The Diversity of Medicinal Herbs of Bogani Ethnic in Bolaang Mongondow, North Sulawesi

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ABSTRACT

As so far, modern medical system has rapidly progress; however traditional medical system is still prevailing for the most Indonesian people. Bogani ethnic in Residency of Bolaang Mongondow still use traditional medical system. As evidence, traditional medicine ingredients are still used in their daily living. In the case, traditional medicine was used to treat many diseases, from minor diseases (headache, cough, and influenza, to the acute ones such as lung inflamed (TBC), liver and tetanus. The research objectives are : (1) to inventory and describe the medicine plant species; (2) to study plant usage as traditional medicine ingredients for many diseases ; (3) as conservation effort of traditional medicine knowledge because most of them not inherited and have limited data, and (4) to collect scientific information regarding the peculiar property of medicine herb where the research information is potential for pharmacology research in order to discover a new medicine ingredient. A rapprochement method for the research is *ethno-directed sampling*. Following Friedberg (1993) in Purwanto (2002), *ethno-directed sampling* methods is a data collection of medicine herb material that based on the local knowledge (ethnic) about medicine herbs, treatment technique, ingredients technique and other aspects that related to public health and conducted with ethnoscience approach. Ethnoscience is an approach that enable us to achieve deep understanding and reveal community knowledge system about medicine herb, treatment technique, ingredient technique and other aspect that related to public health. Qualitative and quantitative approach was used as data collection technique.

The result showed that there were 56 species of herbs used as traditional medicine material for Bogani ethnics in Bolaang Mongondow, North Sulawesi. The herbs were generally collected from forest area, garden near with settlement area and indeed from cultivation product at yard. There were 34 families of medicine herbs and most of them including family of Euphorbiaceae, Labiatae, Verbenaceae, Araceae, and Asteraceae. Chemical analysis results showed that 8.9 % of medicine herbs contained terpenoid, 42.8 % of medicine herbs contained steroid, 53.5 % contained tannin, 50 % contained flavonoid, 75 % contained alkaloid, and 30 % contained saponin. The analysis indicated that most of herbs positively contained alkaloid as active medicine compound. However the analysis was only as pretest in determining active compound in a medicine herb. There are some medicine herbs classified as endemic should be given priority to be cultivated immediately because their existence are more and more scarce such as *Areca vestiaria, Musa sp*,and *Ficus minahassae*. The herbs are almost extinct and need other proper alternative to conserve them.

Key Words : Medicinal plants, Bolaang Mongondownese, North Sulawesi, Biology Program, Department of Mathematics and Basic Sciences, Sam Ratulangi University, Manado, North Sulawesi

INTRODUCTION

Medicines are very important necessity for human being. Human necessities for the medicines evoke a close relationship between human and forest in their daily living and they have high traditional knowledge in utilizing the medicine herbs.

In order to be up against disease healing problems, human being has developed a wide array of knowledge including trust, technique, contribution, value, norms, ideology, attitude, custom, ritual, and many of symbol/sign that has interrelationship one each other. In the case there is certain herbs that can be used as traditional medicines ingredient, whether by absorbing and lubricating at painful part of body.

As so far, although modern medicinal system has rapidly progress, however traditional medicinal treatment system, called as phyto-pharmacy is still prevailing at the most Indonesian people. There is a tendency that modern society to be back again to nature following the popularity of traditional methods, both in domestic and foreign countries. Traditional knowledge system can be shown by many activities forms, for example ritual ceremony of certain faith that use many kind of plants. Utilizing plants as traditional medicine material is more and more increasing because generally there is no side effect than the modern one.

Bogani ethnic in of Bolaang Mongondow Residency still use traditional medical system. As evidence, traditional medicine ingredients are still used in their daily living. In the case, traditional medicine was used to treat many disease, from minor disease (head ache, cough, and influenza, to the acute one such as lung inflamed (TBC), liver and tetanus.

The research objectives are: (1) to inventory and describe the medicine plant type, (2) to study plant usage as traditional medicine ingredient for many disease, (3) as conservation effort of traditional medicine knowledge because most of them not inherited and have limited data, and (4) to collect scientific information regarding the peculiar property of medicine herb where the research information is potential for pharmacology research in order to discover a new medicine ingredient.

This paper presents inventory result of traditional medicine herbs in Bogani ethnics as indigenous people of Bolaang Mongondow Residency that occupy Sub-districts of Passi, Modayag and Lolayan.

Observation result at the research location showed that generally many village inhabitant still depend on their local nature for health safeguarding and source of medicine herbs material that was used by the great grand father long decade ago and they will go to physician only in emergency situation. According to the science and technology development, recently the young generation of Bolaang Mongondowenese tends to leave art and knowledge of traditional medicinal treatment because they are deemed as old fashioned. As a result, professional indigenous medical practitioner is difficult to be found while generally the existing practitioners are oldies. The condition should be alarmed because if any efforts to record and document the local arts and knowledge of medicine herbs is not carried out immediately, then the traditional technique of Bolaang Mongondowenese will be disappeared. In other hands, by integrating the natural resources and local culture, the habitat will be threatened by inhabitant attitude that exploit the

natural resources in irresponsible ways.

Due to the condition, medical herbs inventory in Bolaang Mongondow residency was carried out. The inventory activities are including identification of type, population, distribution, description and creating a database; traditional use and peculiar property; study the chemical content, and making conservation effort to protect scarce and endemic medicine herbs.

METHODOLOGY

a. Research Location

The research was carried out at inhabitant of Bogani ethnics that occupy three sub district of Bolaang Mongondow Residency, Province of North Sulawesi namely sub district of Passi, Modayag, and Lolayan. The research was conducted from May to September 2004.

b. Research Approach

Rapprochement method for the research is *ethno-directed sampling*. Following Friedberg (1993) *in* Purwanto (2002), ethno-*directed sampling* methods is a data collection of medicinal herb material based on local knowledge (ethnic) about medicine herbs, treatment technique, ingredients technique and other aspects that relate to the public health and conducted with ethno science approach. Ethno science is an approach that enable us to achieve deep understanding and reveal community knowledge system about medicine herb, treatment technique, ingredient technique and others aspect that relate to the public health.

Ethno-directed sampling method has been widely used by researcher in developed countries such as Europe and America and proved as efficient methods in comparison with others. This is due to the fact that sampling material has been identified and tested by inhabitant group or certain ethnics and trusted knowledge system believed from generation to generation.

As mentioned above, *ethno-directed sampling* methods has much superiority to be used in medicinal herbs research activities. The approach is suitable to be applied in Indonesia setting with consideration that the country has rich biodiversity and various cultures. Knowledge observation of traditional medical treatment and medicine herbs in every community group or ethnics will result more variation and having higher possibility to find a new compound as the active material for new medicine (Purwanto, 2002).

For the researcher, the advantage is the availability of complete basic information particularly about type of medicine herbs and the chemical content.

c. Data Collection Techniques

Qualitative and quantitative approach was used as data collection technique. In the case, qualitative methods were based on participation method and in order to get more accurate data. Quantitative was used to analyze the respondent (informant).

Data collection was starting with local terminology terms about all observed aspects including nomenclature of herbs and all objects that related with medical treatment technique, type of disease, ingredient method and the usage. The next phase was collecting data about role and function of the observed aspects and the interrelationship of one aspect to the other. The other necessary data is local community concept about member of body function whether disturbed or not. In order to measure the community knowledge system, there is a guideline and description, while the analysis will describe many aspects including: (a) explicitly describing the body function; (b) revealing disease agent; (c) describing what supposed as good and bad condition at individual level; (d) revealing perception about medicine herbs use at medical treatment level and (e) describing practice methods.

In gathering medicine herbs specimen, there is not only *Voucher specimen* that was used for identification purpose but also collection of one parts of the herbs (leaf, fruit, flower, root) or complete part for chemical content analysis, pharmacology and other interest. Herbs sampling was carried out in conservation manner and take into account the environment condition and reducing possibility of habitat destruction. For the purpose, material sample should be treated carefully for chemical analysis.

Herbs material as sample was delivered to Herbarium Bogoriense for identification. Whereas analysis of chemical content was carried out at laboratory of Chemistry Department, Faculty of Mathematics and Basic Science, Sam Ratulangi University, Manado. The analysis of chemical content (saponin, tannin, flavonoid, triterpenoid and steroid) was done based on phytochemical methods (Harborne, 1984) and Natural Products: a laboratory guide (Ikan, 1991).

d. Population and Sample

The population is Bogani ethnics' community in sub districts of Modayag, Passi and Lolayan, Residency of Bolaang Mongondow, Province of North Sulawesi. The sample is the medicine herbs at the location.

The major sample is plant that was used as medicine material and informant that was selected with purposive manner, based on capacity. The informant is classified as : (a) starting point (base) informant, including custom prominent figure, government and religion; (b) principal (main) informant, including traditional medical treatment practitioner and community member that exactly know about medicine herbs; and (c) informal-complement informant, including customary community member with sufficient knowledge about medicine herbs.

e. Data analysis

Data analysis process was based on qualitative and quantitative description. The quantitative data was analyzed statistically whereas interval and probability level will indicate the value. There are three general approaches in order to analyze ethnobotany quantitative data, namely (1) informant consensus, (2) subjective allocation, (3) total utilizing (Purwanto, 2002).

RESULT AND DISCUSSION

A. Perception of Bogani ethnic people about disease

According to observation result, local people consider nature as regular system, in balance and harmonic. Emerging of disease was caused by physical factors (food, climate, poison, microbe and so on) and non physical factors that related with supernatural nature (invisible power). Therefore in treating a disease, besides using medicine herbs, they also ask the indigenous medical practitioner (*local expert*) that use *mantra* (words or combination of words that are chanted or sung as prayer), charm or trusting on supernatural goods. In addition, there are some rules that should be obeyed or prohibition that should not be violated. The medical treatments also have close relationship with philosophies and biological factors.

As so far, although modern medicinal system has rapidly progress, however traditional medicinal treatment system called as phytopharmacy is still prevailing for the most Indonesian people. There is a tendency that modern society to be back again to nature following the popularity of traditional methods, both in domestic and foreign countries. Traditional knowledge system can be shown by many activity forms, for example ritual ceremony of certain faith that use many kind of plants. Utilizing plants as traditional medicine material is more and more increasing because in general there is no side effect than the modern one.

Bogani ethnic in Bolaang Mongondow still use traditional medical system. As evidence, traditional medicinal ingredients are still used in their daily living. In the case, traditional medicine was used to treat many disease, from minor disease (headache, cough, and influenza, to the acute one such as lung inflamed (TBC) ,liver and tetanus.

Knowledge, art and skill about management and utilization of traditional medicine herbs vary among Indonesian ethnics, e.g. Bogani ethnic in Bolaang Mongondow Residence. Usually, not all of community members understand about management and utilization of traditional medicinal herbs, however only those who are known as village practitioner (*local expert in medicinal plant*). The local expert will select another person to teach and generate their knowledge, art and skill, except for the family, with certain requirement, even only through a dream.

As in sub district of Lolayan, there are many village practitioners that obtain traditional medicinal treatment methods through their dreams and until now there are many people use the practitioner service and get recovery whereas patient that take medicine the physician does not. Mean while The village practitioner in sub district of Modayag obtain their traditional medicinal treatment methods by hearing from generation to generation, from their parent to children or grandchild although they should fulfill specific requirement whereas the children should assist the father as long as medical treatment and also searching and collecting medicinal material from surrounding garden or forest

There are some requirements that should be violated by village practitioner to make medical treatment, for example not accepting money for payment or goods from the

patient. If the requirement is violated, the quality of medicine ingredient will be lower and the disease will not be recovered.

B. Diversity of medicinal herbs

The result shows that there are 56 species of herbs that were used as traditional medicine material for Bogani ethnics in Bolaang Mongondow Residency, Province of North Sulawesi. The herbs generally collected from forest area, garden near settlement area and indeed from cultivation product at yard.

There are 34 families and the most widely used are the families of *Euphorbiaceae, Labiatae, Verbenaceae,Araceae,* and *Asteraceae.* Parts of herbs that most used are leaf (41), stem (6), all of herbs (4), root (3), flower (1) and fruits (1).Forest medicinal herbs products are including forest banana (*Musa* Sp.), *Areca avestiaria, Pandanus Sp., Xanthosoma violaceum, Poikilospermum suaveolens, Bischovia javanica, Ficus minahassae, Erthrina variegata, Drymoglossum piloselloides, Clerodendrum buchanii,* and *Syzygium spicatum.* Among the forest species, there are some medicinal herbs classified as endemic that should be given priority to be immediately cultivated because their existence are more and more scarce such as *Areca vestiaria, Musa* sp,and *Ficus minahassae.* The herbs are almost extinct and need other proper alternative to conserve them both in-situ and ex-situ. Local community should maintain the species in order not to be cut by irresponsible person and particularly for *Areca vestiaria,* there is an effort to cultivate at garden near settlement. Whereas *Ficus minahassae* is kept to be grown at forest and people only use if necessary.

However many of the medicinal herbs are also originating from other regions as outsider herbs. For example *Abelmoschus moschatus,* a vegetables plant from India and West Africa. The vegetables used to heal TBC disease and also as local unique food called as "*yondok*", cooked with coconut milk. At Residency of Minahasa, their vegetable is one of vegetable materials to make Manado mush or known as "*tinutuan*".

In the region, there are also found many medicinal herbs are used by other region. The medicinal herbs are including, *Costus megalobractea, Imperata cylindrica, Eleucina indica, Melastoma candidum, Orthosiphon spicatus, Ageratum conyzoides, Centella asiatica, Jatropha curcas, Piper betle, Canna edulis,* and *Physallis peruviana.* However there is different usage whereas the same medicinal herbs were used to treat different disease. For example, *Piper aduncum* in Sundanese ethnics was used to treat abscess disease and as mercurochrome for new wound (referring to medical herbs inventory book of Hutapea *et al.* 2001, part 2) that was published by Department of Health Jakarta. Bogani ethnics use the herbs for diabetes and kidney by taking all part and cooked with 3 glass of water, drunk for 3 times a day. *Physallis peruviana* in other region was used for bronchitis while at Bogani ethnic was used to treat diabetes and kidney. *Peperomia pelleida* in other region was used for kidney and stomach disease while at Bogani ethnic was used to treat high blood tension disease by taking 3, 5, 7, 9 of leaves, cooking with glasses of water plus sufficient sugar palm and drunk for 3 times a day. *Sellaginela tamariscina* in other region was used for cancer (Djauharia & Hernani, 2004), while at Bogani ethnic it was used to treat liver, kidney, and high blood tension disease, by taking 3 clumps, washed and cooked with 3 glasses of water, drunk for 3 times a day.

Table 1 show the list of medicinal herbs, origin, scientific name, type of disease and chemical content.

Table 1. List of medicine herbs, origin, scientific name, type of disease and chemical content.

No	Origin	Scientific Name	Family	Chemical Content	Use
1	Adam Hawa	*Rhoe discolor*	Commelinaceae	Steroid, Tannin, Flavonoid, Alkaloid	Hepatitis
2	Alikokop	*Dischidia nythesiana*	Asclediadaceae	Alkaloid, Saponin	Cancer
3	Bage	*Ipomoea batatas*	Convolvulaceae	Flavonoid, Saponin	Cardio-tonic
4	Balasai	*Jatropha curcas*	Euphorbiaceae	Steroid, Flavonoid	Diarrhea
5	Bambeletan	*Casia alata*	Leguminosae	Triterpen, Alkaloid	Scabies
6	Beabat	*Psidium guajava*	Myrtaceae	Flavonoid, Tannin	Diarrhea
7	Bogu	*Melia azedarach*	Meliaceae	Tannin, Saponin	Asthma bronchial and dysentery
8	Bonok	*Peperomia pellcida*	Piperaceae	Steroid, Tannin, Flavonoid	Hypertension
9	Bonok tagapis	*Scoparia dulcis*	Scorphulariaceae	Tannin, Saponin	Cancer and sinusitis
10	Bontol		Asteraceae	Steroid, Tannin, Alkaloid	Conjunctivitis
11	Boyoba	*Physallis peruviana*	Solanaceae	Steroid	Nephritis and Diabetes
12	Bungang Torompet	*Brugmansia suaveolens*	Solanaceae	Flavonoid, Alkaloid	Sinusitis
13	Cukuran	*Mentha merdinah*	Labiatae	Alkaloid, Steroid, Tannin, Flavonoid	Diabetes, liver, hypertension & asthma bronchial
14	Diat	*Andropogon Zizanoides*	Gramineae	Alkaloid, Steroid, Tannin, Flavonoid	Nephritis
15	Dingin	*Morinda tinctoria*	Rubiaceae	Alkaloid, Steroid, Tannin, Flavonoid	Tuberculosis
16	Dodolipon	*Xanthosoma violaceum*	Araceae	Steroid, Alkaloid	Bone fracture, Anti-fertility
17	Doit-doit	*Drymoglossum piloselloides*	Polypodiaceae	Tannin, Alkaloid, Saponin	Cancer, poisonous insect
18	Dondoyuta	*Hyptis suaveolens*	Lamiaceae	Steroid, Tannin, Alkaloid	Headache, dizzy, influenza
19	Kamiri	*Aleurites moluccana*	Euphorbiaceae	Tannin, Flavonoid, Alkaloid	Varices

20	Kapunggi	*Alsophila glauca*	Cyatheaceae	Flavonoid, saponin	Stomachache, gastritis and diarrhea
21 22	Kayu Keng Kayudondo	*Bischovia javanica* *Vitex negundo*	Euphorbiaceae Verbenaceae	Tannin Alkaloid, Steroid, Tannin, Flavonoid	Hemostatis Diabetes, liver, Hypertension and asthma bronchial, antipyretic
23	Kolintama	*Homelomena cordata*	Araceae	Tannin, Alkaloid	Cancer
24	Kolot	*Blumea riparia*	Asteraceae	Alkaloid, Steroid, Tannin, Flavonoid	Anti-fertility
25	Kontat	*Canna edulis*	Cannaceae	Steroid, Tannin, Flavonoid, Alkaloid	Dysentery
26	Koyondom	*Pogestemon heyneanus*	Labiatae	Tannin, Alkaloid	Asthma bronchial
27	Kumis pinggo	*Orthosiphon spicatus*	Labiatae	Steroid, Tannin, Alkaloid	Anti Malaria & Lumbago
28	Kuyanga Binangoan	*Coechorus acutangulus*	Tiliaceae	Flavonoid, Alkaloid, Saponin	Titache & uric acid
29	Leilem	*Clerodendrum sahelangii*	Verbenaceae	Steroid, Flavonoid	Tuberculosis
30	Lumbuon	*Acalypha caturus*	Euphorbiaceae	Alkaloid, Tannin, Flavonoid	Nephritis
31	Mamaan	*Areca avestiaria*	Palmae	Tannin, Alkaloid, Steroid, Flavonoid	Diabetes
32	Mayana	*Coleus scutellaroides*	Labiatae	Tannin	Diabetes, liver, Hypertension & Asthma bronchial
33	Menggosian	*Clerodendrum inerme*	Verbenaceae	Steroid, Tannin, Flavonoid, Alkaloid	Diabetes, liver, Hypertension & Asthma bronchial
34	Obuyu	*Piper betle*	Piperaceae	Flavonoid, Saponin	Scabies
35	Obuyu	*Piper aduncum*	Piperaceae	Triterpen, Tannin, Alkaloid	Asthma
36	Oilu adi	*Blumea balsamifera*	Asteraceae	Alkaloid	Antipyretic, Fever
37	Oyobung adi	*Selaginella tamariscina*	Selaginellaceae	Steroid, Alkaloid	Hypertension, liver and
38	Pidai	*Poikilospermum suaveolens*	Moraceae	Triterpen, Alkaloid,	Bone fracture
39	Polaguyon/ kayu besi	*Syzygium spicatum*	Myrtaceae	Steroid, Tannin, Flavonoid, Alkaloid	Cough
40	Pomia insumbu	*Gossypium herbaceum*	Malvaceae	Flavonoid, Alkaloid	Asthma bronchial

41	Pondang hutan	*Pandanus Sp.*	Pandanaceae	Alkaloid	Obstetric, gynecological, reproduction
42	Sesewanua	*Clerodendrum buchananii*	Verbenaceae	Alkaloid, Saponin	Antipyretic Meteorismus
43	Siangga	*Impatiens semen*	Balsaminaceae	Flavonoid, Alkaloid	Burnt
44	Siol kabalo	*Centella asiatica*	Apiaceae	Steroid	Nephritis
45	Sombar	*Erythrina variegata*	Papilionaceae	Triterpen, Tannin, Alkaloid, Saponin	Antipyretic, fever and dysmenorrhea
46	Tagin	*Musa Sp.*	Musaceae	Flavonoid, Saponin, Alkaloid	Tetanus
47	Tariokang	*Ipomoea aquatica*	Convolvulaceae	Tannin, Flavonoid, Saponin	Furunculous
48	Tomitomilow	*Aneleima malabatricum*	Commelinaceae	Steroid, Tannin, Alkaloid	Decreasing fever
49	Tongit	*Ageratum conyzoides*	Compositae	Steroid, Tannin, Flavonoid, Alkaloid	Homeostatic & decreasing swollen
50	Tontoigon	*Eleucine indica*	Poaceae	Saponin	Bone fracture, uric acid
51	Tontuatoy	*Costus megalobrachtea*	Zingiberaceae	Flavonoid, Alkaloid, Saponin	Fever and stomachache
52	Tukadan	*Jatropha gossypifolia*	Euphorbiaceae	Alkaloid, Steroid, Tannin, Flavonoid	Tuberculosis, Dysentery
53	Tuyat	*Derris eliptica*	Papilionaceae	Tannin, Flavonoid	Fish poison
54	Udun bolian	*Ficus minahassae*	Moraceae	Tannin, Alkaloid, Steroid, Flavonoid, Saponin	Kidney and Nephritis
55	Uto	*Andropogon zizanoides*	Gramineae	Tannin, Flavonoid, Saponin	Stomachache, Gastritis and diarrhea
56	Yondok mopura	*Abelmoscus Sp.*	Malvaceae	Triterpen, Alkaloid	Hemoptysis and Tuberculosis

C. Chemical Analysis

Chemical analysis result shows that 8.9 % of medicine herbs contain Terpenoid, 42.8 % contain Steroid, 53.5 % contain Tannin, 50 % contain Flavonoid, 75 % contain Alkaloid, and 30 % contain Saponin. The analysis indicated that most of herbs positively contain alkaloid as active medicine compound. However the analysis is only as pretest in determining active compound in a medicine herb.

1. Alkaloid Analysis

Herb sample analyzed for alkaloid and obtained 75% positive contain alkaloid. According to Meistiani (2001), alkaloid effects for medication are anti-hypertension, anti-diabetes mellitus, nerve system, increase blood pressure, reduce pain, and anti-microbial. In this study, herbs that are used as anti-hypertension are *badak* (*Hemigraphis colorata*), *benalu*, *cukuran* (*Mentha merdinah*), *gedi* (*Abelmoschus moschatus*), and *menggosian* (*Clerodendron inerme* L.). Herbs that uses for diabetes mellitus are *boyoba* (*Physallis peruviana* L.) and *kayubondo* (*Vitex negundo* L.). All herb mentioned are positive to alkaloid.

According to Hermawan (2002), alkaloid also uses as medication to inhibit growth of tumor. In this study, alkaloid have the biggest possibility as active compound medicine the cancer, for example: *alikokop* (*Dischidia nythesiana*), *doit-doit* (*Drymoglossum piloseloides* L.), and *kolintama* (*Alocasia cucclata*). The examples for alkaloid compound are nicotine and caffeine.

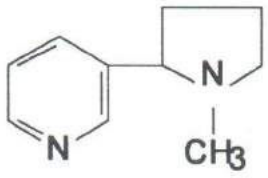


Figure 1. Nicotine

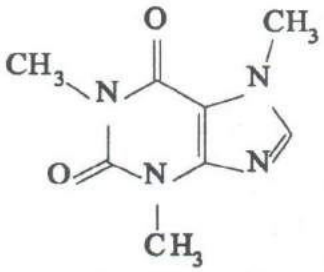


Figure 2. Caffeine

2. Flavonoid Compound

Flavonoid is located almost in entire plant include the fruit, pollen, root and bar (Ikan, 1991). Flavonoid is also used as traditional medication because it can inhibit fosfodiesterase, aldoreductase, monoaminaoxidase, protein kinase, DNA polymerase, and lipooxidase. Flavonoid also acts as anti-oxidant, liver dis-function, reduce blood coagulation, prevent bleeding (skin), and anti-hypertension. Example of Flavonoid is flavon, the yellow pigment of plant.

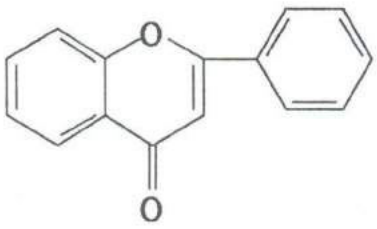


Figure 3. Flavonoid

According to Sianturi (2001), active Flavonoid compound is used as anti-allergic,

anti-tumor, anti-hepatotoxic, cardiovascular, and anti-oxidant. In this study, plants used as anti-hepatitis that positive for flavonoid are *adam-hawa* (*Rhoe discolor* L.), *mayana* (*Coleus scutellariodes*), and *pikit* (*Ocinum basilicum* L.).

3. Triterpenoid and Steroid Compound

Triterpenoid and steroid analysis can be done at the same time, because both compounds are terpenoid that semipolar and noncondense. This analysis is based of both ability to form the color differ by acid addition consentrate sulphuric acid and ethanoic acid anhydride.

Skualene hydrocarbon (Figure 4) is acyclic triterpenoid considered as steroid biosynthesis. The most important and common pentacyclic triterpenoid in spermatophyte is ursolic acid (Figure 5).

Triterpenoid is an active compound in medical plants to cure diabetes, menstruation problem, snakebite, skin problem, liver damage, malaria, anti-bacterial, and anti-viral antibiotic. Steroid is connected with cholesterol, vitamin D, and sex hormone. Plant steroid is referred to sterol with the hydroxyl bond on C-3 position (Robinson, 1995). The example of sterol is β-cytosterol (Figure 6).

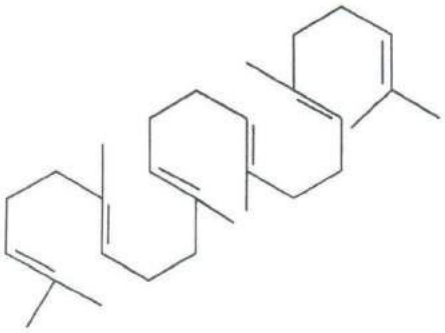


Figure 4. Skualene

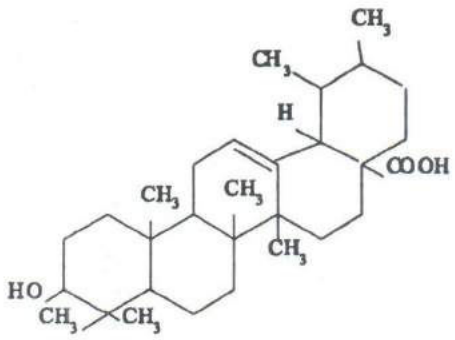
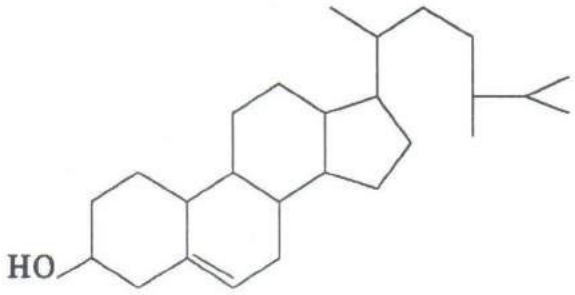


Figure 5. Ursolic acid



Ficure 6. β-sitosterol

In this study, there is only 8.9 % from sample that was positive to triterpenoid test. Plant used as wound medication that positive for triterpenoid are *siangga jantan* (*Impatiens semen*), while *siangga betina* (*Impatiens balsamina* L.) used as anti-diabetes.

According to Harborn (1987) and Robinson (1995), steroid has a role as sex hormone. In this study, only 42.8 % from sample showed steroid existence. Plants used as contraception that show positive for steroid analysis are *dondolipon* (*Xantosoma violaceum*) and *kolot* (*Blumea riparia* (Blume) DC.).

4. Tannin compound

Tannin compound is available widely in vascular plants, especially in angiosperm woody tissue (Harborne, 1987). According to Tedder (1972), tannin is divided in two classes, hydrolyzed tannin and unhydrolyzed tannin or proantosianidin (Figure 9). hydrolyzed tannin molecule has D-glucose as center while half or all hydroxyl group esterized with galic acid like galotannin (Figure 7) or elagic acid like elagitannin (Figure 8).

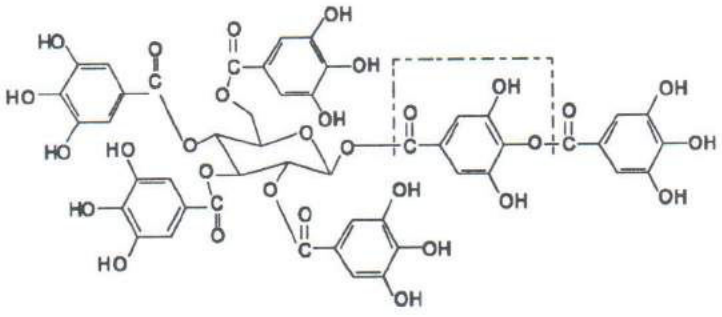


Figure 7. Galotannin

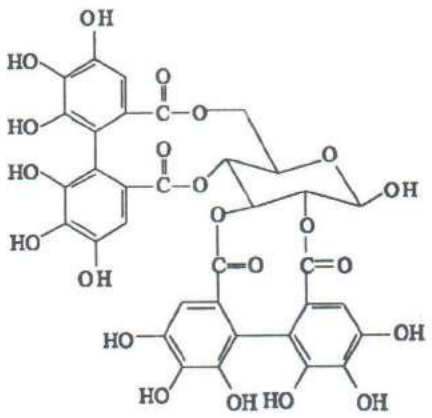


Figure 8. Elagitannin

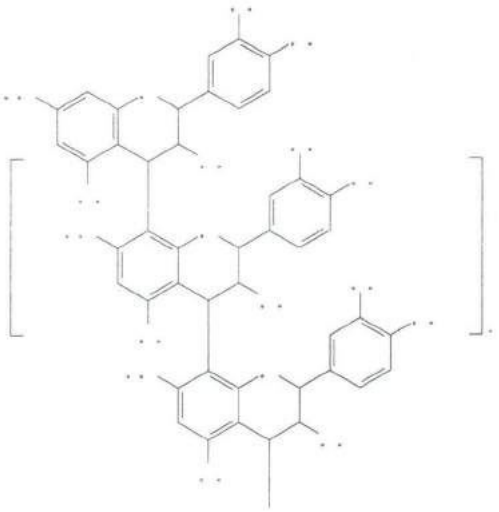


Figure. 9. Proantosianidin

Some of tannins are proved to have anti-oxidant activity, inhibit tumor growth, and inhibit enzyme like "reverse" transcriptase and DNA topoisomerase (Robinson, 1995). But in this study, the plant that is used as anti-tumor/anti-cancer is negative for tannin analysis. Positive result is shown by anti-asthma, *bogu* (*Melia azedarch* L.).

5. Saponin Compound

Saponin is a strong active-surface compound that causes foam when shakes. Some saponin work as anti-microbial (Robinson, 1995). Saponin can also be used as industrial raw material for sex hormone production. The main sources of saponin are high level plants, especially from Liliaceae, Solanaceae, and Scrophulariceae families (Manitto, 1992). Saponin also has ability to absorb cholesterol so it also reduces atherosclerosis (Arcuri, 2004). According to Lacaille and Wagner in Kayun (2003), saponin has specific activity that connects with cancer like cytotoxic, anti-tumor, anti-inflammation, anti-allergic, anti-viral, anti-hepatotoxic, anti-diabetes, and anti-fungal.

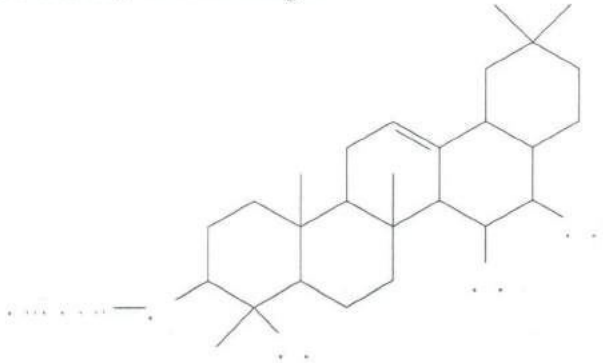


Figure 10. Saponin

This study analysis results that 7 plants use positive for saponin test, they are *adam-hawa* (*Rhoe discolor* L.), *cukuran* (*Mentha merdinah*), *oyobung adi* (*Selaginella tamariscina* (Bauv.) Spring), *mayana* (*Coleus scutellarioides*), *pikit* (*Ocinum basilicum L.), siangga* (*Impatiens balsamina* L.). and *tomi timilow* (*Spilanthes ocymifolia* Moore).

Tabel 2. Type of disease and medicine herbs

No.	Type of disease medicine herbs	Number of medicine herbs species
1.	Analgetic anesthetic	1
2.	Antitussive	5
3.	Antimalaria	1
4.	Antiinflammatory	9
5.	Antipiretik	6
6.	Antiswelling	3
7.	Carminative	2
8.	Hemoptysis	6
9.	Hemostatic	1
10.	Diabetes	13
11.	Nephritis	17
12.	Asthma bronchial	6
13.	Cardiotonic	1
14.	Medicine for women,obstetrik or gynecological	3
15.	or reproduction	3
16.	Influenza	14
17.	Gout	13
18.	Hypertensi	3
19.	Hemostatis	3
20.	Fractur	1
21.	Titanus	5
22.	Medicine for skin	4
23.	Cancer	1
24.	Conjunctivitis	1
25.	Antidote for poisoning	1
26.	Poison	1

D. Conservation Aspect

Most of village communities are still depending on the surrounding environment to maintain their health and medical treatment particularly from medicinal herbs that have been used by their grandfather long time ago and they will go to the physician only in

emergency situation because the distance to the capital city of residency is far.

Following the development of science and technology, recently the young generations of local community tend to leave the art and knowledge of traditional medicinal treatment because they deemed it as old fashioned. As a result, professional indigenous medical practitioner is now difficult to be found. The condition should be alarmed because if any efforts to record and documented the local arts and knowledge of medicine herbs are not carried out immediately, then the traditional technique of Bolaang Mongondowenese will be disappeared. In other hands, by integrating the natural resources and local culture, the habitat will be threatened by inhabitant attitude to exploit natural resources in irresponsible ways.

Due to the condition, medical herbs inventory in Bolaang Mongondow residency was carried out. The inventory activities are including identification of type, population, distribution, description and creating a database; traditional use and peculiar property; to study chemical content, and making conservation effort to protect scarce and endemic medicine herbs.

In the case, local community should cultivate the medicine herbs to support environment sustainability and maintain the biodiversity. If it is not then the extinction of the biodiversity will occur.

For the traditional medical treatment per se, both family and community of Bogani ethnic have conducted planting and cultivating of medicine herbs. The plants have been cultivate at yard and garden near the settlement area.

However, there are some medicinal herbs that classified as endemic that should be given priority to be immediately cultivated because their existence are more and more scarce including *Areca vestiaria, Musa sp*,and *Ficus minahassae*. The herbs is almost extinct and need others proper alternative to conserve them.

CONCLUSION

There were 56 species of herbs used as traditional medicine material for Bogani ethnics in Bolaang Mongondow, North Sulawesi. The herbs were generally collected from forest area, garden near with settlement area and indeed from cultivation product at yard. There are 34 families of medicine herbs and most of them including family of Euphorbiaceae, Labiatae, Verbenaceae, Araceae, and Asteraceae. Chemical analysis results shows that 8.9 % of medicine herbs contain terpenoid, 42.8 % of medicine herbs contain steroid, 53.5 % contain tannin, 50 % contain flavonoid, 75 % contain alkaloid, and 30 % contain saponin. The analysis indicated that most of herbs positively contain alkaloid as active medicine compound. However the analysis is only as pretest in determining active compound in a medicine herb. There are some medicine herbs classified as endemic should be given priority to be cultivated immediately because their existence are more and more scarce such as *Areca vestiaria, Musa sp*,and *Ficus minahassae*. The herbs are almost extinct and need other proper alternative to conserve them.

Bogani ethnic inhabitant considers nature as regular system, in balance and harmony. The concept is local wisdom that contains conservation aspect for nature and

environment preservation. There is a tendency for the extinction of traditional medical treatment knowledge, if the inventory activities were not immediately conducted because most of knowledge is not inherited anymore to the young generation (village practitioners are in old age condition).

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