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Ethnobotanical survey of medicinal plants used for cough management on Calagna-an Island, Carles, Iloilo, Philippines

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Abstract. *Duga AC, Cordero CS, Alejandro GJD. 2026. Ethnobotanical survey of medicinal plants used for cough management on Calagna-an Island, Carles, Iloilo, Philippines. Asian J Ethnobiol 9 (1): y090124. https://doi.org/10.13057/asianjethnobiol/y090124.* Cough remains a public health concern in the Philippines, particularly in island communities with limited access to healthcare where traditional medicine supports primary care. This study documented medicinal plants used for cough management on Calagna-an Island, Carles, Iloilo, Philippines, and assessed their diversity, preparation, origin, conservation status, and cultural importance. Ethnobotanical data were collected from November 2022 to January 2023 through semi-structured interviews with 220 informants aged ≥40 years using purposive and snowball sampling. Relative Frequency of Citation (RFC) was used to determine cultural significance. A total of 25 medicinal plant species representing 21 genera and 17 families were recorded, with Lamiaceae as the most represented family. Herbs and leaves were the predominant growth form and plant part used, respectively, while decoction and oral administration were the most common preparation and application methods. Most species were non-native (72%), although several native taxa were harvested from the wild, raising potential conservation concerns. *Coleus amboinicus*, *Blumea balsamifera*, and *Vitex arvensis* had the highest RFC values and were the most culturally salient species. The tendency of respondents to rely on only one or two preferred medicinal plants suggests a selective, experience-based therapeutic strategy centered on a few trusted remedies. These findings underscore the importance of traditional medicine in isolated communities and identify priority species for pharmacological validation, biodiversity conservation, and culturally responsive community healthcare initiatives.

Keywords: Carles, *Coleus amboinicus*, cough, medicinal plant, Relative Frequency Citation

INTRODUCTION

Cough is a protective reflex that clears excess mucus and inhaled particles from the airways and is one of the most common manifestations of respiratory diseases, ranging from self-limiting infections to severe pulmonary disorders (WHO 2024a). Respiratory illnesses continue to pose a major public health challenge worldwide. In 2021, lower respiratory infections, excluding COVID-19, remained the deadliest communicable diseases and ranked as the fifth leading cause of mortality globally (WHO 2024b). In the Philippines, chronic lower respiratory diseases consistently ranked among the leading causes of death from 2023 to 2025 (PSA 2025a, b). Similarly, in Western Visayas, pneumonia and acute respiratory infections were among the leading causes of mortality and morbidity in 2023 (EMB Region VI 2024). These trends highlight the continuing need for accessible, culturally acceptable, and cost-effective strategies for cough management, particularly in geographically isolated and resource-limited communities.

Medicinal plants have long been used in traditional healthcare systems to manage cough and other respiratory symptoms. Ethnobotanical studies from Asia, Africa, South America, and the Philippines consistently document the widespread use of locally available plants for treating respiratory conditions (Bussmann and Glenn 2010; Mohsenzadeh et al. 2016; Lawal et al. 2020; Shawarb et al. 2023; Teka and Maryo 2023; Sharif et al. 2024; Ekasari et al. 2025; Pardo and Paranada 2025). These studies demonstrate the persistence of traditional medicinal knowledge and the importance of plant-based therapies in communities where access to formal healthcare remains limited.

Ethnobotanical studies play an important role in documenting indigenous and local knowledge regarding the use of medicinal plants. Such studies contribute to the preservation of cultural heritage, facilitate the identification of biologically active plant species for pharmacological research, and provide baseline information for biodiversity conservation. Traditional knowledge is increasingly threatened by modernization, changing lifestyles, urbanization, and the declining transmission of knowledge to younger generations (Cordero et al. 2020, 2022a, b, 2023, 2025; Cordero and Alejandro 2021; Flores et al. 2025; Guimbuayan et al. 2025). Moreover, despite its long history of use and continued popularity among many communities worldwide, it has not been officially recognized in most countries (WHO 2000). Consequently, the documentation of medicinal plant knowledge and

practices has become increasingly important to preserve this valuable cultural and healthcare resource for future generations.

Despite the growing importance of ethnobotanical documentation, significant knowledge gaps remain. Most studies in the Philippines have focused on medicinal plants used for general health conditions, whereas investigations specifically addressing cough management remain scarce. This knowledge gap is even more pronounced in small island communities, where geographic isolation, limited healthcare access, and strong dependence on local natural resources may shape distinct patterns of medicinal plant use. Island environments such as Calagna-an, Carles, Iloilo, Philippines, are characterized by unique ecological conditions and closely integrated cultural practices that can influence the selection, preparation, and administration of herbal remedies. However, these island-specific ethnomedicinal practices remain poorly documented. Investigating such communities is therefore important for understanding localized healthcare strategies, preserving traditional knowledge, and identifying medicinal plant resources with potential pharmacological and conservation significance.

In response to these gaps, this study documents the medicinal plants used for cough management on Calagna-an Island. Specifically, it identifies the plant species used, the plant parts utilized, and the methods of preparation and administration practiced by the local community. The study also examines culturally embedded practices related to plant sourcing and remedy preparation and evaluates the biogeographic origin and conservation status of the recorded species. By integrating ethnobotanical, cultural, and ecological perspectives, this study provides insights into plant-based cough management in a small island setting. The findings contribute to the preservation of traditional knowledge, provide baseline information for future pharmacological and conservation research, and underscore the importance of context-specific healthcare practices in geographically isolated communities.

MATERIALS AND METHODS

Study site

The Municipality of Carles is the northernmost municipality of Iloilo Province, Philippines, situated at the northeastern tip of triangular-shaped Panay Island. It is bounded to the north by the Jintotolo Channel, to the northeast by the Visayan Sea, to the west by the Municipality of Pilar, Capiz, and to the south by the Municipality of Balasan, Iloilo. Carles is approximately 146 km from Iloilo City and about 13 km from Balasan, its nearest neighboring municipality (Province of Iloilo, https://iloilo.gov.ph/en/node/132). The municipality is known for its productive fishing grounds and major tourist destinations, including Islas de Gigantes, Sicogon Island, and Cabugao Gamay Island. Administratively, it comprises 33 barangays and three major islands: Gigantes, Calagna-an, and Sicogon.

Calagna-an Island, the focal study site, has an estimated land area of 20.59 km² and a coastline length of approximately 26.80 km. It is geographically positioned at about 11.4878° N latitude and 123.2183° E longitude, with a mean elevation of 109 m above sea level (PhilAtlas, https://www.philatlas.com/physical/islands/calagnaan.html. The island experiences a tropical maritime climate characterized by high temperature and humidity, with distinct wet and dry seasons typical of the Western Visayas region. According to the Municipal Population Program Office (2021, unpublished public document), Calagna-an Island has a total population of 8,586 residents, comprising 4,574 males and 4,012 females. The island is administratively divided into five barangays: Barangcalan, Bito-on, Punta Batuanan, Talingting, and Tinigban (Figure 1). Their livelihoods are primarily based on small-scale fishing, subsistence farming, and informal trade, with variable access to healthcare services and limited transportation connectivity to the mainland.

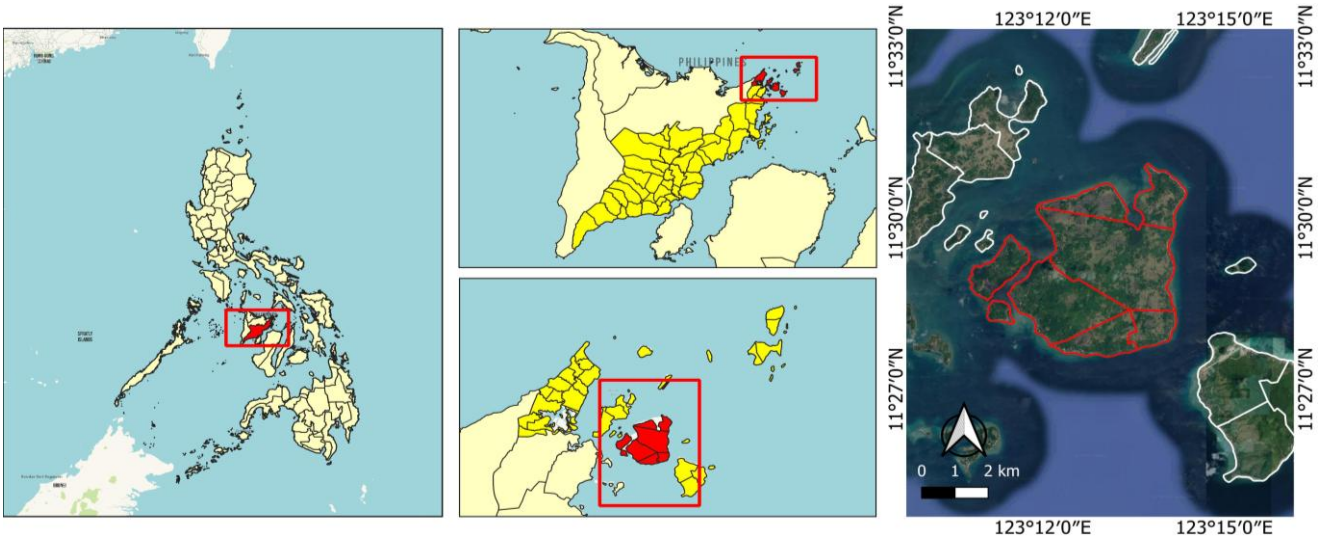

Figure 1. Map of the study site showing Calagna-an Island and its five barangays, Municipality of Carles, Iloilo Province on Panay Island, Philippines

Data collection and sampling methods

Prior to data collection, official permission to conduct the study and access the community was obtained from the barangay office. The objectives, scope, and academic nature of the research were formally presented to the Punong Barangay and the local officials. Participation was strictly voluntary, and written informed consent was obtained from all participants before their inclusion in the study. Fieldwork was conducted from November 2022 to January 2023. Data were collected using a semi-structured questionnaire complemented by informal interviews, an approach that facilitates the collection of comprehensive information within limited timeframes. The proposal and questionnaire were adapted from Cordero et al. (2022a, b, 2023), a tool that had received ethical clearance from the Ethics Review Committee of the University of Santo Tomas Graduate School (GS-2017-PN146). The current study employed a non-invasive, minimal-risk ethnobotanical design that relied on voluntary participation, did not collect sensitive personal or identifiable information, and involved non-indigenous respondents. Informed consent was obtained from all participants prior to the commencement of each interview.

The questionnaire consists of two main parts. The first part gathers the participants' demographic profile, including age, gender, civil status, educational attainment, and occupation, as presented in Table 1. The second part focuses on the medicinal plants used by participants for health-related concerns, including the plant name, part used, mode of preparation, and method of administration, as shown in Table 2. It also inquires about the sources from which the plants were obtained. The questionnaire was written in the Hiligaynon dialect, the native language of the informants, with an accompanying English translation. Medicinal plant data were collected using purposive sampling supplemented by snowball referrals. Purposive sampling, a non-probability technique, involves the deliberate selection of participants with relevant knowledge and experience (Bullard 2024), while snowball sampling facilitates the identification and recruitment of additional informants through referrals from initial participants (Mincheva et al. 2022). To minimize potential bias associated with snowball sampling, initial informants were purposely selected from diverse demographic and socio-occupational groups across the five barangays to ensure broad representation. Referral chains were initiated independently within each barangay and monitored to avoid over-reliance on closely connected networks. This study focused on documenting household-level medicinal plant knowledge among the general population rather than traditional healers. Informants primarily consisted of community members such as fishermen, housewives, self-employed, and other residents who possess practical knowledge transmitted across generations and applied in everyday healthcare practices.

Residents aged 40 years and above (N=2,200), identified as actively and continuously practicing the use of medicinal plants for cough management in the study sites, comprised the study population across the five barangays. The criterion "actively and continuously practicing" was operationalized by including respondents who reported (i) current or recent use of medicinal plants for cough management within the past 12 months, and (ii) consistent or repeated use of such practices over time rather than occasional or one-time use. Ethnobotanical knowledge is often concentrated among older individuals due to long-term experiential learning and intergenerational cultural transmission. Several studies have shown that respondents aged ≥40 years possess substantially greater knowledge of medicinal plants, whereas younger individuals tend to have more limited familiarity with traditional practices (e.g., Dansou et al. 2021; Tahir et al. 2021; Rajoo et al. 2023; Gitima et al. 2025). Consequently, some local ethnobotanical studies prioritize or predominantly include respondents aged 40 years and above to ensure the reliability of data and the depth of indigenous knowledge documented (Cordero et al. 2023; Tiquio et al. 2024).

A total of 220 respondents were included in the study through snowball sampling, a widely employed non-probability sampling approach in ethnobotanical research for identifying individuals who possess specialized traditional knowledge that may not be evenly distributed within the general population. The objective of the study was not to achieve statistical representativeness of the entire population but rather to comprehensively document and validate local medicinal plant knowledge among knowledgeable community members. During data collection, recurring responses and highly consistent patterns of medicinal plant use became evident after approximately 200 interviews, indicating that data saturation had been achieved and that additional interviews were yielding little to no novel information. To further verify the consistency and reliability of the findings across the study sites, an additional 20 respondents were interviewed. The remarkably homogeneous responses among participants, particularly the widespread and repeated preference for *Coleus amboinicus* Lour. for cough management, further supported the attainment of saturation and the robustness of the ethnobotanical dataset. Although snowball sampling inherently carries a risk of selection bias due to the referral of participants through social networks, this limitation was minimized by initiating recruitment from multiple independent entry points across different social groups in the communities and by continuing interviews until thematic saturation and response consistency were attained. Respondents were interviewed at their convenience within their respective communities following established local ethnobotanical survey protocols (Cordero and Alejandro 2021; Cordero et al. 2022a, b, 2023, 2025; Tiquio et al. 2024).

The survey questions covered personal and demographic information, including age, sex, civil status, educational attainment, and occupation, as well as the medicinal plants used for cough management by the participants or their family members. Information on plant parts utilized, modes of preparation, and routes of administration was also documented. To validate the accuracy and consistency of the collected data, a focus group discussion involving 22 selected informants was conducted during an output validation meeting. The session

was facilitated by the Punong Barangay and served to verify, clarify, and corroborate the responses obtained during the individual interviews.

Plant collection and identification

Medicinal plant samples were collected with the assistance of informants, when available in their immediate surroundings or home gardens. Specimens were photographed for documentation. Voucher specimens were prepared by collecting three to five branches, preferably bearing reproductive structures, which were placed in newspaper and arranged to best reflect the plant's natural habit. The samples were treated with a substantial amount of denatured alcohol in polyethylene bags. After poisoning, specimens were transferred to fresh newspaper and placed in a plant press following the procedure of Cordero et al. (2022a). The pressed and dried specimens were subsequently mounted on herbarium sheets with complete documentation labels. All voucher specimens were accessioned and deposited at the Herbarium Sorsogonense of Sorsogon State University, Sorsogon, Bicol Region, Philippines.

Plant species were identified by comparing the collected specimens with reference images from The Co's Digital Flora of the Philippines (Pelser et al. 2011) and the Royal Botanic Gardens, Kew database (POWO 2024). These databases were also used to verify the scientific names and family classifications of the documented medicinal plants.

Ethnobotanical data analyses

The cited medicinal plants were documented at the species level whenever possible. The conservation status of each reported species was determined using the online database of the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (IUCN 2025) and the Department of Environment and Natural Resources (DENR) Administrative Order (DAO) No. 2017-11, which provides the list of threatened plant species and their categories (DENR 2017). The geographical distribution data were obtained from the Plants of the World Online database (POWO 2024). The Relative Frequency of Citation was employed to assess the cultural importance of the documented plant species. It is calculated using the formula RFC = Fc/N, where *Fc* represents the number of informants who mentioned a given species and *N* denotes the total number of participants (Cordero et al. 2022a, b). All analyses were performed using Microsoft Excel.

RESULTS AND DISCUSSION

Demographic profile of the participants

A total of 220 participants, all permanent residents of Calagna-an Island, Municipality of Carles, were surveyed through face-to-face interviews conducted from November 2022 to January 2023. The participants' ages ranged from 40 to 81 years, with a mean age of 60.5 years. Males comprised 119 respondents (54%), while females accounted for 101 (46%) (Table 1). Educational attainment was predominantly at the elementary level, with 132 participants (60%) having completed elementary education, followed by 76 (34.55%) who completed secondary education, and 12 (5.45%) who attained college-level education. Most respondents were married at the time of the interview (198; 90%). The highest proportion of informants was from Barangay Bito-on (25.45%), while the lowest proportion was from Punta Batuanan (13.64%). Fishing was the primary occupation (92; 41.82%), closely followed by housekeeping or homemaking (91; 41.36%). Demographic characteristics are summarized in Table 1. Associations between medicinal plant knowledge and sociodemographic variables were not statistically analyzed, as each informant reported only one to two plant species, limiting analytical robustness. The mean number of plants mentioned ranged from 1.43 to 1.88, as also shown in Table 1.

Medicinal plant diversity and composition

This study documented a total of 25 medicinal plant species belonging to 21 genera and 17 families (Table 2). Among the recorded genera, only four were represented by more than one species, namely *Allium*, *Jatropha*, *Coleus*, and *Citrus*. The families Lamiaceae and Euphorbiaceae were the most well represented, with four and three species, respectively. Species under Lamiaceae included *Clinopodium douglasii* (Benth.) Kuntze, *C. amboinicus*, *C. scutellarioides* (L.) Benth., and *Vitex arvensis* Gentallan, Sengun & M.B. Bartolome. The *Coleus* species were primarily cultivated, whereas *C. douglasii* and *V. arvensis* were commonly sourced from the wild. The Euphorbiaceae family comprised three species: *Euphorbia hirta* L., *Jatropha curcas* L., and *J. podagrica* Hook. All three species were generally collected from the wild, with *E. hirta* frequently occurring as a weed. Three families namely Amaryllidaceae, Asteraceae, and Rutaceae were each represented by two species, while the remaining 12 families were represented by a single species each (Table 2).

Most medicinal plants were collected within or near the sampling sites and were commonly cultivated in informants' home gardens or backyards for household use. Some species were obtained from nearby forested areas, whereas others occurred naturally as weeds throughout the community. Of the 25 documented species, 7 (28%) were exclusively cultivated, 9 (36%) were obtained solely from the wild, and 9 (36%) were sourced from both cultivated and wild environments (Table 2).

The documented medicinal plants exhibited four growth forms: herbs, trees, shrubs, and climbers. As illustrated in Figure 2, herbs constituted the most common growth form (36%), followed by trees (32%), shrubs (20%), and climbers (12%). Most herbaceous species were cultivated, whereas tree species were obtained from both wild and cultivated sources.

Table 1. Demographic profile of the respondents on Calagna-an Island, Carles, Iloilo, Philippines

Social Group	Variable	No. of Informants (n=220)	Percentage (%)	Number of plants mentioned (Mean)
Sex	Male	119	54.09	1.83
	Female	101	45.91	1.70
Age	40-49	78	35.45	1.75
	50-59	68	30.91	1.69
	60-69	57	25.91	1.82
	≥70	17	7.73	1.88
Civil status	Single	7	3.18	1.77
	Married	198	90.00	1.43
	Widowed	15	6.82	1.80
Education	Elementary	132	60.00	1.80
	Secondary	76	34.55	1.68
	College	12	5.45	1.83
Occupation	Housekeeper	91	41.36	1.82
	Farmer	9	4.09	1.55
	Fisherman	92	41.82	1.76
	Self-employed	23	10.45	1.60
	Employed	4	2.27	1.60
Location	Barangcalan	49	22.27	1.75
	Bito-on	56	25.45	1.00
	Punta Batuanan	30	13.64	1.50
	Talingting	48	21.81	2.62
	Tinigban	37	16.81	2.02

Leaves constitute the dominant plant part used, accounting for 80% of all reported preparations. This is followed by fruits and bulbs, each representing 8%, while rhizomes are the least utilized at 4% (Figure 3). Informants reported various methods of preparation and administration of medicinal plants. A total of six preparation methods were identified, with decoction being the most prevalent (69%), followed by pounding or crushing (14%) and soaking (7%). Other methods, including direct application of plant parts, steaming or heating, and chewing, were each reported by 3% of the respondents (Figure 4).

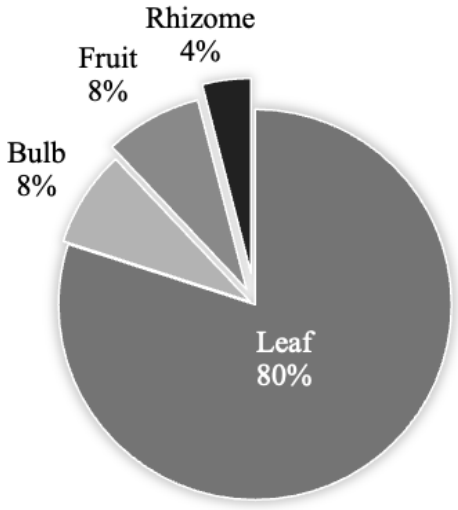

Figure 3. Medicinal plant parts used

Decoction typically involved boiling five, seven, or nine leaves, with the resulting extract administered orally. Remedies prepared through pounding or crushing (14%) were similarly consumed by drinking the expressed juice or extract. Other preparation methods, such as soaking (7%), heating or steaming, direct application, and chewing (each 3%), were less frequently practiced. Preparation of plant materials commonly followed a culturally embedded belief system that prescribes the use of odd-numbered quantities (e.g., 5, 7, or 9 leaves; five fruits; or three bulbs).

In terms of administration routes, most remedies were taken orally (84%), while 16% were applied topically (Table 2). Oral administration generally involved drinking decoctions prepared from five fruits of *Citrus* × *microcarpa* Bunge or seven leaves of *C. amboinicus*, or consuming extracts derived from seven crushed leaves of *Momordica charantia* L. Topical applications included soaking three sliced bulbs of *Allium sativum* L. in water or vinegar overnight and applying the mixture to the chest the following day, or placing three steamed or heated leaves on the chest overnight.

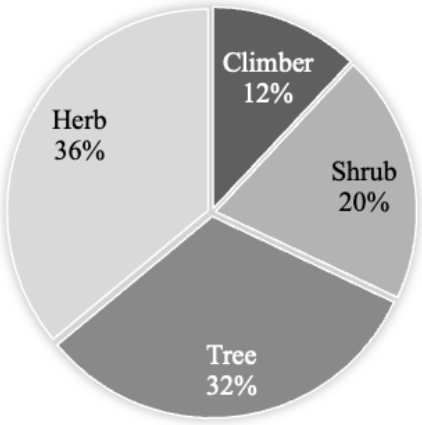

Figure 2. Medicinal plant growth forms

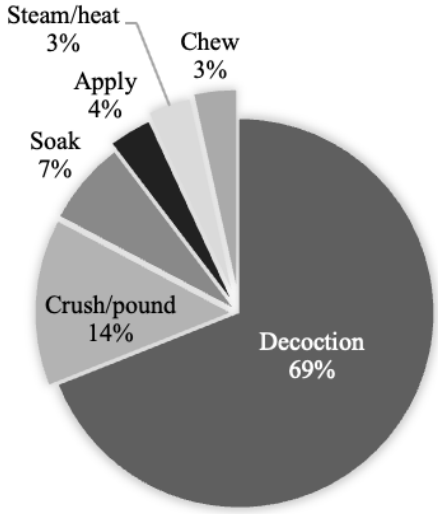

Figure 4. Medicinal plant preparation

Table 2. Medicinal plants used for cough treatment on Calagna-an Island, Carles, Iloilo, Philippines

Family name	Scientific name & accession number	Common name	FC	RFC	Plant part	Preparation and administration	Administration route	Collection	IUCN conservation status	Biogeographic origin	Growth habit
Acanthaceae	*Rhinacanthus nasutus* (L.) Kurz HS0250	*Tagak-tagak*	1	0.005	Leaf	Boil 7 leaves and drink decoction	Oral	Wild	Not evaluated	Native	Shrub
Amaryllidaceae	*Allium cepa* L. HS0251	*Sibuyas*	2	0.009	Bulb	Soak 3 sliced bulb in water or vinegar overnight then apply the mixture on the chest on the following day	Topical	Cultivated	Not evaluated	Non-native	Herb
Amaryllidaceae	*Allium sativum* L. HS0252	*Ahos*	3	0.014	Bulb	Soak 3 sliced bulb in water or vinegar overnight then apply the mixture on the chest on the following day	Topical	Cultivated	Not evaluated	Non-native	Herb
Anacardiaceae	*Mangifera indica* L. HS0253	*Indian mango*	3	0.014	Leaf	Boil 7 leaves and drink decoction	Oral	Both	Data Deficient	Non-native	Tree
Apiaceae	*Centella asiatica* (L.) Urb. HS0254	*Yahong-yahong*	1	0.005	Leaf	Boil 7 leaves and drink decoction	Oral	Wild	Least concern	Native	Herb
Araliaceae	*Heptapleurum ellipticum* (Blume) Seem. HS0255	*Lima-lima*	1	0.005	Leaf	Boil 7 leaves and drink decoction	Oral	Both	Least concern	Native	Shrub
Asteraceae	*Artemisia vulgaris* L. HS0256	*Artemisa*	6	0.027	Leaf	Boil 7 leaves and drink decoction; soak 7 leaves in warm water and drink	Oral	Wild	Not evaluated	Non-native	Herb
Asteraceae	*Blumea balsamifera* (L.) DC. HS0257	*Alibhon*	63	0.286	Leaf	Boil 7 or 9 leaves and drink decoction	Oral	Both	Least concern	Native	Shrub
Bixaceae	*Bixa orellana* L. HS0258	*Istiwitis*	1	0.005	Leaf	Boil 7 leaves and drink decoction	Oral	Both	Least concern	Non-native	Shrub
Cucurbitaceae	*Momordica charantia* L. HS0259	*Margoso*	10	0.045	Leaf	Boil 7 leaves and drink decoction; crush 7 leaves and drink extract	Oral	Cultivated	Not evaluated	Native	Climber
Euphorbiaceae	*Euphorbia hirta* L. HS0260	*Tawa-tawa*	2	0.009	Leaf	Boil 7 or 9 leaves and drink decoction	Oral	Wild	Not evaluated	Non-native	Herb
Euphorbiaceae	*Jatropha curcas* L. HS0261	*Kasla*	1	0.005	Leaf	Apply 5 or 7 leaves on the forehead	Topical	Wild	Least concern	Non-native	Shrub
Euphorbiaceae	*Jatropha podagrica* Hook. HS0262	*Ginseng*	2	0.009	Leaf	Boil 7 leaves and drink decoction	Oral	Wild	Not evaluated	Non-native	Shrub

Fabaceae	*Tamarindus indica* L. HS0263	*Sambag*	3	0.014	Leaf	Boil 7 leaves and drink decoction	Oral	Both	Least concern	Non-native	Tree
Lamiaceae	*Clinopodium douglasii* (Benth.) Kuntze HS0264	*Herba buena*	4	0.018	Leaf	Boil 5 leaves and drink decoction	Oral	Wild	Not evaluated	Non-native	Herb
Lamiaceae	*Coleus amboinicus* Lour. HS0265	*Oregano*	154	0.700	Leaf	Boil 7 leaves and drink decoction; crush or pound 7 leaves and drink the extract	Oral	Cultivated	Not evaluated	Non-native	Herb
Lamiaceae	*Coleus scutellarioides* (L.) Benth. HS0266	*Lampunaya*	40	0.182	Leaf	Boil 7 leaves and drink decoction; crush or pound 7 leaves and drink the extract	Oral	Cultivated	Not evaluated	Native	Herb
Lamiaceae	*Vitex arvensis* Gentallan, Sengun & M.B.Bartolome HS0267	*Lagundi*	43	0.195	Leaf	Boil 5 leaves and drink decoction	Oral	Wild	Least concern	Non-native	Shrub
Moringaceae	*Moringa oleifera* Lam. HS0268	*Malunggay*	2	0.009	Leaf	Boil 7 leaves and drink decoction	Oral	Both	Least concern	Non-native	Tree
Myrtaceae	*Psidium guajava* L. HS0269	*Bayabas*	5	0.023	Leaf	Boil 7 leaves or a handful of leaves and drink decoction	Oral	Both	Least concern	Non-native	Tree
Piperaceae	*Piper betle* L. HS0270	*Buyo*	1	0.005	Leaf	Apply 3 steamed or heated leaves on the chest overnight	Topical	Wild	Not evaluated	Native	Climber
Rutaceae	*Citrus maxima* (Burm.) Merr. HS0271	*Kabugaw*	1	0.005	Fruit	Boil 1 whole fruit and drink the decoction	Oral	Cultivated	Least concern	Non-native	Tree
Rutaceae	*Citrus × microcarpa* Bunge HS0272	*Simuyaw*	15	0.068	Fruit	Boil 1 or 5 whole fruits and drink the decoction	Oral	Both	Not evaluated	Non-native	Shrub
Solanaceae	*Capsicum frutescens* L. HS0273	*Katumbal*	3	0.014	Leaf	Boil 7 or 9 leaves and drink decoction; crush 7 or 9 leaves and drink extract	Oral	Both	Least concern	Non-native	Herb
Zingiberaceae	*Zingiber officinale* Roscoe HS0274	*Luy-a*	5	0.023	Rhizome	Chew a thumb-sized rhizome and swallow the extract; boil 9 slices and drink decoction; pound a thumb-sized and drink the extract	Oral	Cultivated	Data Deficient	Non-native	Shrub

Conservation status and origin

The conservation status of the documented medicinal plants was determined using the IUCN Red List of Threatened Species and the DENR Administrative Order (DAO) List of Threatened Plant Species and their Categories. None of the recorded medicinal plant species were included in the DAO list. According to the IUCN, the species were classified as Least Concern, Data Deficient, or Not Evaluated (Table 2). Of the 25 medicinal plant species recorded, 2 (8%) were classified as Data Deficient (*Zingiber officinale* Roscoe and *Mangifera indica* L.), 11 (44%) as Least Concern, and 12 (48%) as Not Evaluated (Table 2).

In terms of biogeographic origin, the majority of the documented species were non-native to the Philippines (72%), while only seven species (28%) were classified as native namely: *Rhinacanthus nasutus* (L.) Kurz, *Centella asiatica* (L.) Urb., *Heptapleurum ellipticum* (Blume) Seem., *Blumea balsamifera* (L.) DC., *M. charantia*, *C. scutellarioides*, and *Piper betle* L.. Most native medicinal plants are sourced from the wild. Many non-native species are cosmopolitan and commonly used as food plants, particularly as culinary ingredients and spices. Others are cultivated as ornamental plants, and some are invasive or weedy species.

Quantitative analyses

As shown in Table 2, the species with the highest Relative Frequency Citation (RFC) was *C. amboinicus* (0.70), followed by *B. balsamifera* (0.286), *V. arvensis* (0.195), and *C. scutellarioides* (0.182). *C. amboinicus* was the most frequently cited species, reported by 154 informants. It is commonly prepared either by boiling seven leaves to produce a decoction or by crushing or pounding seven leaves to extract the juice for oral administration. The species is typically cultivated in home gardens for medicinal purposes. *Blumea balsamifera* was cited by 63 informants and is obtained from both cultivated sources and the wild. It is usually prepared by boiling seven or nine leaves and consuming the resulting decoction. *V. arvensis* was cited by 43 informants and is sourced primarily from the wild; it is prepared by boiling five leaves to produce a decoction for oral intake. Similarly, *C. scutellarioides* is commonly prepared by boiling seven leaves for decoction or by crushing or pounding seven leaves to obtain an extract for oral administration. This species is likewise cultivated in home gardens and maintained primarily for its medicinal use. The remaining species showed substantially lower citation frequencies. Twelve species were cited by only two to six informants, one species, *Citrus* × *microcarpa* (RFC=0.068) was cited by 15 informants, and seven medicinal plants were cited by only one informant each.

Discussion

The 25 medicinal plant species belonging to 17 families documented in this study indicate a moderate diversity of therapeutic flora supporting respiratory healthcare in Calagna-an Island. The predominance of Lamiaceae is consistent with ethnobotanical studies on respiratory ailments in other regions and likely reflects the family's abundance of bioactive compounds with antimicrobial, anti-inflammatory, and immunomodulatory properties, as well as the ease of cultivating many of its species (Mohsenzadeh et al. 2016; Kianmehr et al. 2023; Shawarb et al. 2023; Teka and Maryo 2023). Species richness in the present study was generally higher than that reported in several Philippine communities but lower than inventories from Mina, Iloilo and Iran, while remaining comparable to findings from East Java, Indonesia (Mohsenzadeh et al. 2016; Cordero et al. 2020, 2022b, 2023, 2025; Cordero and Alejandro 2021; Ekasari et al. 2025; Pardo and Paranada 2025). These differences likely reflect variations in local biodiversity, cultural transmission of ethnomedicinal knowledge, healthcare accessibility, and the extent of ethnobotanical documentation across regions.

The predominance of herbs and extensive use of leaves likely reflect their accessibility, ease of cultivation, rich bioactive composition, and sustainable harvestability. Similar patterns have been widely documented in ethnobotanical studies from the Philippines and other regions, suggesting common adaptive strategies in traditional plant-based healthcare systems (Bussmann and Glenn 2010; Lawal et al. 2020; Shawarb et al. 2023; Teka and Maryo 2023; Sharif et al. 2024).

Decoction was the most common preparation method, likely reflecting its effectiveness in extracting water-soluble bioactive compounds and the community's preference for simple, accessible aqueous remedies. The continued use of odd-numbered plant parts further illustrates the integration of symbolic beliefs with practical healing traditions. Similar patterns have been documented in ethnobotanical studies from Panay Island and other regions, including Nigeria, Ethiopia, Palestine, Peru, and the Philippines (Bussmann and Glenn 2010; Cordero et al. 2020, 2022a, b, 2023; Lawal et al. 2020; Cordero and Alejandro 2021; Shawarb et al. 2023; Teka and Maryo 2023; Tiquio et al. 2024; Pardo and Paranada 2025).

The high RFC values of *C. amboinicus*, *B. balsamifera*, and *V. arvensis* indicate strong cultural consensus regarding their effectiveness for cough management. These species are also widely reported as cough remedies in indigenous, rural, and urban communities across Panay Island and other regions of the Philippines, suggesting broad ethnomedicinal recognition (Cordero et al. 2020, 2022a, b, 2023, 2025; Cordero and Alejandro 2021; Flores et al. 2025; Guimbuayan et al. 2025; Pardo and Paranada 2025). The tendency of respondents to rely on only one or two medicinal plants further suggests a selective, experience-based therapeutic strategy in which a few trusted and accessible remedies are preferentially retained and repeatedly used. Pharmacological studies support this cultural preference, as these taxa contain diverse bioactive compounds with demonstrated antimicrobial, antioxidant, anti-inflammatory, and antitussive activities, with *V. arvensis* additionally exhibiting clinically validated bronchodilatory and cough-relieving effects (WHO 1998; Arumugam et al. 2016; Alegado-Bagaoisan et al. 2020; Kumar et al. 2020; Jirakitticharoen et al. 2022; Perveen et al. 2022; Wang et al. 2023; Filipe et al. 2025). Collectively,

these findings identify these species as priority candidates for further phytochemical and pharmacological investigations.

The predominance of non-native species in the local pharmacopeia reflects a long history of plant introduction and cultural integration in the Philippines, a pattern likewise reported for respiratory medicinal plants in Peru (Bussmann and Glenn 2010). Although none of the documented species are listed as nationally threatened and most are categorized as Least Concern, nearly half remain Not Evaluated by the IUCN, indicating uncertainty rather than security. Consequently, the apparent abundance of these species should be interpreted cautiously, particularly for frequently utilized taxa collected from wild populations. The continued reliance on wild-harvested native species raises potential conservation concerns, as sustained use and habitat alteration may threaten local populations despite the absence of formal threat classifications. Given the important role of traditional medicine in geographically isolated communities, future research should prioritize pharmacological validation of culturally salient species and ecological monitoring of wild native taxa to support both biodiversity conservation and sustainable community healthcare.

In conclusion, this study demonstrates that traditional medicinal knowledge for cough management remains an important component of primary healthcare on Calagna-an Island despite geographic isolation and limited access to formal medical services. The tendency of respondents to rely on only one or two preferred medicinal plant species suggests a selective and experience-based therapeutic strategy in which a few trusted and culturally validated remedies are retained and repeatedly used across generations. The high consensus surrounding *C. amboinicus*, *B. balsamifera*, and *V. arvensis* highlights their cultural importance and identifies them as priority taxa for pharmacological investigation. At the same time, the continued dependence on medicinal plants, including several wild-harvested native species, underscores the need to integrate ethnomedicinal knowledge with biodiversity conservation and community healthcare initiatives. By documenting and validating these practices, this study provides a foundation for preserving biocultural heritage, promoting the sustainable management of medicinal plant resources, and informing culturally responsive healthcare strategies for geographically isolated island communities.

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