



## RESEARCH PAPER

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# Ethno-botanical survey of indigenous herbs and spices in the municipality of Jose Abad Santos, Davao Occidental Philippines

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## Abstract

Jose Abad Santos, Davao Occidental is surrounded by Indigenous groups of Blaan, Manobo and Sanger tribes that utilized traditional herbs and spices used for culinary dishes. This study attempts to survey and document the traditional knowledge and use of herbs and spices for culinary purposes and their therapeutic relevance for medicinal purposes. A combination of methods: ethnographic sources, scientific literature, and analysis of field data obtained through semi-structured interviews in local communities were conducted with 15 key informants from each barangay from September 2021-September 2022. The guidelines prescribed in the Code of Ethics of the International Society of Ethnobiology were followed during the field study, and its compliance was confirmed by the Ethical consideration of the Code of Ethics from the Annual General Meeting of the International Society of Ethnobiology (ISE 2006). A total of 37 herbs and spices distributed in 35 genera and 22 families were used to address 22 herbs as culinary, 11 used as spices and 4 used both herbs and spices. The family Fabaceae, Malvaceae and Zingiberaceae was best represented with 3 species followed by Brassicaceae, Cucurbitaceae, Moraceae, Poaceae and Solanaceae with 2 species representatives. There were five values used to quantify the plant importance: use value (UV), relative frequency of citation (RFC), relative importance index (RI), informant consensus factor (ICF), and fidelity level (FL). The use-value (UV) and informant consensus factor (ICF) were employed to determine the relative importance of the spices, their culinary and medicinal uses of the informants' knowledge. *Moringa oleifera*, *Cymbopogon citratus* and *Triticum aestivum* Linn garnered the highest Use Value of one (1). Most of the identified species ranged its ICF of one (1). The highest ICF (1) was observed with in the 11 Herbs and spices. Qualitative analysis on the presence or absence of a phyto-chemical should be conducted to all identified herbs and species particularly *Kolowratia elegans* Presl.

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## Introduction

Indigenous peoples of different localities in the country have developed their own specific knowledge of herbs and spices that can be used in different dishes and become an integral part of the culinary cultures. These tribes (Blaan, Manobo, and Sanger) living in the highlands of Jose Abad Santos, Davao Occidental are still upholding their traditional ways of cooking their culinary dishes using herbs and spices because they believe that these are widely geographically abundant in their surroundings. Not enough knowledge about ethnobotanical of herbs and spices has been known due to limited written records, and no recent research has been conducted on the use of plants as herbs and spices (ADSD, 2020).

This study generally aims to establish an ethnobotanical data on the various species of herbs and spices in the Municipality of Jose Abad Santos, Davao Occidental. Specifically, it aims to identify indigenous herbs and spices as well as document the traditional knowledge and use of herbs and spices for culinary purposes, Identify the local preparation of Indigenous herbs and spices using utilization indices such as use value (UV), relative frequency of citation (RFC), relative importance index (RI), informant consensus factor (ICF), and fidelity level (FL) (Faruque *et al.*, 2018). It is expected that this study will help indigenous knowledge on how herbs and spices use for culinary serve as a medium for preserving their indigenous herbs and spices and biological diversity.

## Materials and methods

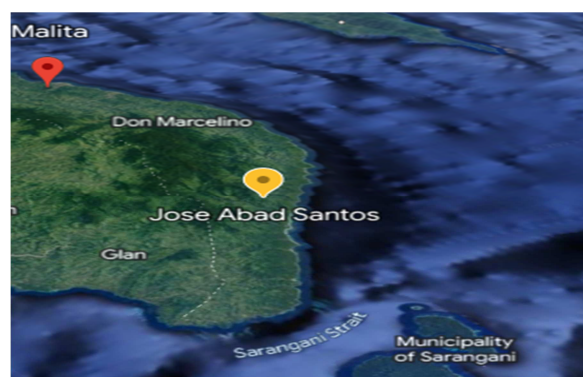
### Research Design

Semi-structured interviews were conducted with 15 key informants from each barangay from September 2021-September 2022. A total of 37 herbs and spices distributed in 35 genera and 22 families were identified with 22 herbs used for culinary purposes, 11 used as spices and 4 used both herbs and spices. The family Fabaceae, Malvaceae and Zingiberaceae was best represented with 3 species followed by Brassicaceae, Cucurbitaceae, Moraceae, Poaceae and Solanaceae with 2 species representatives. Fruits and leaves are the most frequently used plant part in form

of preparation. There were five values used to quantify the plant importance: use value (UV), relative frequency of citation (RFC), relative importance index (RI), informant consensus factor (ICF), and fidelity level (FL). The use-value (UV) and informant consensus factor (ICF) were employed to determine the relative importance of the spices, their culinary uses, as well as the homogeneity of the informants' knowledge.

### Research Locale

Research study sites was carried out in 3 barangays in Jose Abad Santos municipality in the southernmost part of Mindanao Island with a coordinate of 5° 55' North, 125° 39' East. Elevation at these coordinates is estimated at 13.3 meters or 43.6 feet above mean sea level (Fig. 1). Villages in the study sites were located in the coastal area in which fishermen dominate the population but there are also agricultural activities in the land area in which the main activity is farming with a livelihood of poultry and agriculture. Further, the local which dominates the area still relies on traditional indigenous herbs and spices for their culinary dishes and to ameliorate types of diseases.



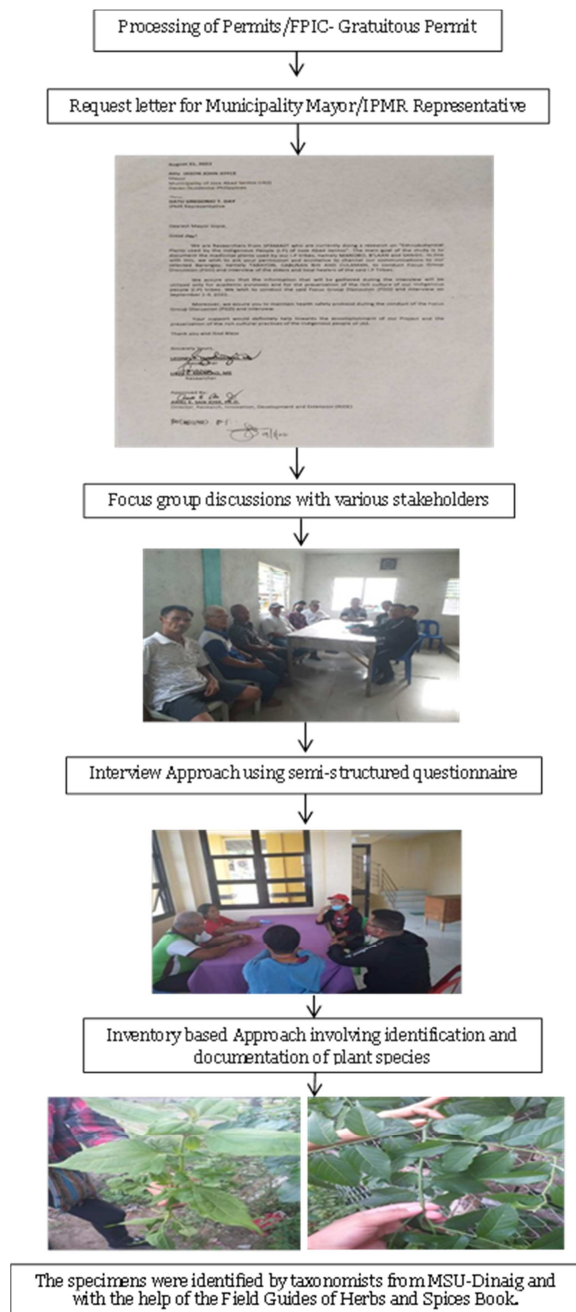
**Fig. 1.** Map of the Study Sites.

### Respondents of the Study

Purposive random sampling method were employed in the selection of informant which is widely used tool in ethnobotany (Bernard 2009, Lewis & Sheppard 2010). A total of 15 knowledgeable traditional culinarian of three different selected barangays of Jose Abad Santos were selected randomly. The 15 participants were selected purposively based on the recommendation of the knowledgeable elders (Indigenous People Municipal Representative).

The selection of key participants was also based on the quality of explanation that particular participants gave during an interview. Local healers automatically qualified as key participant being traditional expert who are guardians of indigenous knowledge on medicinal plants.

#### Data Process



#### Results

The botanical names of the herbs and spices along with their local names, classification as herbs or spice, images, preparations, and utilizations are presented

in Table 1. There were 37 herbs and spices distributed in 35 genera and 22 families were used to address 22 herbs as culinary, 11 as spices and 4 used both herbs and spices. Plant identification was confirmed by Dr. Paul Remollo of Maguindanao State University-Dinaig. The results shows an indication of a good diversity of plants used as spices in the study area and could be attributed to the rich diversity of plants (Bhat, 2013).

Table 2 shows the Utilization Indices: Use value (UV), relative frequency of citation (RFC), relative importance index (RI), informant consensus factor (ICF), and Fidelity level (FL). Results of the study depicted that *Moringa oleifera*, *Cymbopogon citratus* and *Triticum aestivum* Linn garnered the high number of Use Value of 1.

This indicates the importance of species used as herbs in a certain dish (Vitalini *et al.*, 2013). *Abelmoschus manihot*, *Corchorus olitorius*, *Hibiscus sabdariffa* Linn and *Hibiscus surattensis* Linn achieved its highest Relative Frequency Citation (RFC) of 0.4. Any Values closest to 1 indicate that herbs and spices are most frequently cited as useful in different use categories (Tardio *et al.*, 2008). A relative Index (RI) of 15 shows in herbs and spices of *Alpinia galangal*, *Cucurma domestica* and *Kolouratia elegans* Presl which simply justify that these herbs and spices have the greatest absolute number and richness in use (Tardio *et al.*, 2008).

Almost all of the species ranged its ICF of 1. The highest ICF (1) with 11 use citations occurs in Herbs and spices and in traditional medicine. *Amaranthus spinosus* under family Amaranthaceae cited with the lowest ICF of 0.88. Low ICF values indicate that informants have used this herbs and spices but differ in their preference on the preparation (Cakilcioglu *et al.*, 2011). *Abelmoschus manihot*, *Corchorus olitorius*, *Hibiscus sabdariffa* Linn and *Hibiscus surattensis* Linn garnered 60 percent of Fidelity Level which indicates that these herbs and spices had their outstanding preference for using these in their culinary dishes (Friedman *et al.*, 1986).

**Table 1.** List of indigenous herbs and spices with botanical names, common and local names, classification as herbs or spices, images, preparations, and occurrence in the study sites.

Plants Scientific Name	Common Name	Local Name	Photos	Parts Utilized	Herbs Preparation and Its Uses	Spices Preparation and its uses	Occurrence in the Study Sites 1 2 3		
1. <i>Abelmoschus manihot</i>	Nating saluyot	Gikway		Young leaves can also Petals	Leaves and petals be cooked with coconut milk and can be added to salads		/		/
2. <i>Alocasia macchoriza</i>	Biga	Elephant ear		Leaves	The leaves are used to wrap steamed meats and vegetables.	Typically roasted, stuffed, used for sauces	/		/
3. <i>Alpinia galangal</i>	Galanga	Tikwas (M) Langkuas		rhizomes, roots		Add in soups and curries	/	/	/
4. <i>Amaranthus spinosus</i>	Kujapa	Kalapi-lapi		Leaves and seeds	Leaves are edible, used as a cooked leafy vegetable in cuisines	The ash coming from the seeds is used as a vegetable salt	/		
5. <i>Artocarpus camansi</i>	Breadfruit	kolo		Fruit / seeds	Fruit used in soups, meat and seafood dishes and snacks when boiled and fried	Powder seeds serve in salads soups and curries	/	/	/
6. <i>Avverhoa carambola</i>	Carambola	Baling-bing		Fruit, flowers and leaves	The flowers and leaves can be added to salads.	Fruit can be squeezed to add flavor to stewed fish "Paksiw"	/		/
7. <i>Auricularia heimuer</i>	Black Wood Ear	Tainga ng Tekamag daga			Directly used in stir-fry dish or soup and for salad and chopsuey.		/		
8. <i>Basella alba</i>	Malabar Spinach	Alugbati			Leaves and stalk can be used in "Lao-oy"		/	/	/
9. <i>Bixa Orellana</i>	Annatto	Atsuete				Used as food coloring	/		/
10. <i>Brassica oleracea</i>	Repolyong Ihalas	Kulis		Leaves, inflorescence, root, stem, and seed),	Used for salads and coleslaw		/		
11. <i>Broussonetia luzonica</i>		Himbabao /alocon		Leaves, flowers.		Flower spikes are edible; in meat and vegetable dishes like pinakbet and bulanglang.	/		/
12. <i>Melothria pendula</i> Linn.	Pipinong Ihalas (Creeping cucumber)	Temon		Fruit, Leaves		Fruits can be eaten raw. Leaves used as vegetable mixed with monggo	/		/
13. <i>Cajanus cajan</i>	Tadlos (Pigeon Pea)	Tabios		Fruit		Used to mix with ginataang batong.	/		



Plants Scientific Name	Common Name	Local Name	Photos	Parts Utilized	Herbs Preparation and Its Uses	Spices Preparation and its uses	Occurrence in the Study Sites 1 2 3		
14. <i>Capsicum frutescens</i> Linn	Sili	Katumbal		Fruits, Leaves	Leaves can be used to mix with tinolang manok	Fruits are used to give spicy flavor to food	/	/	/
15. <i>Corchorus olitorius</i> .	Jew's Mallows	Saluyot		Leaves	They will mix this vegetable in "ginataang gulay and lao oy".		/	/	
16. <i>Citrus Limon</i>	Kalamansi	Lemonsito		Fruits		Liquid portion of lemon is used to remove fishy smell specially in kinilaw.	/	/	/
17. <i>Curcuma domestica</i> Linn	Turmeric	Dulaw		Fruits /Roots	Dried roots give flavor and color to curry powders.		/	/	/
18. <i>Cymbopogon citratus</i>	Tanglad	Baying-gusan (Manobo)		Leaves	Added to soups, stir-fries, stews, seafood and sauces.		/	/	/
19. <i>Diplazium esculentum</i>	Pako	Lampako		Leaves	Leaves used for salads		/	/	
20. <i>Hibiscus sabdariffa</i> Linn		Roselle Morado			Leaves used to mix with sinigang or sinabawan		/		
21. <i>Hibiscus surattensis</i> Linn.	Gumamela	Labuag (Kolabo)			Leaves can be used for steamed fish or "Paksiw"		/		
22. <i>Kolouratia elegans</i> Presl		Tagbak		Fruits At the tip, a stalk may have a cluster of fruit. The fruit is filled with sour white seeds inside	Used in sinigang and paksiw.				
23. <i>Moringa oleifera</i>	Kamunggay (bunga)	Malunggay			Both the leaves and the young pods are edible. Used in ginataang gulay and lao-uy.		/	/	/
24. <i>Nasturtium officinale</i> Linn	Watercress			Leaves	Can be mixed with Sardines.		/	/	
25. <i>Schizophyllum commune</i>	White tree fungus	kulapdok			Can be stir-fried		/		
26. <i>Barringtonia asiatica</i>	Bitoon			Fruits	Fruits can be used as sinigang bits because of its sour taste		/	/	

Plants Scientific Name	Common Name	Local Name	Photos	Parts Utilized	Herbs Preparation and Its Uses	Spices Preparation and its uses	Occurrence in the Study Sites		
							1	2	3
27. <i>Physalis philadelphica</i>	lingon	Tomatillo		Fruit	The fruit of the tomatillo is used cooked, or even raw, to prepare purees or minced meat dishes which are used as a base for chili sauces		/	/	
28. <i>Sesbania grandiflora</i>	Taray or katuray	Hummingbird		Flower, Pistil, Leaves, Shoots	Flowers are eaten raw in salads, boiled, deep-fried, or used in curries, soups, and stews.		/	/	/
29. <i>Talinum paniculatum</i> .	Jewels-of-Opar, Fameflower, Pink Baby-Breath	Kashoy		Leaves	The leaves are blanched and used in green salads or cooked in soups and stew		/	/	/
30. <i>Zingiber officinale</i>	ginger	Luy-a		rhizome	Use as tea, spices for all type of meat in order to remove fishy smell.		/	/	/
31. <i>Avverhoa bilimbi</i>		Iba		Fruit	Fruits used for infusing flavor to soups, dals and curries.		/	/	
32. <i>Artemisia vulgaris</i>	Kamisan	Herbaka		Leaves	Leaves can be used for nilagang baka as food flavoring and salad dressing		/		
33. <i>Curcuma longa</i>	Turmeric	Kwalag		rhizome	Can be used to flavor and color soups and arroz caldo		/	/	/
34. <i>Tamarindus indica</i>	Tamarind	Sampalok		Fruits		Use as spices when crush for sinigang	/		/
35. <i>Tremella fuciformis</i>	white tree fungus	Tanibo		Whole part	Cooked in soups, both sweet and savory. Good for Chopsuey as add-on		/		
36. <i>Triticum aestivum L.</i>	Wheat	Usok		Grain	Can be used as flour for afritada and caldereta menu	Can be substituted with pork meat		/	
37. <i>Momordica charantia</i>	Wild ampalaya			Leaves	Can be used for Mongo		/		/

Legend:

1-Tabayon, 2- Sugal, 3- Culaman

**Table 2.** Utilization of Herbs and Spices of Jose Abad Santos, Davao Occidental Philippines

Category	Family	Number of Herbs and Spices (Ip)	Citation by informants (CI) or used reports	Frequency Citation (FC)	Use Value (UV)	Relative Frequency of Citation (RFC)	Relative Importance Index (RI)	Informant Consensus Factor (ICF)	Fidelity Level (FL)
H/S	Amaranthaceae ( <i>Amaranthus spinosus</i> )	2 (3)	10	5	0.66	0.33	0.265	0.88	20
H/S	Araceae ( <i>Alocasia macchioriza</i> )	1 (5)	10	2	0.66	0.13	0.115	1	33
H	Asteraceae ( <i>Artemisia vulgaris</i> )	1(6)	5	2	0.33	0.13	0.115	1	40
H	Athyriaceae ( <i>Diplazium esculentum</i> )	1(3)	10	2	0.66	0.13	0.115	1	30
H	Auriculariaceae ( <i>Auricularia heimuer</i> )	1(4)	5	2	0.33	0.13	0.115	1	40
H	Basellaceae ( <i>Basella alba</i> )	1(3)	6	2	0.4	0.13	0.115	1	30
S	Bixaceae ( <i>Bixa aureliana</i> )	1(4)	10	2	0.66	0.13	0.115	1	40
H	Brassicaceae ( <i>Nasturtium officinale</i> Linn)	2(3)	5	3	0.33	0.2	0.2	1	20
H/S	Cucurbitaceae ( <i>Melothria pendula</i> Linn) ( <i>Momordica charantia</i> )	2 (4)	8	3	0.53	0.2	0.2	1	46
S	Fabaceae ( <i>Cajanus cajan</i> ) ( <i>Tamarindus indica</i> Tamarindus indica)	2(7)	12	2	0.8	0.13	0.165	1	46
H	Lecythidaceae ( <i>Barringtonia asiatica</i> )	1(6)	10	2	0.66	0.13	0.115	1	40
H/S	Malvaceae ( <i>Abelmoschus manihot</i> ) ( <i>Corchorus olitorius</i> .) ( <i>Hibiscus sabdariffa</i> Linn) ( <i>Hibiscus surattensis</i> Linn.)	4(9)	12	6	0.8	0.4	0.4	1	60
H/S	Moraceae ( <i>Artocarpus camansi</i> ) ( <i>Broussonetia luzonica</i> )	2(5)	6	4	0.4	0.26	0.23	1	33
H	Moringaceae ( <i>Moringa oleifera</i> )	1(2)	15	2	1	0.13	0.115	1	13
H/S	Oxalidaceae ( <i>Avverhoa carambola</i> ) ( <i>Avverhoa bilimbi</i> )	2(3)	8	2	0.53	0.13	0.165	1	20
H/S	Poaceae ( <i>Cymbopogon citratus</i> ) ( <i>Triticum aestivum</i> L.)	2(2)	15	4	1	0.26	0.23	1	13
H	Portulacaceae ( <i>Talinum paniculatum</i> )	1(4)	5	2	0.33	0.13	0.115	1	46
S	Rutaceae ( <i>Citrus Limon</i> )	1(3)	4	2	0.26	0.13	0.115	1	20
H	Schizophyllaceae ( <i>Schizophyllum commune</i> )	1(5)	3	2	0.2	0.13	0.115	1	33
H/S	Solanaceae ( <i>Capsicum frutescens</i> Linn) ( <i>Physalis philadelphica</i> )	2(3)	9	4	0.6	0.26	0.23	1	20
H	Tremallaceae ( <i>Tremella fuciformis</i> )	1(2)	4	2	0.26	0.13	0.115	1	13
H/S	Zingiberaceae ( <i>Alpinia galangal</i> ) ( <i>cucurma domestica</i> ) ( <i>Kolowratia elegans</i> Presl) ( <i>Curcuma longa</i> ) ( <i>Zingiber officinale</i> )	5(4)	15	4		0.26	0.38	1	46
2	22	37		65					

**Conclusion**

This study was undertaken to identify herbs and spices using utilization indices such as use value (UV), relative frequency of citation (RFC), relative

importance index (RI), informant consensus factor (ICF), and fidelity level (FL). The findings of the study showcased the rich herbs and spices of our traditional tribal culinarian.

The generated information on the ethno-botanical knowledge of our indigenous people will serve as an instrument towards preservation and cultivation of these herbs and spices plants.

Moreover, the dissemination of these findings of the study can be adopted and applied by other tribes in modernizing traditional recipes into healthier dishes.

### Recommendation

Qualitative analysis on the presence or absence of a phyto-chemical should be conducted to *Kolowratia elegans* Presl. Seminar- workshops and hands-on training on Herbs and spices should be undertaken to the community that will serve as their livelihood program in the future.

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