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Site Characteristic of Medicinal Plants for Domestication in South Kalimantan, Indonesia

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Abstract: ***Medicinal plants are an important part of community life, especially as a source of livelihood. Generally 80% of the world's population relies on medicinal herbs. People was living around forest areas have local knowledge in the utilization of forest plants, one of them is for traditional medicine, conducted since the days of our ancestors and passed down from generation to generation indirectly. Some ethnic groups in Hulu Sungai Selatan Region and TapinRegion were dependent existence of herbs as ingredients to support health and to maintain fitness. They believe in the efficacy of traditional herbs and they are relying on the forest. Based on research of RISTOJA 2012is that Dayak BukitEthnic in Hulu Sungai Selatan Regionfound 62 medicinal plants, and 60 potions derived from medicinal plants from forests, while the research results of RISTOJA 2015, on Ethnic Harakitin Tapin found as many as 111 species of medicinal plants and 93 potions, of which 82% are derived from forests. Most of them has not done cultivation yet. In reality only 20% of medicinal plants are cultivated, it indicates that the research and development of native medicinal plants is very low. In order to prevent the extinction and commercialization of medicinal plants it is essential to develop the cultivation of medicinal plants either in situ or ex situ. Some result of researchesstates that domestication is a method to maintain the productivity of natural medicinal plants.Departement of Forestry Republic of Indonesia stated that the direction of the preparation of medicinal plants need to pay attention to the technical aspects, especially the abiotic environment, including: soil type, pH, soil structure and soil fertility. Based on that, as an initial step in order domestication of some medicinal plants used by the people of Malinau and Harakit, South Kalimantan, it is necessary to do a study of physical and chemical properties of land from the original habitat ofplants, so that later can be developed elsewhere, with state media planting that resembles the original. It is very important because in the cultivation of medicinal plants avoided the use of fertilizers and chemicals. The results showed that soil permeability of medicinal plant habitat ranges: 0.17 to 4.66 cm /hour,it is included the slow-to-moderate category. Bulk density ranges from 0.94 to 142 g / cm3, including medium density. Particle density of 2.28 to 2.84 g / cm3 were moderate, porosity everything including special (minimum 25%). Total N content from 0.07 to 0.18 was high, organic C from 1.17 to 3.74%), including low to moderate P content from 9.48 to 47.49 mg / 100 g, including low until high. The degree of acidity (pH) of the soil ranged from 4.29 to 6.45, including acid to slightly acid, it does show that medicinal plants can grow in less fertile soil.***

Keywords: medicinal plants, domestication, physic-chemical soil, fertility

1. Introduction

Indonesia is known as a storehouse of medicinal plants (herbs) so it can call live laboratory. In the area of Indonesia's tropical rain forest there are 30,000 species of plants, more than 8,000 species of medicinal plants, and 800-1200 species have been used by the community for traditional or herbal medicine **[25]**. Aproximately 80% of world's population is believeed to rely, to some extent, on medicinal plants **[10]** and than 10% of world's approximately 250,000 flowering plant species have been examined for pharmaceutical properties **[41]**.

In the region of South Kalimantan itself, based on the results RISTOJA 2012 and 2015 there were 60 species of medicinal plantusedby people in Dayak BukitEthnic, Malinau Sub-district, Hulu Sungai Selatan Region and 111 species in HarakitEthnic, Piani Sub-district, Tapin Region. About 82% species is still obtained in forest, and not cultivation yet **[12], [1]**. Dhar et al (2000) says that only 20% of medicinal plants cultivated reflects the low research and development research endemic of medicinal plants. This fact is very unfortunate given the utilization trend of mecinal plants actually showed an increase in line with the trend of people to return to nature (back to nature). According to the WHO, about 65% of the population in developing countries use herbal medicines**[2]**, **[30]**.Indigeneous forest-dwelling peoples tend to be particularly dependent upon medicinal plants and often possess exceptional medicinal plant knowledge **[5]**, **[19]**, **[23]**. However, exposure to modern culture, increased trade, and access to modern culture, increased trade, and access to modern coveniences (including modern medicines) ae altering the distribution and extend the local knowledge and use of medicinal plants in these societies **[21]**, **[29]**, **[33]**.

Dependence of Medicinal plantto the forest and utilization still many original plants conventionally, requiring the role of experts aquaculture **[31]** and the need to develop cultivation techniques either in situ or ex situ, said that the research policy of medicinal plants development is still mined from nature, so it needs domestication**[36]**. Domestication is the process of wild plants into crops by planting in the new habitat. Ministry of Forestry RI (2004) states that the cultivation of medicinal plants must pay attention to the technical aspects, particularly about the soil aspect.The growth and reproduction of medicinal plants can be adversely affected by slight micro-climatic changes and loss of specific bark conditions found only on certain mature canopy trees **[45]**. Medicinal plant diversity was highest in old secondary forest (79 species), river bench (61 species), and primary forest sites (42 species, and lowest in logged (18 species) and early successional forests (29-37 species) **[3]**. The Ransa classification system includes four successional stages reflectingthe transition from abandonment of recently cultivated swiddens through

primary forest and parallels that decribed by typical ecologists **[32]**, **[45]**.

Based on this background as a first step of domestication is necessary to advance ecological habitats studied medicinal plants, including soil quality (physical and chaemical properties of soil). The purpose of study was to determine the soil Characteristic native habitat of four (4) types of medicinal plants are frequently used by etno botanistof Dayak Bukit Ethnicin Malinau Sub-district and HarakitEthnic in Piani Sub-district. The benefits of this research is to be able to create a nursery in the greenhouse and determined cropping media in accordance with the needs of each type of medicinal plants, and can be made manual seeding of each species of medicinal plants in accordance with characteristic of soil as well asoriginal habitat.

2. Research Methodology

Study period was for seven months, starting from preparation, site survey and data collection, data analysis and report. The method used purposive sampling, data collection means the place where found medicinal plant. The soil characteristic parameters studied were soil physical properties, included: soil texture, permeability, bulk density, particle density and porosity. and chemical properties of soil, included; N-total, C-organic, P-total, pH and CEC (cation exchange capacity). Data and additional information are the coordinates where the discovery of medicinal plant itself andit's altitude.

2.1 Study Location

The study was conducted in the of Malinau Sub-District and PianiSub-District, South Kalimantan Province.This location is the natural habitat where we were found seven species of mecinal plants, namely; manggarsih (*Parameria laevigata*(Juss.) Moldenke), pikajar (*Schizaea digitata* (L) Sw.), kayu sisil laki (*Litsea* sp.), bayuan (*Coptosapelta tomentosa* Korth.), tambar bisa (*Clausena excavata* Burm.f.), pasak bumi (*Eurycoma longifolia* Jack) and akar waring (*Coptosapelta tomentosa* Valeton ex K.Heyne).

Picture 1: Location of research

2.2. Soil analyses

Study period was for seven months, starting from preparation, site survey and data collection, data analysis and report. The method used purposive sampling, data collection means the place where found medicinal plant. *As* an assessment standard for soil fertility degree, i.e. soil texture (sand, dust and clay), soil permeability, bulk density, density particles, porosity, soil acidity (pH), soil nutrients N, P, K, C-org, Ca, Mg, Na, Al, KB, and Cation Exchange Capacity (CEC).

This research begins with preparation. The method used in this research is descriptive survey method with sampling by purposive sampling. In general, research conducted onfour stages, namely: (1) preparation, (2) field implementation, (3) laboratory analysis, and (4) data analysis/discussion.

The preparation stage includes the preparation of field survey equipment. Required equipment such as a ground drill, sample ring and equipment and other materials. Field implementation stage is the activity of soil sampling. In each land area two composite soil samples were taken at a depth of 0-20 cm. At each sample point, soil samples were taken in a disturbed condition using a soil drill and which were not disturbed using the sample ring.

The stage of laboratory analysis is carried out in Soil Fertility laboratory Faculty of Agriculture Universitas Lambung Mangkurat. The disturbed soil samples were dried and sieved using a 2 mm sieve, while the undisturbed soil samples were directly weighed for soil weight and then partially filled with water to analyze some soil physical properties. The soil physical properties variables analyzed are as follows: Soil texture (fraction of dust, sand and clay) using pipette method, Porosity determined from Bulk Density determination using ring sample and Particle Density using pixometer with gravimetric method, and soil permeability using Constant Head Permeameter. The calculation of the porosity value of the soil follows the formula: Porosity = (1 - BD / PD) x 100%. Furthermore, the soil chemical properties analyzed were P and K total using the method of degradation with 25% HCl extract, total N using Kjeldhal macro method, C-organic extracted K-

Chromate using Walkley and Black method, P-available using Bray I extract spectrophotometer method, pH H2O (1: 2,5), interchangeable cations and Soil Cation Exchange Capacity extracted extract with NH4oAc 1 M pH 7.0 and interchangeable Al is extracted with 1N KCl using titrimetric method.

The last step is to analyze the physical and chemical properties of the soil and discuss it descriptively to know and study the soil chemical status and soil fertility. Assessment of soil chemical status using criterion of soil chemical properties based on criteria issued by Soil Research Institute in 1983. While soil fertility status was determined using soil fertility criterion assessment of fertility status based on criteria of Soil Research Center in 1995.

3. Result

Soil analysis done on the neighborhood where the medicinal plants found (seven plants medicinal plants) and is taken from two different locations (two ethnics, namely: Dayak Bukit Ethnic in Malinau Sub-district and HarakitEthnic in Piani Sub-district).

3.1. Physical soil properties of medicinal plant habitat

The results of analysis of soil physical properties, included: permeability, bulk density, particle density, porosity and texture are taken from two different locations, can be seen in **Table 1** and **Figure 1**.

Table 1: Analysis of soil physical properties of medicinal plant habitats

No	Physical soil properties	*S. digitata* (L) Sw.		*C. optosapelta tomentosa* Korth.		*C. excavata* Burm.f.		*E. longifolia* Jack	
		Site location		Site location		Site location		Site location	
		Malinau	Harakit	Malinau	Harakit	Malinau	Harakit	Malinau	Harakit
1	Permeability (cm/hour)	1,69	0,41	2,60	4,66	1,41	2,38	0,17	2,03
	Category*)	very slow	slow	moderate	moderate	bit slow	moderate	slow	moderate
2	Bulk Density (gr/cm3)	0,94	1,37	1,19	1,42	0,98	1,41	1,13	0,93
3	Particle Density (gr/cm3)	2,28	2,84	2,39	2,30	2,28	2,35	2,33	2,33
4	Porosity (%)	58,75	51,58	50,23	37,97	56,94	40,00	51,45	59,92
5	Tekstur (%)								
	Sand	43,09	58,42	56,99	58,09	36,45	64,09	28,93	19,06
	Dust	14,86	9,94	15,02	19,32	28,33	12,42	21,37	38,12
	Clay	42,05	31,64	27,99	24,59	35,22	23,49	49,70	42,81

Information : ***) Category of permeability based on Purwowidodo (2005)
****) Category based on Hasibuan (2006)
Malinau: A village where was found some medicinal plants and they were frequently used by Dayak Bukit Ethnic.
Harakit: A villaged where was found some medicinal plants and they were frequently used by Harakit Ethnic.

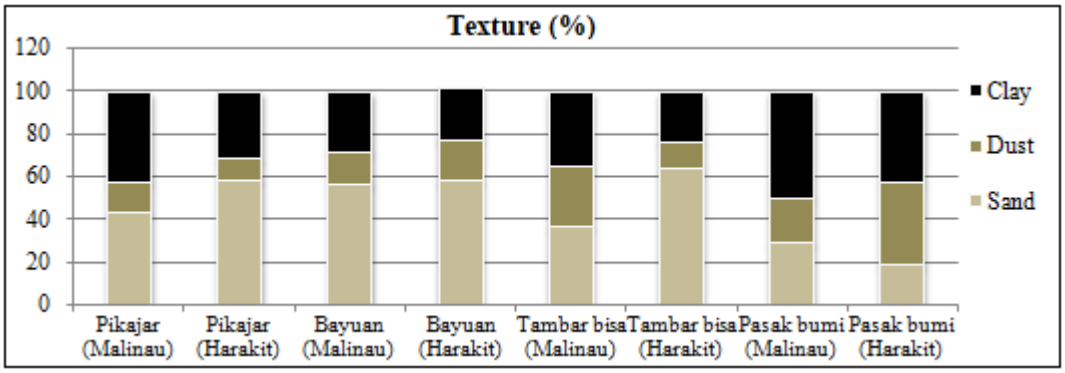

Figure 1: Soil texture characteristic of medicinal plants habitat

Based on result of researchshows the permeability generally has an inverse relationship with the bulk density and the same direction with porosity **[37]**. Permeabilityof soilwill increase with low bulk density and high porosity. Soil permeability on medicinal plant habitats is ranging from slow, a bit slow and moderate. Soil permeability is a parameter of soil physical properties that determine the speed of movement of water in the soil. Soil with low permeability desired for the rice fields that require a lot of water **[17]**,in this case means that the majority of medicinal plants need a lot of water, or with a low-permeability, except in*Coptosapelta tomentosa* Korth.. Land habitat of *Coptosapelta tomentosa* Korth. has a higher permeability than other medicinal plant habitat, and *Coptosapelta tomentosa* Korthonly found in soil permeability moderate.

According to Tan (1995) rough-textured soil, permeability greater than fine-textured soils, because coarse-textured soil matric potential lower than fine-textured soils. Meanwhile, the *Eurycoma longifolia* Jack and *Schizaea digitata* (L) Sw.can be found in the habitat with soil permeability ranging from slow, a bit slow to moderate, with a lower bulk density and higher porosity than the soil on other medicinal plants. According to Ohta and Effendi (1996), a lower bulk

density in the surface layer due to the development of better structure, as a result of mixing organic matter with clay. As well as bulk density, total pore on the surface of the soil is greater than the layer below it. Soil conditions with good porosity level will help the root system of the plant to the process of taking nutrients and water from the soil **[42]**. According to Soegiman (1982), that the soil loose and bulky will have a weight of unity volume (Bulk Density) is low and the mass density that occurs is determined by the solid soil grains.

According Mustafa (2007), bulk density values can be influenced by several factors, including tillage, organic matter, compaction by tools, texture, structure, soil water content, and others. Magnitude of soil bulk density can be varied from time to time or from layer to layer in accordance with changes in soil pore spaces or structures. The diversity reflects the degree of soil density **[8]**, because the soil pore space is reduced and the weight of each unit of land increases lead to increased soil bulk density. Land with a great weight will be difficult to continue the water or difficult to penetrate the roots of plants, otherwise the soil with a low bulk density, growing plant roots more easily, and vice versa soil with a low bulk density, the plant roots more easily develop **[14]**.The results showed that for the cultivation of medicinal plants, especially *Schizaea digitata* (L) Sw.and *Eurycoma longifolia* Jackneed to be given additional compost more, in order to increase the porosity and bulk density reduced. Utami (2009) states that the cultivation of land and the provision of materials soil conditioning (such as organic material, organic fertilizer (manure, compost) is one way to lose weight volume of soil (bulkdensity high), so that the soil is clotted and become loose. Based on the texture, both grow in habitats with land have fine or coarse clayey texture.

3.2 Chemical soil proferties of medicinal plant habitat

Chemical soil properties were analyzed in this study included; the degree of acidity (pH), C-Organic, N-total, P-Bray, and base cations (Ca, Mg, K, Na, CEC). The result of chemical soil properties of medicinal plants can be seen in **Table 2**.

Table 2: Analysis ofchemical soil properties of medicinal plants habitat

No	Chemical soil properties	*S. digitata* (L) Sw.		*C. optosapelta tomentosa* Korth.		*C. excavata* Burm.f.		*E. longifolia* Jack	
		Site location		Site location		Site location		Site location	
		Malinau	Harakit	Malinau	Harakit	Malinau	Harakit	Malinau	Harakit
1	pH	4,29	4,64	5,42	4,93	4,66	6,45	4,52	4,30
	Category ***)	acid	acid	acid	acid	acid	Fairly neutral	acid	acid
2	CEC (me/100 g)	16,13	18,00	24,02	17,52	18,95	22,37	14,36	25,63
	Category****)	clayed loam	clayed loam	clay	clayed loam	clayed loam	clay	loam & dusty clay	clay
3	C-organic (%)	2,16	1,97	2,09	1,29	3,74	1,17	2,03	1,21
	Category	moderate	low	moderate	low	high	low	moderate	low
4	N- Total (%)	0,12	0,15	0,14	0,12	0,18	0,07	0,11	0,15
	Category	low	low	low	low	low	very low	low	low
5	Pospor (ppm)	0,15	0,90	0,30	0,15	0,46	0,30	0,77	0,61
	Category	very low	very low	very low	very low	very low	very low	very low	very low
6	Calsium (Ca) (me/100g)	0,31	1,13	7,19	1,73	4,03	6,49	0,42	3,88
	Category	very low	very low	very low	very low	low	moderate	very low	low
7	Magnesium (Mg)(me/100g)	0,10	0,10	0,10	0,10	0,11	0,20	0,11	0,31
	Category	very low	very low	very low	very low	very low	very low	very low	very low
8	Kalium (K) (me/100g)	0,11	0,10	0,11	0,16	0,16	0,16	0,11	0,16
	Category	very low	very low	very low	very low	very low	very low	very low	very low

Information
Malinau : A village where was found some medicinal plants and they were frequently used by Dayak Bukit Ethnic.
Harakit : A villaged where was found some medicinal plants and they were frequently used by Harakit Ethnic.

Results of testing the soil pH or acidity showed that soil pH medicinal plant habitat ranges between 4.29 -6.45, with most including acid categories, only one of which belongs to the category that is fairly neutral on medicinal plant habitat *Clausena excavata* Burm.f.which located in the Harakit Sub-district. Soil pHis generally range from 3.0 to 9.0. In Indonesia generally reacts acidic soil with a pH ranging from 4.0 to 5.5 so that the soil with a pH of 6.0 to 6.5 often been said quite neutral though actually still a bit acid. Soil pH measurements can provide information about the need for lime, soil response to fertilizer, chemical processes that may take place in the process of soil formation, and others **[14]**. Hakim et al. (1986) said that the factors that affect the pH, among others: base saturation, the nature of micelles (colloidal), and the kind of cation adsorbed.

Based on the research, the value of medicinal plant habitats for CEC ranged from 14.36 to 25.63 (me/100 g), where the highest and lowest results contained in the soil habitat of the *Eurycoma longifolia* Jackby category dusty texture to clay loam soil. Hasibuan (2006) states that the texture of the soil can affect soil CEC. Land with CEC 10-15 is dusty loam soil texture, soil CEC 15-20 is clayey loam soil texture and soil with clay soil texture is CEC 20-40. Cation exchange capacity (CEC) is a chemical nature which is closely related to soil fertility. Soil with organic matter content or high clay content have a higher CEC than soils with low organic matter or sandy soils **[14]**. The intensity of the CEC greatly affect the soil's ability to absorb nutrients and mineral. Soils with high CEC value is able to adsorb and provide better nutrients than soil with a low CEC. CEC value varies and depends on the nature and characteristics of the land itself.

The size of the CEC is influenced by soil reaction or pH, or the amount of clay texture, type of clay mineral, organic matter, liming and fertilizing. The more finely ground texture is the higher the CEC. Soil with CEC value is relatively low, the process of adsorption of nutrients by colloidal soil did not last intensive, and consequently nutrient elements will be easily washed away and lost with the movement of water in the soil (infiltration, percolation), and in turn the nutrients are not available for plant growth. CEC value in disturbed footprint is generally lower when compared with the tread is not compromised. Based on these results, it is still able to grow medicinal plants and is found in soil with low CEC, even under 2.

The levels of C-organic medicinal plant habitats ranged from 1.17 to 3.74 (%), where the levels of C-organic lowest and the highest found in the soil habitat *Clausena excavata* Burm.f..The results are consistent with the opinion which states that the organic material is generally found at ground level, the amount is not large only 3-5% but their influence on the properties of the soil is very large**[14]**. Mustofa (2007) states that the organic matter content should be maintained not less than 2%. When compared with the results of this study, the medicinal plant habitats located in the Malinau Sub-dsitrict were more than 2%, while in Harakit Sub-dsitrict all below 2%. C-Organic is the main constituent of organic material. Soil organic matter is a complex organic compounds that are or have been undergoing a process of decomposition, either in the form of humus results humification and inorganic compounds mineralization results**[13]**. According Istomo (1994), an organic material turned out to have a very important role in the soil, especially its influence on soil fertility. Many properties of soil physical, chemical and biological soil directly and indirectly affected by organic matter. The organic material is any material or residue derived from plants, animals and humans that are on the surface or in the soil with a different degree of weathering **[16]**. The organic material is a material good stabilizing soil aggregates. Approximately half of the cation exchange capacity (CEC) is derived from an organic material. The content of organic matter in the soil is one of the factors that play a role in determining the success of cultivation. This is because the organic material can increase the fertility of chemical, physical and biological soil. Determination of organic matter content is based on the number of C-Organic **[44]**. According to Kohnke (1968) states that the function of the organic material is as follows: (i) a source of food and energy for microorganisms, (ii) to help the fertility of crops through an overhaul itself through exchange capacity, (iii) providing the substances needed in the formation of the stabilization of aggregates soil, (iv) improve the capacity to bind water and passing the water, (v) as well as help in controlling surface runoff and erosion. Soil organic matter is crucial interactions between biotic and abiotic components of soil ecosystems.

The levels of nitrogen or N-total of soil for habitat of medicinal plants, as well as levels of C-organic, isthe lowest and the highest in the land of a natural habitat*Clausena excavata* Burm.f. of 0.07 to 1.18%. Nitrogen is the macro nutrients the main needs of crops in large quantities, absorbed by plants in the form of ammonium (NH4 +) and nitrate (NO3 +) **[9]**. Hanafiah (2007) in his book states that the nitrogen make up about 1.5% weight of the plants and functioned primarily in the formation of proteins.

In contrast to the content of organic C and N-total in which the lowest and highest values found in soil habitat*Clausena excavata* Burm.f., then the content of the lowest and highest phosphorus element contained in medicinal plants*Schizaea digitata* (L) Sw., ie: 0.15 to 0.90 ppm. The low content of phosphorus is caused by the average soil finely textured medicinal plant habitats. According toOlsen and Watanabe (1963), the concentration of phosphorus in coarse-textured soils (sandy) higher than fine-textured soils. Availability of phosphorus depending on the texture of the soil and water availability. Foth (1984), that flooding has a significant role against for P availability. P availability is generally higher in the flooded land (wetland) compared with dry soil. Furthermore Hanafiah (2007) says that the old lands in Indonesia (podzolic and litosol) generally naturally low P levels and high fixation helpless, so planting regardless P supply will likely fail due to low content of phosphorus deficiency P. nothing to do with the acidity of the soil , which on acid soils P element can not be absorbed by plants due fastened (fixed) by Al, so availability is low **[34]**. Pospor together with nitrogen and potassium are classified as major elements even if absorbed in amounts the smaller of the two elements. Plants typically absorb P in the form of H2PO4- and a small portion in the form of secondary HPO42-. In general, the phosphorus in the soil is in a state not soluble, so that in such circumstances it is impossible to get into the root cells (water content in the soil a little sand). But as anions, phosphate can be exchanged easily with OH-ions **[7]**. Decrease in soil porosity (worsening aeration) is also the most influential factor in the absorption of P. The lower the porosity of the soil, hence the lower the ability of the soil in uptake of P so that a lower P availability. This is in line with the results of this study, in which the soil habitat "bayuan" and "tambar bisa" are generally lower porosity than the other and it turns out the P element content too. Sanchez, (1992) states that the levels of available phosphorus in the soil will increase after opening because of the content of phosphorus in the ashes.

Results of research on calcium or Ca element content, ranging from 0.31 to 7.19 (me/100gr). In general soil and habitat of *Schizaea digitata* (L) Sw. and*Eurycoma longifolia* Jack need Ca contains elements which is lower than the others. It is correlation with a low CEC values, as shown mainly in the soil habitat *Schizaea digitata* (L) Sw.where the CEC value is low, so the content of the element calcium is also low. In general, calcium levels including the medicinal plant habitats is low, when compared to the location ofmix-garden research results by Utami (2009), in which the calcium element content can reach 26 me/100g. It is caused by low pH or acidity.

Magnesium is an element forming the chlorophyll. Magnesium levels in the soil have to do with the value of CEC, if the CEC has decreased, the amount of magnesium were lower. This is in line with the content of Ca. Mg interest on cation exchange sites, weaker than Ca, so that generally the soil Ca levels are always higher than Mg **[13]**. It is as shown in the results of the study (Table 2), in which

the element Calcium content ranged from 0.31 to 7.19 (me/100gr), whereas only 0.10 to 0.31 Magnesium (me/100gr).

Potassium is a nutrient second after Nitrogen, the most widely absorbed by plants, it is important to analyze whether a field contains K sufficient or not **[13]**. Hakim et al. (1986), states that the availability of Potassium Potassium is interchangeable and can be absorbed by plants that depend additions from the outside, fixation by its own land and the addition of potassium itself. Potassium nutrient availability in the soil can be divided into three forms of potassium relative is not available, slowly available potassium, potassium very available.

4. Discussion

Nitrogen is the main macro nutrients needed by plants in large amounts, absorbed by plants in the form of ammonium (NH4 +) and nitrate (NO3 +). In general, nitrogen is the limiting factor in crop plants. The average plant biomass is containing N by 1 to 2% and possibly as much as 4 to 6%. In terms of the total quantity required for the production of crops, N including fourth among the 16 essential elements **[9]**. If we compare it with the results **[44]**, the location of the garden soil with a mixture, the content of N-total ranged from 0.09 to 0.21%, then the soil habitat of medicinal plants have lower content of N-total, since only ranges from 0.07 to 0.18%. This is presumably due to the topography is steep with soil porosity are relatively large and the permeability of the soil is very fast, the rainfall is high enough, causing water loss through water infiltration into the soil or surface water (surface run off), so that nutrients are lost along with the process of leaching and erosion. Another cause is because the soil does not get the input of fertilizers from the outside, while there yag nutrients in the soil originating from crop residue mineralization that live on it. According to Rosmarkan and Yuwono (2002), the amount of plant nutrients that are released depend on the kinds of plants, plant parts, and the number of plants aborted volume. Low Nitrogen also showed that in locations of medicinal plants found there has been no intensive farming like fertilizing. As stated by Leiwakabessy(2002), that the element Nitrogen is important for plants and can be supplied by man through fertilization. Nitrogen is generally absorbed by plants in the form of NO3- and NH4 +. According Hardjowigeno (2003), nitrogen in the soil contained in the various forms of the protein (organic matter), amino compounds, ammonium (NH4 +) and nitrate (NO3). Forms N absorbed by different plants. There is a better crop to grow if given NH4 + some plants are better given NO3 and some plants are not affected by these N forms **[22]**.

The medicinal plant habitat is still not a lot of land clearing activities. According Sanchez (1992), the magnitude of this increase is approximately 7 to 25 kg of P/ha. The element phosphorus (P) in soils derived from organic matter, fertilizers and minerals in the soil. Ion P is not the car so that the movement of ions H2PO4-, HPO42-, and PO43- through the lining of the water around the sand particles depends on soil pH **[3]**. Phosphorus is most easily absorbed by plants at pH 6-7 **[15]**. Phosphorus is the macro nutrients and essential for plant growth. Phosphorus in the soil can not all be immediately available, it depends on the nature and characteristics of the soil and land management. Phosphorus comes from deposits of rocks and minerals that contain phosphorus in the earth's crust which is thought to contain approximately 0.21% phosphorus. The plants will absorb the phosphorus in the form of orthophospat. The amount of each shape depends on the pH of the soil. Available phosphorus in the soil can be defined as P soil that can diekstrasikan by water and nitric acid. The addition of these elements is expected to come from phosphate fertilizers, phosphate minerals weathering and animal and plant residues. While the loss of P can occur because the transported plants, leached and eroded.

In Table 2, where the soil pH study results showed almost all medicinal plants can grow on acid soil. Soepardi (1983) states that the usual acidic soil has a low Ca content. Furthermore it is said that the majority of Ca are in the adsorption complex and easily interchangeable, making it easily available to plants. In wet soil Ca happen very real loss.

Availability magnesium occurs because the process of weathering of minerals containing magnesium. Magnesium loss due to leaching, erosion, transported plants. This loss may be greater in the lands that are experiencing high rainfall.

Potassium in soil formed from weathering of rocks and minerals containing potassium. Through the process of decomposition of plants and microorganisms then potassium will dissolve and go back to the ground. Furthermore, most of the potassium soil will be washed or eroded soluble and process this loss will be accelerated again by the uptake of plants and microorganisms. Some soil types have abundant potassium content. The potassium in the soil found in weathered minerals and release potassium ions. Ions adsorption on cation exchanged and absorbed quickly available for plants. Organic soils contain little potassium **[11]**. This is in line with the results of this study, in which the results showed the soil habitat of medicinal plants, the content of potassium range between 0.1 to 0.16 (me / 100g), very different than the content of potassium in the mixed garden ranged between 0.41-0.65 (me / 100g) research by Utami (2009).

5. Conclusion

1) Characteristic of the soil habitat of medicinal plants is vary widely depending on the species of medicinal plants.
2) The physical properties of the soil habitat of medicinal plants: permeability (0.17 to 4.66 cm/hour), bulk density (0,93- 1,42 gr/cm3), particle density (2.28 to 2.84 gr/cm3), porosity (37.97 to 59.92%), with a texture dominated by sand particles except on *Eurycoma longifolia* Jack and *Schizaea digitata* (L) Sw. habitat dominated by clay. Exceptions also occur in permeability, bulk density and porosity, which is different from the soil in a natural habitat of other medicinal plants, the soil habitat of *Eurycoma longifolia* Jackand *Schizaea digitata* (L) Sw.*Schizaea digitata* (L) Sw.it has a low permeability, bulk density was low but

porosity is higher than two species, namely:*Coptosapelta tomentosa* Korth. and *Clausena excavata* Burm.f..

3) Chemical soil properties of medicinal plants habitat, namely; pH (4.29 to 6.45), CEC (14.35 to 25.63 me/100g), C-organic (1.21 to 3.74%), N -Total (from 0.07 to 0.18%), P (0.15 to 0.90 me / 100g), Ca (0.31 to 7.19 me /100g), Mg (0.10 to 0.31 me/100g) and K (0.10 to 0.16 me/100g). In general, almost all land habitats of medicinal plants including low pH or acidic, unless habitat of *Clausena excavata* Burm.f.bisa by category rather neutral. Habitat of *Schizaea digitata* (L) Sw.and*Eurycoma longifolia* Jackhave in common is pH, CEC, C-organic, Ca and K lowest compared to *Coptosapelta tomentosa* Korth.and *Clausena excavata* Burm.f.. P element for *Schizaea digitata* (L) Sw.can live on land with the content of lowest to highest, and *Eurycoma longifolia* Jackcan only live on a high P element content. Mg in the soil for*Schizaea digitata* (L) Sw.is low, but *Eurycoma longifolia* Jackis high. Instead *Clausena excavata* Burm.f.live on N content from the lowest to highest.

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