International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 5, 2025
https://theaspd.com/index.php

Documentation Of Polyherbal Formulations In Dolo, Bansalan, Davao Del Sur, Philippines

Arven Jay Alao Artucilla[1], Mark Anthony J. Torres[2,3], Augie E. Fuentes[4,5], Jayson R. Pucot[5,6]
[1] Institute of Teacher Education, Davao del Sur State College, Matti, Digos City, 8002 Davao del Sur, Philippines
[2]Department of Biological Sciences, MSU- Iligan Institute of Technology, A. Bonifacio Ave., Iligan City, 9200 Lanao del Norte
[3]Office of the Vice Chancellor for Strategic Initiatives, MSU- Iligan Institute of Technology, A. Bonifacio Ave., Iligan City, 9200 Lanao del Norte
[4]Office of the President, Davao del Sur State College, Matti, Digos City, 8002 Davao del Sur, Philippines
[5]Institute of Graduate and Professional Education, Davao del Sur State College, Matti, Digos City, 8002 Davao del Sur, Philippines
[6]Department of Biology, Institute of Mathematics, Arts and Sciences, Davao del Sur State College. Matti, Digos City, 8002 Davao del Sur, Philippines, jaysonredelosa.pucot@gmail.com

Abstract. *This study presents the first survey of the knowledge, practices, and use of polyherbal formulations among the residents of Dolo, Bansalan, Davao del Sur, Philippines, to preserve this knowledge and explore its therapeutic applications. Using ethnographic qualitative research methods, key informants—including shamans, traditional birth attendants, masseurs, and herbal oil makers—were interviewed. Thirty-two (32) polyherbal formulations were identified, primarily composed of plant-based ingredients (68.75%), with some incorporating commercially available items (31.25%). These formulations treat various health conditions, such as gastrointestinal pain, fever, wounds, postpartum care, and poisoning. The study also documented unique plants, such as efficacient na kahoy, named for its menthol-like scent, and bulanganon, a vine described to have distinct, broad leaves commonly hanging around tall tropical trees to treat wounds and body pains. Distinctive practices were observed, including tandok, ABC, and mixing coconut oil with medicinal plants and naphthalene balls to manage body pain and colic during pregnancy—highlighting traditional medicinal practices and cultural adaptation while raising potential safety concerns. This knowledge has been passed down through generations and attributed to spiritual guides, ancestors, and parents. Sociodemographic analysis revealed that female practitioners predominated (85.7%), most of whom had only completed primary education. The study underscores the importance of documenting traditional healthcare practices to preserve cultural knowledge and support future pharmacological research. The findings suggest the potential for discovering novel bioactive compounds and emphasize the need for safety assessments and education on proper usage to mitigate risks associated with traditional medicine.*

Keywords: *Cocos nucifera (coconut), Cultural Heritage, Ethnography, Spiritual Guides, ABC polyherbal formulation*

1. INTRODUCTION

The use of plants as medicine is as old as the greatest and oldest civilizations in history, and its usage can extend from different plants to several animal products and minerals that are still used today (Metwaly et al. 2021). The World Health Organization (WHO) highlights that using plants in traditional medicine, even in recent times, plays a crucial role in achieving Universal Health Care (Rankoana 2022). Thus, much attention is given to understanding plants and elucidating biochemical components and bioactivity responsible for their therapeutic effect (Suwardi et al. 2020; Mazumber and Hussain 2021; Pucot et al., 2021a; Julung et al. 2023).

Across the globe, countries rely heavily on traditional medicine for many reasons, including deep-rooted cultural acceptance and widespread availability (Yadav et al. 2020). Ayurveda and Traditional Chinese Medicine (TCM) systems are widely accepted and utilized in countries like India and China. For instance, the classics Ayurveda alone, i.e., Charaka Samhita and Sushruta Samhita, have more than 700 medicinal plants and 8000 formulations of varied modes of preparation and pharmacological benefit (Mukherjee et al. 2017). Efforts to document traditional healing systems of different cultures and places have also been

evident in recent years, such as in Southern Africa (Van Vuuren et al. 2022), Pakistan (Amjad et al. 2020), Nigeria (Lawal et al. 2020) and even in conjunction with the recent health concerns (e.g., COVID-19) (Odebunmi et al. 2022). Documentation of traditional healthcare plays a crucial role in addressing various health concerns, enriching the healthcare landscape.

Reports show that medicinal plants are not only used individually but in combination with other ingredients, e.g., herbal plants and non-plant-based ingredients (Mukherjee et al. 2017; Dapar et al. 2020; Pucot et al. 2021b). Thus, documenting medicinal plants, particularly polyherbal formulations, is essential for understanding the synergistic interactions between plants and other ingredients. One example is the 187 polyherbal formulations surveyed in Africa, which gave information about herb-herb and herb-animal formulations and diseases commonly treated in the area (Van Vuuren et al. 2022). Another notable study that emphasizes the importance of investigating synergistic interactions of polyherbal formulations is the study on Tetradium ruticarpum, a medicinal plant widely used in Traditional Chinese Medicine (TCM) due to its diverse bioactive components. Long-term use or excessive doses can lead to potential toxicity (Shan et al. 2020). To mitigate this risk, TCM practitioners typically combine T. ruticarpum with other herbs to not only achieve a synergistic therapeutic effect but also to reduce the likelihood of toxicity (Shan et al. 2020). Further, Bentong (Piper nigrum), Citrofortunella macrocarpa, and honey from Apis dorsata have been found to have antioxidant and synergistic properties (Yap et al. 2023). Herbal formulations have also played a role in health maintenance during the recent pandemic due to the known antioxidant properties of herbal plants (Kaya et al. 2021) and as a treatment for different diseases e.g., psoriasis (Yadav et al. 2024); diabetes (Bisht et al. 2021), anti-obesity (Pandeya et al. 2021), anticancer (Pucot et al. 2019), antibacterial and anti-inflammatory (Mandrika et al. 2021), urinary tract infection (Abbas et al. 2021).

Being one of the most biodiverse hotspots in the world, the Philippines is home to more than 10,000 species of vascular plants (Meñiza et al. 2024). This rich plant diversity is coupled with the rich traditional healthcare system of different communities in the country, making ethnobotanical studies rich, as evident in many indigenous and local communities from Luzon, Visayas, and Mindanao (Balangcod and Balangcod 2011; Pucot and Demayo 2021c). Mindanao, being the original inhabitants of Filipinos, the Indigenous Peoples or Lumad, the island harbors cultural diversity, and in the past years, previous reports noted that locals and the Indigenous Peoples utilize plants for basic health care (Pucot and Demayo 2021c). Nevertheless, most herbal documentation heavily focused on mono-herbal and plant utilization, such as (Naïve et al. 2021; Nuñeza et al. 2021), with minimal literature on polyherbal formulations. Nevertheless, numerous regions and practices in the Philippines have not yet been studied, and the threat of losing this knowledge and practice continues, reiterating the importance of this study.

This study aims to document the polyherbal formulations used by the locals in Dolo, Bansalan, Davao del Sur and understand the qualitative aspect of using polyherbal formulations with the significance of preserving local traditional practices.

2. MATERIALS AND METHODS

2.1. Study area

The study was conducted in barangay Dolo in the Municipality of Bansalan, Davao del Sur (Figure 1) (6.8080 N, 125.1931 E), a village or barangay near but outside Mount Apo and encompassing a total area of 871.78 hectares, divided into eight districts or Purok. Brgy. Dolo is an agricultural landscape consisting of rice and coconut plantations. Localities are mainly composed of three ethnicities: Cebuano, Ilonggo, and Ilokano. The research locale has one clinic situated near the barangay hall and a medical hospital within three kilometers.

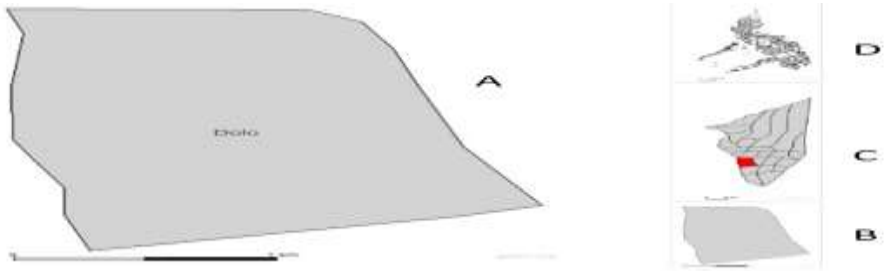

Figure 1. Map of the Dolo (A), Bansalan (B), Davao del Sur (C), Philippines (D).
Source: https://gadm.org/maps/PHL/davaodelsur/bansalan/dolo.html

2.2. Data Collection and Analysis

The study employed snowball and purposive sampling techniques, selecting participants based on an ethnographic qualitative research design. Key informants included: (1) Manambalay (shamans), believed to have the ability to communicate with spirits to perform healing practices addressing both spiritual and physical well-being; (2) Mananabang (doulas), those who assist during childbirth; (3) Manghihilot (masseurs or masseuses) and (4) Maglalana (traditional oil-based ointment maker), individuals who concoct ingredients using coconut oil as medium.

Interviews were then conducted using semi-structured questionnaires adapted from previous studies (Dapar et al. 2020; Pucot and Demayo 2021b). The questionnaire was contextualized by the authors and then reviewed and validated by a social science professor and researcher. Data on polyherbal formulations were analyzed and categorized using Microsoft Excel. The following data were classified into columns: code name, ingredients (local/vernacular name), ingredients (common/English name), scientific name, plant parts used, application, preparation, mode of utilization, and adverse effects. Respondents were asked to describe the medicinal applications in detail to ensure an accurate translation—a local nurse from the Barangay Health Unit of Brgy. Dolo translated, reviewed, and certified the English translation of the medicinal applications for accuracy.

Guided fieldwork was conducted with the respondents to identify components of the polyherbal formulations. No plants were collected; however, photographs were taken whenever samples were available. Polyherbal medicines were classified using codes combining three elements: (1) area source, (2) participant source, and (3) a specific polyherbal medicine code represented by lowercase letters. For instance, Prk5A-a and Prk5A-b represent two different polyherbal medicines from respondent A of Purok 5 (abbreviated as Prk). Note that Purok is a smaller unit within a barangay or village.

Following the documentation and interviews, a focus group discussion (FGD) was conducted to analyze the responses and establish a shared understanding among participants. The respondents' experiences and the origins of their folkloric knowledge were presented using a narrative approach. Participants were identified using "P" followed by a numerical designation (e.g., P1 and P2 denote two distinct participants) to ensure clarity and consistency. Additionally, a local historian and a grammarian reviewed and certified the verbatim English translation of the interview and FGD transcripts.

2.3. Consent and Ethical Certification

The research was conducted in accordance with the National Ethical Guidelines Involving Human Participants set by the Philippine Health Research Ethics Board (PHERB, 2022). Permission and certification from the relevant local government units and agencies were obtained prior to the study. A certificate was also secured from the National Commission on Indigenous Peoples (NCIP) to confirm that the participants were not members of Indigenous Cultural Communities/Indigenous Peoples (ICCs/IPs) and that no rights of the ICCs/IPs were violated. Additionally, the Cor Jesu College Research Ethics Committee reviewed and approved the study protocol and the informed consent form (ICF) (Reference: DSSC-2023-01).

3. RESULTS AND DISCUSSION

3.1. Profile of the Respondents

Most of the respondents in the study were females (85.7%) and predominantly married (85%). Participants' ages ranged from 30 to 65. Although previous research indicates a direct correlation between age and folkloric knowledge (Olowa and Demayo 2015), the findings of this study indicate an inverse trend, with the youngest participant demonstrating the highest level of folkloric knowledge. This discrepancy may be attributed to the fact that the youngest respondent of this study is a second-generation healer who inherited ethnomedicinal knowledge from both parental lineages at an early age.

In terms of gender, female participants exhibited a stronger association with folkloric practices, a pattern consistent with findings of other studies conducted in the country (Naïve et al. 2021; Pucot and Demayo 2021b). This trend is likely influenced by women's predominant role in household settings, facilitating the transmission and preservation of folkloric traditions (Tantengco et al. 2018).

Most of the respondents in this study were elementary graduates (71.4%), followed by high school graduates (28.6%). Additionally, participants' profiles indicate that most respondents are farmers (85.71%), which can be attributed to the predominantly agricultural nature of the area. Many respondents

also practice traditional massage or hilot (57.1%), specializing in prenatal, postpartum, and child health care. These practitioners are also recognized as traditional birth attendants (Landicho 2022).

The findings of this study further revealed a distinct pattern in the distribution of polyherbal knowledge about the participants' sociodemographic profiles as confirmed also in the focus group discussions (Fig. 2). A comprehensive demographic profile of the respondents is shown in Table 1.

Table 1. Demographic profile of the respondents from Dolo, Bansalan, Davao del Sur

DEMOGRAPHIC CHARACTERISTICS	f	PERCENTAGE
Sex		
Male	1	85.7
Female	6	14.3
Total	7	100
Age Range		
35-44 years old	1	14.3
45-64 years old	5	71.4
65 and older	1	14.3
Total	7	100
Civil Status		
Single	1	14.3
Married	6	85.7
Total	7	100
Educational Attainment		
Elementary	5	71.4
High School	2	28.6
Total	7	100
Occupation		
Farmer	6	85.71
Dried Fish Vendor	1	14.29
Total	7	100
Family Monthly Income		
Low Income but not Poor	2	28.6
Lower Middle Income	5	71.4
Total	7	100
Folkloric Practice		
Hilot (Masseur and Masseuse)	4	57.1
Traditional Oil Maker	1	14.3
Traditional Snake Bite Healer	1	14.3
Manambalay (Healer)	1	14.3
Total	7	100

Figure 1. Focus group discussions with the respondents from Dolo, Bansalan, Davao del Sur.

3.2. Polyherbal formulations used by the locals of Dolo, Bansalan, Davao del Sur

The survey identified and documented 32 polyherbal formulations, as shown in Table 2. Most of these formulations are plant-based ingredients (68.75%), while a smaller proportion (31.25%) incorporates commercially available products. Unique characteristics of the polyherbal formulation were also recorded, some of which have no direct English translation. One particular example is efficacient na kahoy, named for its scent, which resembles menthol. Another example is Bulanganon, described by the respondents as a vine with distinct, broad leaves commonly hanging around tall tropical trees. The roots of these vines are extracted to treat wounds and body pains. Bulanganon is typically used on its own but is also reportedly combined with coconut oil concoctions.

In addition, fresh leaves were preferred by the respondents, as they believed that fresh leaves are more potent than dried or pliant ones. Drying leaves were also found to affect the nutrients they contain, e.g., the impact on antioxidants (Babu et al. 2018). The most used ingredient is guava (Psidium guajava), which is mentioned in eight formulations. Guava has long been used in the Philippines primarily for skin diseases and wounds (Díaz-de-Cerio et al. 2017), as it is a common backyard plant adaptive to any soil type. Guava leaves contain various pharmacological properties: antibacterial, antiproliferative, anti-inflammatory, antidiabetic, antimicrobial, antioxidant, and anti-tumor (Díaz-de-Cerio et al. 2017). In addition, it is also considered an alimentotherapy (Deguchi and Miyazaki gum); along with the mixture of other ingredients, the potency of these formulations contributes to its efficacy. Thus, suggest a further investigation.

3.3. Medicinal Application and Utilization

Respondents frequently mentioned coconut (Cocos nuficera) as the primary component of polyherbal formulations (31.25%) (i.e., polyherbal formulations: Prk5A-d, Prk5B-f, Prk5B-j, Prk6A-a, Prk6A-b, Prk6A-c, Prk7A-a, Prk7A-c, Prk8A-a, Prk8A-d). The formulations can be applied externally and internally (oral consumption) for various purposes, including treating body pain, toothaches, wounds, and animal bites.

According to P6, coconut oil is an indispensable composition of polyherbal formulations, particularly in “Lana na uli”. The name of this formulation is derived from the Cebuano word “Ulian,” which means “to restore”- in this context, to restore one’s health. Notably, the formulation is also used to treat animal bites, specifically snake bites.

In treating a snake bite, the respondent performs“tandok”- a procedure in which a small incision is made at the bite site to release the venom. Healer-chewed guava leaves and Lana na uli are then applied to the incision. After the procedure, the patient is advised not to bathe for three (3) consecutive days. Although the procedure and the use of Lana na uli and Tandok have been found effective, respondents acknowledge that snake bites can be potent and may sometimes lead to immediate death. This underscores the need for pharmacovigilance and further study on the effects of lana na uli and tandok concerning various types of snake venom.

In addition, unique ingredients were also documented in this study. For example, soda, burnt rice, and ice were commonly used in the treatment of “pasmo”, a condition characterized by a sudden feeling of cold and fatigue caused by skipping meals or not eating enough food, which was also described in other studies (Pucot and Demayo 2021b). The formulation is applied through vapor inhalation, boiling the ingredients in a pot. Alternatively, charcoal can be burned and placed inside a pot containing the formulation to release the vapor essence. The streaming formulation is then placed under a chair where the patient sits, covered with blankets to ensure no steam escapes. The procedure takes only a few minutes, after which patients are advised to wear jackets, socks, and head bonnets and to remain confined in a closed room for the day.

Noticeably, formulations, i.e., the ABC formulation, associated with treating gastrointestinal illnesses, relapse, and fever, were frequently mentioned, as also observed in another study (Pucot and Demayo 2021b). This formulation follows a mnemonic: A for Avocado (Persea americana), B for Bayabas (Psidium guajava), and C for Caimito (Chrysophyllum cainito). However, respondents noted that the composition of ABC can vary as long as the ABC mnemonic is maintained. For instance, avocado may be substituted with atis (local name) or sugar apple (Annona squamosa).

Another interesting plant is Lunas, a key ingredient cited for curing poison. The plants were not found during the supervised field walks; thus, documentation and the scientific name were not identified. However, Lunas, as described by the respondents, is a vine plant commonly found climbing tall trees. Its

International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 5, 2025
https://theaspd.com/index.php

Code	Polyherbal	Vernacular Name	Common English Name	Scientific name	Plant Parts Used*	Medicinal application	Preparation and mode of utilization	Adverse effect
Prk1A	a	Mangga	Mango	Mangifera indica	Lvs	Gastrointestinal pain, fever, migraine, fatigue, relapse, body pains, flatulence	Boil leaves (dried or fresh) in water, and drink the decoction. Drink as needed.	None
		Labana	Soursop	Annona muricata	Lvs			
		Gabon	Sambong	Blumea balsamifera	Lvs			
		Atis	Custard Apple	Annona squamosa	Lvs			
		Mangoosteen	Mangosteen	Garcinia mangostana	Lvs			
Prk5A	a	Abokado	Avocado	Persea americana	Lvs	Amoebiasis	Boil fresh leaves and drink the decoction. Pour 1 glass and drink three times a day or two times a day (in the morning and afternoon). Drink as symptoms subside.	Overdose can lead to constipation
		Tambis	Java Rose Apple	Syzygium samarangense	Lvs			
		Makupa	Malay Apple	Syzygium malaccense	Lvs			
		Bayabas	Guava	Psidium guajava	Lvs			

1 Table 2. Polyherbal Formulations documented at Dolo, Bansalan, Davao del Sur, Philippines
2

1

	b+	Asunting	Candle bush	Senna alata	Lvs	Typhoid fever, cold, fatigue	Boil Asunting leaves over an open flame and pound to extract juice. In a few seconds, lay unrefined salt (that has clumped together) into direct-burning charcoal. Mix all the ingredients and drink as needed.	None
		Luy-ang dilaw	Turmeric	Curcuma longa	Rhz			
		Asin (tibuok)	Salt	Sodium Chloride				
	c	Busikad	Whitehead Spikesedge	Kyllinga monocephala	Lvs	Relapse, fever	Pound ingredients to extract juice. Drink as needed or use extra juice to massage into joints.	None
		Ubod sa Saging na sab-a na puti	Plantain	Musa ssp.	Stlk (young)		Apply extracts to muscle pain.	
	d+	Luy-a	Ginger	Zingiber officinale	Rhz	Fatigue, headache, fever, body pains	Saute ingredients in coconut oil until brown. Gather all in a receptacle and submerge in coconut oil. Add menthol candy for aroma. Use externally, directly on the affected area.	None
		Ahos	Garlic	Allium sativum	Blb			
		Tanglad	Lemon grass	Cymbopogin citratus	Stlk			
		Sili	Chili	Capsicum spp.	Frt			
		Lana	Coconut oil	Cocos nucifera				
		Mentos/mintol kendi	Menthol candy					
Prk5B	a	Tanglad	Lemon grass	Cymbopogon citratus	Rt/stlk	Stomachache, diarrhea	Baste ingredients in water. Drink as needed.	None
		Busikad	Whitehead spikesedge	Cyperus kyllingia	Lvs			
	b	Mansanitas	Singapore cherry	Muntingia calabura	Lvs	Diabetes	Boil or baste in water. Drink as needed or use as supplement.	None
		Sili	Chili	Capsicum spp.	Rt			

	c	Bungan na saging	Plantain	Musa spp.	Stlk	Relapse	Broil ingredients to extract sap and mix together. Drink decoction.	None
		Sab-a na saging	Plantain	Musa spp.	Stlk			
		Buli	Buri palm	Corypha elata	Stlk/petiole			
	d	Bulanganon	N/A	N/A	Rt	Gastroinstestinal pains	Boil in water. Drink as needed.	None
		Labana	Soursop	Annona muricata	Lvs			
		Bayabas	Guava	Psidium guajava	Lvs			
	e+	Kapayas	Papaya	Carica papaya	Lvs	Dengue	Pound papaya leaves and mix with honey when cool. Drink three or two times a day until symptoms subside.	None
		Dugos	Honey					
	f+	Pula na lubi	Dwarf Malayan yellow coconut	Cocos nucifera	Frt peel (young)	Pasmo (description: trembling muscles due to a lapse in eating)	Boil ingredients in a pot; use for vapor inhalation therapy. Do it only once.	None
		Tanglad	Lemon grass	Cymbopogon citratus	Whl			
		Kok/Coke	Soda					
		Ays	Ice					
		Dukot	Burnt rice					
	g	Handamay	Stevia	Stevia rebaudiana	Lvs	Wounds and skin infection	Pound ingredients and apply directly unto affected area.	None
		Efficacient na kahoy			Wd			
	h	Simuyaw	N/A	N/A	Lvs	Hair loss	Mix ingredients. Use as shampoo.	None
		Alu vera	Aloe vera	Aloe vera	Lvs (extract)			
	i	Abokado	Avocado	Persea americana	Lvs	Stomachache	Boil leaves and drink as needed	None
		Bayabas	Guava	Psidium guajava	Lvs			
		Caimito	Star Apple	Chrysophyllum cainito	Lvs			
	j+	Lunas	N/A	N/A	Brk	Poison	Cook ingredients in coconut oil and drink when poisoned.	None
		Lana	Coconut oil	Cococ nucifera	Fr			
		Tapol na tawas	Alum	Potassium alum				

Prk6A	a	Lana	Coconut oil	Cocos nucifera	Fr	Cough , sprain, colic, fever	Cook ingredients in coconut oil except for betel leaves. Apply directly onto the skin, massage, and apply Boyo leaves to painful or affected areas (externally).	None
		Gabon	Sambong	Blumea balsamefera	Lvs			
		Luy-a	Ginger	Zingiber officianale	Rhz			
		Kalabo	Oregano	Origanum vulgare	Lvs			
		Boyo	Betel plant	Piper betle	Lvs			
	b	Lana na uli	Coconut oil (preformulated with herbal roots)	Cocos nucifera	Fr	Snake bites, dog bites, cat bites, and insect bites	Drink the coconut oil and apply munched guava leaves to the wound, followed by a drop of coconut oil. Lastly, bandage with guava leaves. Do not take a bath after 3 days. Use after being bitten.	None
		Bayabas	Guava	Psidium guajava	Lvs			
	c	Lana na uli	Coconut oil (preformulated with herbal roots)	Cocos nucifera	Fr	Skin diseases	Pound fresh galangal and guava leaves and apply to the skin with coconut oil.	None
		Panyawan		Tinospora rumphii	Lvs			
		Bayabas	Guava	Psidium guajava	Lvs			
Prk7A	a	Luy-a	Ginger	Zingiber officinale	Rhz	Gastrointestinal pains, body pains, colic, flatulence	Cook dried ginger in coconut oil. Directly apply to the skin (affected area).	None
		Lana	Coconut oil	Cocos nucifera				
	b^+	Ahos	Garlic	Allium sativum	Blb	Asthma, cough, cold, body pains, arthritis	Cook dried garlic, dried sambong leaves, dried betel plant leaves. Mix naphthalene balls. Apply when needed (externally).	None
		Gabon	Sambong	Blumea balsamifera	Lvs			
		Boyo	Betel plant	Piper betle	Lvs			
		Moth balls	Naphthalene balls					
	c^+	Panyawan		Tinospora rumphii	Stlk	Colic, relapse	Cook in coconut oil. Add naphthalene balls. Apply when needed.	None
		Lana	Coconut oil	Cocos nucifera				

		Moth balls	Naphthalene balls					
	d+	Tuba-tuba	Barbados nut	Jatropha curcas	Stlk	Body pains, gastroinstestinal pains during pregnancy	Baste all ingredients in wintergreen ointment. Use as needed.	None
		Gabon	Sambong	Blumea balsamifera	Stlk			
		Luy-a	Ginger	Zingiber officinale	Rhz			
		Winter green						
		Alcohol						
		Moth balls	Naphthalene balls					
	e+	Sibukaw	N/A	N/A	Wd	Relapse, arthritis, hyperuricemia, dengue	Baste sappan wood in rice wine, for a week and drink as needed.	None
		Shiok tong	Rice wine					
	f+	Lagnub	White-ven fig	Ficus septica	Rt	Relapse, body pains	Directly laid ingredients into a burning coal; used in steam inhalation theraphy. Use once.	None
		Coke	Soda					
		Ice						
		Dukot	Burnt- rice					
	g	Kipi-kipi	Sensitive plant	Mimosa pudica	Rt	Relapse	Baste ingredients roots in water. Drink 1 glass serving a day until symptoms subside	None
		Iskuba	Common wireweed plant	Sida acuta	Rt			
		Tuway-tuway	Cobblers peg	Soliva anthemifolia	Rt			
Prk7B	a	Busikad	Whitehead spikesedge	Cyperus kyllingia	Lvs	Fever (teething babies)	Boil or baste into water. Drink as needed	None
		Bila-bila	Goosegrass	Eleusine indica	Lvs			
		Bayabas	Guava	Psidium guajava	Lvs			
		Kogun	Cogon grass	Imperata cylindrica	Fwr (spikelet)			
	b	Panyawan		Tinospora rumphii	Wd	Diabetes, arthritis, relapse, body pains, hypertension, urinary tract infection	Boil ingredients and drink three times a day until symptoms subsides	None
		Bayabas	Guava	Psidium guajava	Lvs			
		Gabon	Sambong	Blumea balsamifera	Lvs			
	c	Banag	N/A	N/A	Rt	Relapse		None

		Kakaw	Cacao	Theobroma cacao	Rt		Boil or baste ingredients. Drink as needed	
		Kape	coffee	Coffea spp.	Rt			
Prk8A	a	Gabon	Sambong	Blumea balsamifera	Lvs	Flatulence, Urinary tract infection, cough	Boil fresh leaves of sambong and galangal, drinking as needed. Lay Barbados nut leaves in the affected area, drinking as needed.	None
		Panyawan		Tinospora rumphii	Lvs			
		Tuba-tuba	Barbados nut	Jatropha curcas	Lvs/Stlk			
		Lana	Coconut oil	Cocos nucifera	Fr			
	b	Labana	Soursop	Annona muricata	Lvs	Flatulence, colic, relapse	Boil fresh leaves and drink decoction, as needed.	None
		Hilbas	Artemisia	Artemisia spp.	Lvs			
		Bila-bila	Goose grass	Eleusine indica	Lvs			
		Kalabo	Oregano	Origanum vulgare	Lvs			
	c	Abokado	Avocado	Persea americana	Lvs	Stomachache	Boil fresh leaves. Drink decoction as symptoms subsides	None
		Bayabas	Guava	Psidium guajava	Lvs			
		Mansanitas	Singapore cherry	Muntingia calabura	Lvs			
	d	Sambag	Tamarind	Tamarindus indica	Rt	Amoebiasis, pregnancy relapse (postpartum care)	Boil ingredients. Drink decoction three times a day until symptoms subsides or bleeding stops (in pregnancy relapse)	None
		Kaimito	Star apple	Chrysophyllum cainito	Rt			
		Bayabas	Guava	Psidium guajava	Lvs			
		Lubi na limbahun	Coconut	Cocos nucifera	Frt			
		Lagnub	White vein fig	Ficus septica	Lvs			

2 Legend: *: St: stem; Br: bark; Rh: ribosome; Rt: roots; Lvs: leaves; Sp: sap; Fr: fruit; Fwr; Flower Wh: whole plant; +: formulations with non-plant ingredients.

3.4. Public Health Safety

Locals in Brgy. Dolo uses mothballs in their polyherbal formulations, which are administered during pregnancy and applied externally as ointments and aromatics (Prk7A-b, Prk7A-c, and Prk7A-d). The formulation is described as having a hot or burning effect on the skin, particularly when applied to pregnant women, and is believed to reduce pain and flatulence during pregnancy. However, the ingestion of naphthalene, especially during the third month of pregnancy, has been documented to cause reticulocytosis, leukocytosis, hemolytic anemia, and indirect hyperbilirubinemia in infants (Sahni et al. 2019). Both immediate and delayed toxicity of napthalene ingestion were also reported that might have neurotoxic effects (e.g., confusion, lethargy, listlessness, and vertigo), gastrointestinal distress, hepatic effects (e.g., jaundice, hepatomegaly, and elevated serum enzyme levels), renal effects, and ocular effects (e.g., cataracts and optical atrophy) (Bhardwaj and Yadava 2025). Further, there have been reports of several fatalities resulting from the deliberate ingestion of mothballs containing naphthalene. The lethal quantity of naphthalene is approximately 2–3 g for children and 5–15 g for adults (Bhardwaj and Yadava 2025). This reiterates the need for strengthening pharmacovigilance and for further investigation into different kinds of polyherbal formulations.

3.5. Traditional knowledge acquisition and transfer

Traditional knowledge, especially the use of herbal medicines, is at risk of being lost due to the increasing reliance on modern medicine. Therefore, exploring how this knowledge is acquired and passed down from one generation to the next is crucial for preserving this valuable cultural heritage. In the focus group discussions, respondents were also asked about how they acquired and transmitted their knowledge of polyherbal formulations and their uses. The following themes emerged from the analysis:

3.6. Spirits as a source

According to respondents P1 and P8, they acquired folkloric knowledge through spiritual guidance:

"...my personal experience, only through the wisdom of Fatima (spirit)" (translated from vernacular language, respondent P1).

"Voices guide me on what plant to use. I often forget these things as they would just guide me during the practice. I want to remember, but I would really forget" (translated from vernacular language, respondent P8).

P1 emphasized that divine intervention and guidance are the primary sources of their knowledge and healing abilities. P1 follows a strict protocol that includes a prayer followed by hilot (massage). The oil used during hilot is a polyherbal formulation. According to P1, the efficacy and potency of the polyherbal formulation are enhanced by storing it on the altar.

P8 shared that, during practice, spirits verbally guide them on what to do. However, P8 often forgets these instructions after the administration, as if the event never occurred. Additionally, during diagnosis, the spirit whispers what illnesses the patient has and which plants should be used in the polyherbal formulation. Although P8 mentioned several polyherbal formulations during the interview, P8 reiterated that they could name more with the help of the spirit. The spiritual guidance of folkloric knowledge has also been documented in other regions of the country (Berdon et al. 2016).

3.7. Family as source

Ancestors and parents were frequently cited as sources of folkloric knowledge on medicinal plants by respondents P5a, P5b, P6, P7a, and P8. Notably, P5a explained that their prominent use of herbal medicines was due to a lack of access to medical practitioners and basic healthcare:

"Back then, there were no doctors (medical doctors), so they would do trial and error with plants..." (translated from vernacular language, respondent P5a).

For P6 and P7a, their fathers were their primary sources of knowledge. P6 mentioned that her father continues to influence her practices to this day, particularly because he is the one who produces uli coconut oil, a key ingredient in their formulations:

"My father is the one making coconut oil with uli." (translated from vernacular language, respondent P6).

P6 further explained that the potency of the formulation could cure poison, but the exact ingredients remain a secret. Only a family heirloom will have access to this knowledge:
"I have a cure for poison, but I cannot tell exactly what it is because my father is the only one who makes the uli formulation. I haven't received the inheritance yet, but the time will come." (translated from vernacular language, respondent P6).
Similarly, P7a shared that her father, a healer in their hometown, was her source of knowledge:
"...my father, he is a healer. He makes medicinal herbs and polyherbal formulations." (translated from vernacular language, respondent P7a).
P7a also mentioned that her mother is knowledgeable in herbal medicine and folkloric practices, particularly in infant care:
"My mother also knows about folkloric medicines, like knowing if a baby is ready to take a bath without compromising the infant's health..." (translated from vernacular language, respondent P7a).
P5b, like the others, inherited her polyherbal and folkloric knowledge from her parents, both of whom were healers. P5b also had the highest number of polyherbal formulations among the respondents, which she attributes to the combination of her parent's knowledge, culture, and environment:
"...we lived in the highlands, the mountains. I grew up there. My father is a healer, a famous healer in Leyte, and my mother is a healer. I have knowledge (folk healing), but it is not yet prominent—just massage for now." (translated from vernacular language, respondent P5b).
The respondents' multifaceted insights reveal how spiritual and familial sources intertwine to sustain these traditional practices. Spiritual guidance emphasizes the metaphysical connection to healing, while familial transmission ensures the continuity and preservation of knowledge across generations. The trial-and-error methods used by ancestors demonstrate the community's resilience and adaptability in the absence of modern medicine. However, the secrecy surrounding specific formulations, often regarded as family heirlooms, challenges broader documentation and dissemination.
This study represents the first survey of polyherbal medicines in the Davao region, Philippines. In conclusion, the study documented 32 polyherbal formulations, which are commonly used to treat bughat, pasmo, and kabuhi—conditions that may be widespread in the area and warrant further investigation. This survey documented the knowledge of plant utilization and folk medicine, particularly the first in Davao del Sur province. This provides valuable opportunities for future pharmacological research and the discovery of novel bioactive compounds, which could have important implications for their conservation. The survey's findings also emphasize the need to document folk medicines in rural areas and Indigenous communities, where pharmacovigilance should be prioritized to mitigate the potentially toxic effects of some herbal medicines on human health.

4. Acknowledgements

We would like to express our sincere gratitude to Davao del Sur State College, National Commission on Indigenous Peoples Region XI, the local government of Brgy. Dolo, most especially to the Brgy. Officials, the officers of the health unit, the Municipality of Bansalan, and the DENR XI- CENRO for their extended help in the conduct this study and for approving necessary permits and certifications. We also express our sincere gratitude to the locals of Dolo for their active participation in this study. In addition, the first author would like to thank his family for providing support during the field interviews.

5. REFERENCES

1. Metwaly, A., et al., 2021, "Traditional ancient Egyptian medicine: A review," Saudi J. Biol. Sci., June. doi: 10.1016/j.sjbs.2021.06.044.
2. Rankoana, A. S., 2022, "Indigenous Plants Used for Primary Healthcare by the Members of a Rural Community in Limpopo Province, South Africa," In: Tshifhumulo, R., and Makhanikhe, T. J., eds., Handbook of Research on Protecting and Managing Global Indigenous Knowledge Systems, IGI Global, Hershey, PA, pp. 100–111. doi: 10.4018/978-1-7998-7492-8.ch006.
3. Alkhalaf, M. I., et al., 2019, "Anti-oxidant, anti-inflammatory and anti-cancer activities of avocado (Persea americana) fruit and seed extract," J. King Saud Univ. Sci. Available at: https://api.semanticscholar.org/CorpusID:92666068.
4. Suwardi, A. B., Navia, Z. I., Harmawan, T., Syamsuardi, and Mukhtar, E., 2020, "Ethnobotany and Conservation of Indigenous Edible Fruit Plants in South Aceh, Indonesia," Biodiversitas, 21(5), pp. 1850–1860. DOI: 10.13057/biodiv/d210511.

5. Mazumder, T., and Hussain, M. S., 2021, "A Comprehensive Review of Pharmacological and Toxicological Properties of Cheilocostus speciosus (J. Koenig) C.D. Specht," Trends Phytochem. Res., 5(1), pp. 1–12. DOI: 10.30495/tpr.2021.680480.
6. Pucot, J. R., Dapar, M. L. G., and Demayo, C. G., 2021, "Qualitative Analysis of the Antimicrobial, Phytochemical and GC-MS Profile of the Stem Ethanolic Extract from Anodendron borneense (King & Gamble)," J. Complement. Med. R.
7. Julung, H., Supiandi, M. I., Ege, B., Zubaidah, S., and Mahanal, S., 2023, "Ethnobotany of Medicinal Plants in the Dayak Linoh Tribe in Sintang District, Indonesia," Biodiversitas, 24(2). DOI: 10.13057/biodiv/d240212.
8. Yadav, V., Krishnan, A., and Vohora, D., 2020, "A Systematic Review on Piper longum L.: Bridging Traditional Knowledge and Pharmacological Evidence for Future Translational Research," J. Ethnopharmacol., 247, p. 112255. DOI: 10.1016/j.jep.2019.112255.
9. Mukherjee, P. K., Harwansh, R. K., Bahadur, S., Banerjee, S., Kar, A., Chanda, J., Biswas, S., Ahmmed, S. M., and Katiyar, C. K., 2016, "Development of Ayurveda – Tradition to Trend," J. Ethnopharmacol., 197, pp. 10–24. DOI: 10.1016/j.jep.2016.09.024.
10. van Vuuren, S. F., Motlhatlego, K. E., and Netshia, V., 2022, "Traditionally Used Polyherbals in a Southern African Therapeutic Context," J. Ethnopharmacol., 288, p. 114977. DOI: 10.1016/j.jep.2022.114977.
11. Amjad, M. S., Zahoor, U., Bussmann, R. W., Altaf, M., Gardazi, S. M., and Abbasi, A. M., 2020, "Ethnobotanical Survey of the Medicinal Flora of Harighal, Azad Jammu & Kashmir, Pakistan," J. Ethnobiol. Ethnomed., pp. 1–28. DOI: 10.1186/s13002-020-00417-w.
12. Lawal, I. O., Olufade, I. I., Rafiu, B. O., and Aremu, A. O., 2020, "Ethnobotanical Survey of Plants Used for Treating Cough Associated with Respiratory Conditions in Ede South Local Government Area of Osun State, Nigeria," Plants, 9(5). DOI: 10.3390/plants9050647.
13. Odebunmi, C. A., Adetunji, T. L., Adetunji, A. E., Olatunde, A., Oluwole, O. E., Adewale, I. A., Ejiwumi, A. O., Iheme, C. E., and Aremu, T. O., 2022, "Ethnobotanical Survey of Medicinal Plants Used in the Treatment of COVID-19 and Related Respiratory Infections in Ogbomosho South and North Local Government Areas, Oyo State, Nigeria," Plants, 11(19), p. 2667. DOI: 10.3390/plants11192667.
14. Dapar, M. L., Alejandro, G. J., Meve, U., and Liede-Schumann, S., 2020, "Quantitative Ethnopharmacological Documentation and Molecular Confirmation of Medicinal Plants Used by the Manobo Tribe of Agusan Del Sur, Philippines," J. Ethnobiol. Ethnomed., 16(1). DOI: 10.1186/s13002-020-00363-7.
15. Pucot, J. R., and Demayo, C. G., 2021, "Ethnomedicinal Documentation of Polyherbal Formulations and Other Folk Medicines in Aurora, Zamboanga del Sur, Philippines," Biodiversitas, 22(12), pp. 5331–5343. DOI: 10.13057/biodiv/d221214.
16. Shan, Q., Sang, X., Hui, H., Shou, Q., Fu, H., Hao, M., Liu, K., Zhang, Q., Cao, G., and Qin, L., 2020, "Processing and Polyherbal Formulation of Tetradium ruticarpum (A. Juss.) Hartley: Phytochemistry, Pharmacokinetics, and Toxicity," Front. Pharmacol., 11, p. 133. DOI: 10.3389/fphar.2020.00133.
17. Yap, V. L., Tan, L. F., Rajagopal, M., Wiart, C., Selvaraja, M., Leong, M. Y., and Tan, P. L., 2023, "Evaluation of Phytochemicals and Antioxidant Potential of a New Polyherbal Formulation TC-16: Additive, Synergistic or Antagonistic?" BMC Complement. Med. Ther., 23, p. 93. DOI: 10.1186/s12906-023-03921-0.
18. Kaya, Y., Yousefi, Z., Akrami, M., and Yousefi, M., 2021, "Ethnomedicinal Knowledge of Plants Used as Mono, Di and Polyherbal Formulation for the Treatment of Common Ailments and COVID-19 in the Villages of Hamedan, Iran," J. Life Sci. Biomed., 11(03), pp. 36–52. DOI: 10.51145/jlsb.2021.6.
19. Yadav, T., Yadav, H. K. S., Raizaday, A., and Alam, M. S., 2024, "The Treatment of Psoriasis via Herbal Formulation and Nano-Polyherbal Formulation: A New Approach," BioImpacts, 15, p. 30341. DOI: 10.34172/bi.30341.
20. Bisht, A., Dwivedi, H., and Rawat, A. K., 2021, "Development and Evaluation of Polyherbal Formulation for Diabetes," Asian Pac. J. Health Sci., 8(4), pp. 48–54. DOI: 10.21276/apjhs.2021.8.4.07.
21. Pandeya, P. R., Lamichhane, R., Lamichhane, G., Lee, K. H., Lee, H. K., Rhee, S., and Jung, H., 2021, "18KHT01, a Potent Anti-Obesity Polyherbal Formulation," Front. Pharmacol., 12, p. 807081. DOI: 10.3389/fphar.2021.807081.
22. Pucot, J. R., Manting, M. M. E., and Demayo, C. G., 2019, "Ethnobotanical Plants Used by Selected Indigenous Peoples of Mindanao, the Philippines as Cancer Therapeutics," Pharmacophore, 10(3), pp. 61–69.
23. Mandrika, I., Kumar, S., Zandersone, B., Eranezhath, S. S., Petrovska, R., Liduma, I., Jezupovs, A., Pirags, V., and Tracevska, T., 2021, "Antibacterial and Anti-Inflammatory Potential of Polyherbal Formulation Used in Chronic Wound Healing," Evid. Based Complement. Alternat. Med., 2021, p. 9991454. DOI: 10.1155/2021/9991454.
24. Abbas, Z., Manoharan, A. L., Jagadeesan, G., Nataraj, G., Muniyandi, K., Sathyanarayanan, S., and Thangaraj, P., 2021, "Evaluation of an Edible Polyherbal Formulation Against Urinary Tract Infection Pathogens, Its Antioxidant and Anti-Inflammatory Potential," Biocatal. Agric. Biotechnol., 35, p. 102104. DOI: 10.1016/j.bcab.2021.102104.
25. Meñiza, J. F., Pasco, M. M., and Alimbon, J. A., 2024, "A Review of Ethnobotanical Studies Reveals Over 500 Medicinal Plants in Mindanao, Philippines," Plant Divers., 46(5), pp. 551–564. DOI: 10.1016/j.pld.2024.05.001.
26. Balangcod, T., and Balangcod, A. K., 2011, "Ethnomedical Knowledge of Plants and Healthcare Practices Among the Kalanguya Tribe in Tinoc, Ifugao, Luzon, Philippines," Indian J. Tradit. Knowl., 10, pp. 227–238.
27. Pucot, J. R., and Demayo, C. G., 2021c, "Medicinal Plants Used by the Indigenous People of the Philippines: A Systematic Review of Ethnobotanical Surveys and Bioactive Compounds," J. Complement. Med. Res., 12(2), pp. 107–131. DOI: 10.5455/jcmr.2021.12.02.15.
28. Naive, M. A. K., Binag, S. D. A., and Alejandro, G. J. D., 2021, "Plants with Benefits: Ethnomedicinal Plants Used by the Talaandig Tribe in Portulin, Pangantucan, Bukidnon, Philippines," Indian J. Tradit. Knowl., 20(4), pp. 741–748.

29. Nuneza, O. M., Rodriguez, B. C., and Nasiad, J. G. M., 2021, "Ethnobotanical Survey of Medicinal Plants Used by the Mamanwa Tribe of Surigao del Norte and Agusan del Norte, Mindanao, Philippines," Biodiversitas J. Biol. Divers., 22, pp. 3284–3296. DOI: 10.13057/biodiv/d220634.
30. Olowa, L., and Demayo, C. G., 2015, "Ethnobotanical Uses of Medicinal Plants Among the Muslim Maranaos in Iligan City, Mindanao, Philippines," Adv. Environ. Biol., 9(27), pp. 204–215.
31. Tantengco, O. A. G., Condes, M. L. C., Estadilla, H. H. T., and Ragragio, E. M., 2018, "Ethnobotanical Survey of Medicinal Plants Used by Ayta Communities in Dinalupihan, Bataan, Philippines," Pharmacogn. J., 10(5), pp. 859–870. DOI: 10.5530/pj.2018.5.145.
32. Landicho, M. B., 2022, "Alaga sa Hilot: Unraveling Local Knowledge, Practices, and Experiences on Pregnancy and Childbirth in a Community in Batangas, Philippines," Acta Med. Philipp., 56(16). DOI: 10.47895/amp.v56i16.5689.
33. Babu, A. K., Kumaresan, G., Raj, V. A., and Velraj, R., 2018, "Review of Leaf Drying: Mechanism and Influencing Parameters, Drying Methods, Nutrient Preservation, and Mathematical Models," Renew. Sustain. Energy Rev., 90, pp. 536–556. DOI: 10.1016/j.rser.2018.04.002.
34. Díaz-de-Cerio, E., Verardo, V., Gómez-Caravaca, A. M., Fernández-Gutiérrez, A., and Segura-Carretero, A., 2017, "Health Effects of Psidium guajava L. Leaves: An Overview of the Last Decade," Int. J. Mol. Sci., 18(4), p. 897. DOI: 10.3390/ijms18040897.
35. Deguchi, Y., and Miyazaki, K., 2010, "Anti-Hyperglycemic and Anti-Hyperlipidemic Effects of Guava Leaf Extract," Nutr. Metab., 7(1), p. 9. DOI: 10.1186/1743-7075-7-9.
36. Sahni, M., Vibert, Y., Bhandari, V., and Menkiti, O., 2019, "Newborn Infant With Mothball Toxicity Due to Maternal Ingestion," Pediatrics, 143(6), p. e20183619. DOI: 10.1542/peds.2018-3619.
37. Bhardwaj, U., and Yadava, R. N., 2025, "Naphthalene: Risk Assessment and Environmental Health Hazard," Hard. Chem., pp. 157–175. DOI: 10.1016/B978-0-323-95235-4.00018-9.
38. Berdon, J. S., Ragosta, E. L., Inocian, R. B., Manalag, C. A., and Lozano, E. B., 2016, "Unveiling Cebuano Traditional Healing Practices," Asia Pac. J. Multidiscip. Res., 4(1), pp. 51–59.