INDIGENOUS KNOWLEDGE OF THE CO TU ETHNIC GROUP FOR MEDICINAL PLANTS USED IN THE TAY GIANG DISTRICT (AXAN AND TR'HY COMMUNE), QUANG NAM PROVINCE, VIETNAM

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SUMMARY

The Co Tu people in two communes Axan and Tr'Hy, Tay Giang district, Quang Nam have rich experience in using medicinal plants because their life have been based on the forest resources. In this article, we discuss the medicinal plants in the following key points: usage, parts used, and disease groups used. The data collection methods in this study includes the specimen collection, the interview method, while the identification of the species name, the method of medicinal plant resources diversity assessment and the method of endangered medicinal plants level assessment are employed in this work. The initial investigation shows that the medicinal plants in this area consisted of 59 species, 54 genera, 41 families, which are belonged to three vascular divisions under the names: Polypodiophyta, Pinophyta and Magnoliophyta. Moreover, roots and tubers of these medicinal plans are two most popularly used parts by the ethnic minorities of Co Tu. People there often use medicinal plants in traditional medicine practices, particularly in treatments of the arthritis and diseases of the digestive system. Finally, seven species of medicinal plants found here are listed in the Vietnam Red Data Book (2007), the IUCN Red list 2022 and the Government Degree No 84/2021/ND-CP of the Socialist Republic of Vietnam.

Keywords: Co Tu ethnic, indigenous knowledge, medicinal plants, Tay Giang district.

1. INTRODUCTION

Medicinal plants have been discovered and used in traditional medicine practices since ancient times. They are highly valuable to those whose depend on forests. Along with the development of human society, medicinal plants are becoming more and more important in today's life. Using medicinal plants is not only highly effective, but also does not cause side effects, unlike many western drugs on the market (Philomena G., 2011). In many developing countries, a large part of the population has been using medicinal herbs in medicine practices.

Vietnam is a country with 3/4 of the mountainous area where a diverse range of medicinal plants grow. It is also a home to 54 ethnic groups, most of which are ethnic minorities with about 24 million people, accounting for more than a third of the national population (Tran Thuy et al., 2005). There are diversity in the ethnic groups along with the differences in conditions, soil, climate, customs and culture in each ethnic community, which therefore has created the variety and richness in folk knowledge, particularly the knowledge of using the surrounding plants in traditional medicine practices.

However, due to the increasing demand for natural health products, and secondary metabolites of medicinal plants, the use of medicinal plants is growing rapidly (Bentley R., 2010) and 20% of their wild resources have already been nearly exhausted with the increasing human population and plant consumption (Ross I.A., 2005). Moreover, because of the requirements of the economic development, our society is facing the contradiction between supply and demand of medicinal plants. Therefore, the task to conserve medicinal plants and develop them sustainably are urgent and should be prioritized.

Tay Giang is a mountainous district, which is located to the northwest of Quang Nam province. The area of the district's forestry land is more than 65,000 hectare (i.e. ha), of which the area of the forestry land of Axan commune is about 4,068 ha and of the Tr'Hy commune is about 8,939 ha, where there are quite rich resources and varieties of plants, especially medicinal plants (Statistical Yearbook, 2021). Majority of the population located at these two communes are belonging to the Co Tu ethnic communities, whose have a long history living in mountains and forests. As a consequence, people here have lots of experience, that was

passed down for many generations, which make use of the medicinal plants in medicine practices. Nevertheless, because of the isolated customs and habits of the Co Tu ethnic communities, study about the source of many medicinal plants at these regions has not widely circulated.

In addition, the resources of medicinal plants are increasingly depleted. The main reason is the extensive and comprehensive exploitation of these medicinal plants to meet the rising market demand both locally and globally. On top of that, there are other threats, such as climate change and habitant destruction, including deforestation (e.g. Shifting cultivation by ethnic minorities, etc...), which leads to the reduction of many precious species of medicinal plants, of which many of those have already been over-collection. These medicinal plants are consequently in danger of extinction, while the loss of valuable indigenous medical knowledge is unavoidable. For these reasons, in order to preserve and maintain the precious medicinal plants, it is extremely necessary to research on the cultivation and the usages of these plants by the Co Tu people.

2. RESEARCH METHODOLOGY

Data collection methods: We collected data on natural, socio-economic conditions from official reports of the People's Committees of districts and communes and relevant specialized documents. At the same time, we worked with relevant organizations, which included the Department of Ethnic Minority Affairs, the District Department of Agriculture, the Tay Giang Protection Forest Management Board and the Forest Management and Protection Station No. 3, in order to obtain other necessary information.

Interview method: We performed a community survey in the region of interests, each commune interviewed 50 people aged between 35 and 65 years and selected representatives from the target audience as survey participants, which were the elderly, village elders, village chiefs, healers or anyone whose had experience using the medicinal plants and traditional remedies. The interviews with the filtered target audience were organized to gather insights for our research. We recorded information about medicinal plants, such as common/ethnic names, sample numbers, life forms, habitats, parts that were used for medicines (e.g. stems, roots, flowers, fruits, seeds, etc.) and the use values of medicinal plants resources.

Specimen collection: we obtain precious medicinal plants under the guidance of local physicians and follow the directions included in the documents, that came from the interviews in Axan and Tr'Hy commnues, Tay Giang district, Quang Nam province. We conducted surveys in four main areas:

1. Around Po Mu Ecological Village includes adjacent forest and streamside forest (coordinates 15°48'19.30"N, 107°19'57.26"E, altitude 1370 m).

2. Mountain forest along the way from Po Mu Ecological Village to Forest Management and Protection Station No. 3, Axan commune (coordinates 15°82'72.08"N, 107°31'70.08"E, elevation 1282 m).

3. Around Que mountain area, Tr'Hy commune (coordinates 15°50'4.85''N, 107°22'51.97''E, altitude 1304 m).

4. Around Voong village, Tr'Hy commune (coordinates 15°48'44.68''N, 107°22'6.93''E, elevation 1286 m).

Identification of the species name: We identified plant species in two main steps: (i) identification in the field; (ii) expert knowledge and the existing works in the literature, for examples: Plants of Vietnam (Ho P.H, 1999), Dictionary of Vietnamese medicinal plants Nam (Chi V.V, 2012), Vietnamese medicinal plants and herbs (Loi D.T., 2005), List of Vietnamese plant species (Ban N.T., 2003, 2005).

Medicinal plant resource diversity assessment: This assessment is based on the method mentioned by Thin N. N, 2007).

3. RESULTS AND DISCUSSION

3.1. Composition of medicinal plants used by the Co Tu ethnic group in the study area

During the investigation and examination of specimens, we have identified 59 species, 54 genera, 41 families, which are belonged to three vascular divisions under the names:

Polypodiophyta, Pinophyta and Magnoliophyta, more details can be seen in Table 1. The Co Tu ethnic group in the region of interest use these medicinal plants as either medicines or health supplements.

Table 1. Distribution of medicinal plants used by the Co Tu ethnic group

No.	Phylum/Class	Family		Genus		Species	
		Quantity	%	Quantity	%	Quantity	%
I	Polypodiophyta	2	4.88	3	5.56	3	5.08
II	Pinophyta	1	2.44	1	1.85	1	1.69
III	Magnoliophyta	38	92.68	50	92.59	55	93.22
1	*Magnoliopsida*	*27*	*65.85*	*35*	*64.81*	*39*	*66.10*
2	*Liliopsida*	*11*	*26.83*	*15*	*27.78*	*16*	*27.12*
	Total	**41**	**100**	**54**	**100**	**59**	**100**

From Table 1, we can see that the Magnoliophyta is dominant with 55 species (accounting for 92.59%), 50 genera (accounting for 92.59%) and 38 families (accounting for 92.68%). The Polypodiophyta and Pinophyta both account for a much lower proportion, which ranges from 1 to 5% in taxon levels. In the Magnoliophyta, the Magnoliopsida accounts for more than 65% of taxon levels compared to the Liliopsida. Families with 3 or more species, including Rubiaceae and Zingiberaceae (5 species) and Polygonaceae (3 species), are used as medicines by the Co Tu ethnic group. Particularly, these families were reported to have a high number of species in Vietnam and have a wide ecological range such as the Rubiaceae family has a total of 430 species (Minh T.N, 2005), the Zingiberaceae family has about 135 species (Binh N.Q, 2011).

There is enough evidence to confirm that the flora in the study area consists mainly of representative species belonging to Magnoliophyta. They are common plants that grow around villages, on hills, along streams and forests, whence people often encounter them. Moreover, these plants are preferred to be made into medicine more than other plants. Firstly, the root of the *Curculigo orchioides* can be soaked in alcohol to treat back pain, nervous weakness, impotence, while the leaves of the *Caesalpinia hymenocarpa* can be crushed, covered or cooked in water to treat scabies, ringworm. And the *Morinda officinalis* can be soaked in alcohol and be used for people with kidney failure, impotence, back pain, knee pain, rheumatism, muscle pain, muscle cramps, and bone weakness. Lastly, the *Phrynium placentarium* has the effect of detoxifying alcohol and curing snakebites, etc. To sum up, the species in the Magnoliophyta, especially those in the Magnoliopsida and Liliopsida, play an important role in the traditional medicine practices in the Co Tu ethnic community.

3.2. Parts of the plants are used as medicine by the Co Tu ethnic group in the study area

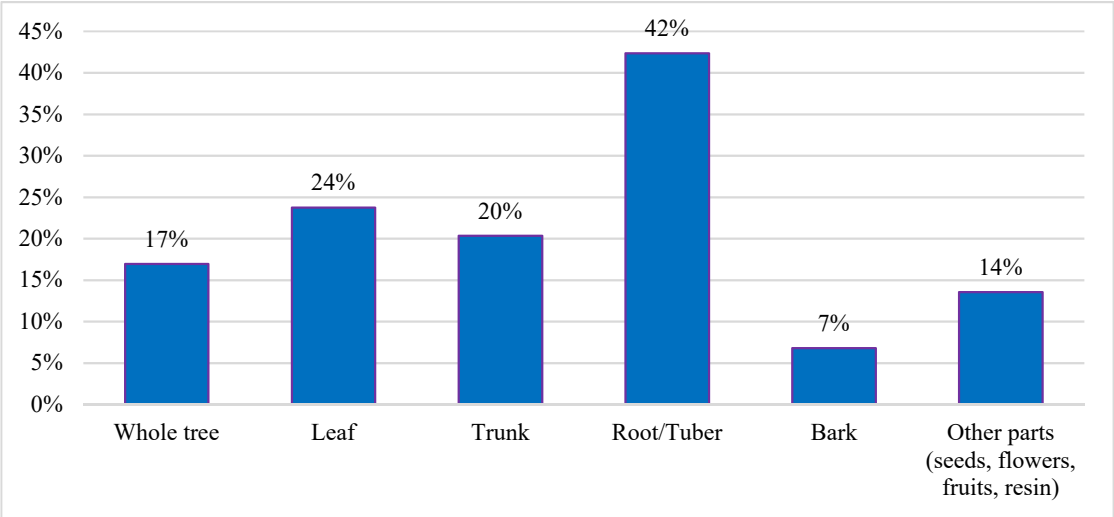
Research on the used parts of medicinal plants not only shows the rich and diverse properties in the healing ability, but also has great significance for conservation, while at the same time, studying parts of medicinal plants assesses to some extent the sustainability of the exploitation and the use of medicinal plant resources in ethnic minority communities.

Medicinal properties derived from plants can come from many different parts of a plant including leaves, roots, bark, fruit, seeds, flowers. The different parts of plants can contain different active ingredients within one plant. In another word, the decision of using only partial of the medicinal plants can directly affects the ability to preserve and develop them in long term. Traditional medicine practitioners should use the leaf parts compared to others for remedial preparation is due to their accessibility and for preventing them from extinction. In fact, harvesting the root parts of the medicinal plant for preparation of traditional medicines has negative consequences on the existence of the plants themselves in the future. That is why most of the medicinal plants are currently at

risk, declining highly due to them using their root parts besides other human pressures.

Statistical results about the parts used as medicine, which are based on the experience of the Co Tu ethnic group in Axan and Tr'Hy communes, are shown in Figure 1.

Figure 1. Percentage of parts used as medicine according to the experience of the Co Tu ethnic group in Axan and Tr'Hy communes



(Note: The percentage in the table is greater than 100% because some species can use different parts as medicine)

From Figure 1, we can see that there is a diversity among parts of the medicinal plants that are used as medicines by the Co Tu ethnic group. We group them into six categories, namely whole tree, trunk, bark, leaf, root/tuber and other parts. Here, the most widely used part is the root/tuber, which takes up 34%, with examples are *Paris polyphylla*, *Codonopsis pilosula*, *Curculigo orchioides*, *Morinda officinalis*. The main reason here is that the root is a part that can be used to cure many different diseases, particularly it is very effective for common diseases of bones/joints and for postpartum care. However, over-exploitation the root/tuber will impact the conservation of the species in particular and the forest ecosystem in general in the study area. Therefore, it is necessary to conduct more work urgently about the construction of medicinal gardens, propagation species by technical methods (e.g. cutting, invitro, etc.), study compounds with similar activities in other parts of the plants, etc.

On the other hand, the remaining parts, that can be used to make medicine, accounting for less than 20%. Here, the use of bark and other parts (e.g. seeds, flowers, essential oils, etc.) for healing take up the lowest proportion, only 6% and 11% of the total species respectively. Some species include *Polygonum odoratum*, of which the leaves are used to treat colds and snakebites; whereas we can use the whole plant of the *Eriocaulon sexangulare* or the stem of the *Eurycoma longifolia* as medicines. The fruits of the Osteoarthritis, *Musa acuminata* are used to treat kidney stones, while the essential oil of *Fokienia hodginsii* has the effect of reducing swelling and good antiseptic. The evaluation about different parts of the medicinal plants will determine the usage effectively.

3.3. Experience of using medicinal plants in traditional medicine practices by the Co Tu people in the study area

The Co Tu people live in groups in each area, and households often gather in a closed circle, which forming villages. In the village, it is common to have someone with the knowledge of the usage about the medicinal plants, this person is often to be the village elder, local health worker or the family head, in which the knowledge has been passed down between generations of a clan.

The experience of using medicinal plants is also associated with daily activities and the

nature of the residential areas such as: production and labor activities often are taken place in the forest, where there are many dangers from wild animals; or from the experience of getting diseases that are usually occurred when staying in the high mountain forests. Therefore, the knowledge passed on in oral tradition is usually about medicinal plants that are capable of treating injuries, bones, joints, snakebites, hemostasis, malaria, abdominal pain, etc. As for the forms of medicinal plant used, more than half of the cases are reported in the form of boiling (decoction) or drinking alcohol, followed by the forms used externally (crushed, applied to the wound, painful place, etc.). The summary of the treatment diseases that can be treated via medicinal plants in the Co Tu ethnic group is given in Table 2.

From Table 2, it can be seen that the medicinal plants in the study area are often used to treat digestive diseases (18.64%), followed by bone and joint diseases (16.95%), skin diseases (15.25%), and circulatory diseases (11.86%). The group of diseases with a lower rate of using medicinal plants includes: women's diseases, animal bites, and heat loss (both are 3.39%). Lastly, the two groups with the lowest rate, only 1.69%, are stomach disease and cancer.

In particular, some medicinal plant species can cure many different diseases such as: The *Paris polyphylla* can cure cancer, diabetes, snakebite, cough asthma. The *Smilax glabra* can be used in diabetes, stabilizing blood pressure, nourishing kidney. And the *Stachytarphelajamaicencis* has sedative, cooling, and diuretic effects.

In general, the experience of using medicinal plants in traditional medicine practices by the Co Tu people in Axan and Tr'Hy communes has a high diversity. In addition, our research provides the scientific basis for further research about the conservation and sustainable development of medicinal plants, folk remedies of the Co Tu ethnic community in the region of interest, and can be expanded to other parts in Vietnam.

Table 2. The groups of diseases can be treated via medicinal plants by the Co Tu ethnic group

No.	Treatment group	Quantity	%
1	Women's diseases (infertility, postpartum, menstrual regulation...)	2	3.39%
2	Digestive diseases (diarrhea, constipation, dysentery...)	11	18.64%
3	Osteoarthritis (rheumatism, back pain, pain) bones, rheumatism...)	10	16.95%
4	Liver disease (cirrhosis, liver detoxification, hepatitis...)	4	6.78%
5	Weather illness (cough, fever, cold, chickenpox...)	4	6.78%
6	Diseases caused by animal bites (snake bites, dog bites...)	2	3.39%
7	Cool down	2	3.39%
8	Diseases of the stomach (stomach pain, colon...)	1	1.69%
9	Kidney disease (glomerulonephritis, kidney stones, painful urination...)	5	8.47%
10	Skin diseases (itching, allergic pimples, pimples...)	9	15.25%
11	Tumor disease (cancer, cyst, lymph node...)	1	1.69%
12	Neurological diseases (sedation, headache...)	3	5.08%
13	Respiratory diseases (pharyngitis, cough...)	4	6.78%
14	Diseases of the circulatory system (blood fat, blood pressure, heart...)	7	11.86%

(Note that the percentage in the table is more than 100% because some species can be used to treat many different diseases)

3.4. Medicinal plants need to be prioritized for conservation

In this work, we have identified seven species of medicinal plants in the region of interest, that are listed in the Vietnam Red Book (2007), Decree No 06/2019/ND-CP and No

84/2021/ ND-CP and IUCN Red List see more details in Table 3. Particularly, according to the Red Book of Vietnam, there are up to five species at the endangered level (EN). Therefore, the relevant sectors/departments need to impose more resources and policies to protect these precious medicinal plants that are at risk of extinction.

Table 3. Endangered, precious and rare medicinal plant species in the study area

No.	Scientific names	Local names	Vietnam Red Book (2007)	Decree 84/2021/ND-CP (2021)	IUCN Red List 2022
1	*Drynaria fortunei* (Kuntze ex Mett.) J. Smith	"Cốt toái bổ"	EN	IIA	
2	*Fokienia hodginsii* (Dunn) A.	"Pơ mu"	EN	IIA	VU
3	*Codonopsis pilosula* (Franch.) Nannf.	"Đẳng sâm"	VU	IIA	
4	*Gynostemma pentaphyllum* (Thunb.) Makino	"Giảo cổ lam"	EN		
5	*Disporopsis longifolia* Craib.	"Hoàng tinh trắng"	VU	IIA	
6	*Curculigo orchioides* Gaertn.	"Sâm cau"	EN		
7	*Paris polyphylla* Smith	"Bảy lá một hoa"	EN	IIA	VU

(Note: EN: Endangered, VU: Vulnerable, IIA: Limit the exploitation, used for commercial purpose)

We have listed 7 could be extinction research area, which are belonging to 7 families and 3 vascular divisions under the name: Polypodiophyta (1 species), Pinophyta (1 species) and Magnoliophyta (5 species). Among them, there are two species in the Vietnam Red Book (2007), Decree 84/2021/ND-CP and IUCN Red List 2022: *Fokienia hodginsii* (Dunn) A. and *Paris polyphylla* Smith.

Results on conservation status of these plants showed that more than 80% of the respondents were unaware that seven medicinal plants in table 3 were declining. Consequently, some of the species are threatened when wild habitats are converted into agricultural lands and only few of them have been conserved on farm include: *Curculigo orchioides* Gaertn., *Codonopsis pilosula* (Franch.) Nannf.

Considering the low level of understanding of conservation concerns for these species, there is need therefore, to build capacity among the local communities in this area particularly in regard to sustainable use of natural resources, conservation methods as well as domestication processes.

4. CONCLUSION

There are a large number of species identified among various medicinal plants used by the Co Tu ethnic community. In this study, we have recorded 59 species, 54 genera, 41 families belonging to 3 vascular divisions under the name: Polypodiophyta, Pinophyta and Magnoliophyta. Moreover, the Co Tu people also have rich experience in using many components of the plant to make medicine including tree, leaf, stem, root/tuber, bark, some other parts (seeds, flowers, fruit, resin). These parts can also be used for other purposes, such as cooking, drinking, pounding on the skin, steaming, bathing, soaking in alcohol, etc. We found that the most commonly used part for medicine purpose is the root/tuber, which accounts for 34%, the remaining parts accounts for less than 20% and the bark is the least common used part with only 6%.

For groups of diseases treated via medicinal plants, the most common diseases associated with the life and work of Co Tu people were reported. In this study, we categorize into 14 different groups of diseases, that can be treated via medicinal plants, based on surveys collected from the Co Tu ethnic group. In which, the most medicinal plant species were to treat digestive diseases (18.64%), bone and joint diseases (16.95%).

Lastly, we have identified seven species of medicinal plants in the study area, that appear in the Vietnam Red Book (2007), three species

appear in the Decree No 06/2019/ND-CP and No 84/2021/ ND-CP/2006. Consequently, more work about the construction of medicinal gardens, propagation species by technical measures, study compounds with similar activities in other parts of the plants..., are required, along with the necessity of the evaluation about different parts of the medicinal plants. Moreover, regulations on the exploitation of medicinal plants are needed to be expanded and discussed carefully in order to provide rational usage and maintain the species diversity in the study area.

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TRI THỨC BẢN ĐỊA CỦA NGƯỜI DÂN TỘC CƠ TU TRONG SỬ DỤNG THỰC VẬT LÀM THUỐC TẠI RỪNG PHÒNG HỘ TÂY GIANG TỈNH QUẢNG NAM, VIỆT NAM

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TÓM TẮT

Người Cơ Tu tại hai xã Axan và Tr'Hy, huyện Tây Giang, Quảng Nam có kinh nghiệm sử dụng cây thuốc phong phú do tập quán sinh sống dựa vào tài nguyên rừng. Trong bài báo này, một số thông tin chủ yếu về cây thuốc của người Cơ Tu tại khu vực nghiên cứu được khái quát hóa theo số liệu thống kê về cách dùng, bộ phận dùng, các nhóm bệnh được sử dụng. Các phương pháp sử dụng gồm có: điều tra cộng đồng, thu thập mẫu vật, định danh tên loài, đánh giá tính đa dạng nguồn tài nguyên cây thuốc. Kết quả nghiên cứu bước đầu xác định được 59 loài, 54 chi, 41 họ thuộc 3 bộ có mạch Polypodiophyta, Pinophyta và Magnoliophyta được người dân tộc Cơ Tu sử dụng làm thuốc chữa bệnh. Rễ và củ là bộ phận được sử dụng phổ biến nhất của đồng bào dân tộc thiểu số Cơ Tu. Người dân tộc Cơ tu đã sử dụng nhiều cây thuốc nhất để chữa bệnh khớp và các bệnh về hệ tiêu hóa. Bảy loài đã được ghi trong Sách Đỏ Việt Nam (2007), Danh lục Sách Đỏ của Liên minh Bảo tồn Thiên nhiên Quốc tế (IUCN, 2022) và Nghị định 84/2021/NĐ-CP của Chính phủ.

Từ khoá: Cây thuốc, dân tộc Cơ Tu, huyện Tây Giang, tri thức bản địa.

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