocated to ensure these practices can be safely and sustainably integrated into healthcare.

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