

Characterization of Selected Medicinal Plants of Mamanwa Tribe in Caraga, Philippines

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Abstract

Mamanwa indigenous people (IP) mostly lived in Caraga region, Philippines. Most of them depended on the traditional method of herbal plants for medication. This study aims to determine the bioactive compounds present in the fifteen ethnomedicinal plants extract through IR spectrophotometric analysis for the presence of the different functional group in the plant extract. The presence of the peaks forms IR spectroscopy for the stretching of O-H/ N-H, C-H, C-O and C-Cl /C-S, S-H, N=O and C=O for the functional groups alcohols, carboxylic acids, alkanes, alkenes, halogens, amide, aromatic compounds, ethers, amino acids, lactones, nitro compounds, acid anhydrides and aldehydes that makes this possible potential antibiotics and medicine.

Keywords: Mamanwa IP, functional groups, ethnomedicine & IR spectrophotometric analysis.

Introduction

Herbal medicine involves the use of plants for medicinal purposes. The term "herb" includes leaves, stems, flowers, fruits, seeds, roots, rhizomes, and bark. There can be little doubt that the use of plants for healing purposes is the most ancient form of medicine known. The quest for plants with medicinal properties continues to receive attention as scientists are in need of plants, particularly of ethnobotanical significance for a complete range of biological activities, which ranges from antibiotic to anticancer substance. Several plants and herb species used traditionally have potential antimicrobial and antiviral properties (Shelef, 1983; Zaika, 1988) and this has raised the optimism of scientists about the future of phyto-antimicrobial agents. (Das, Mujib & De, 1999).

In the Philippines, an emphasis has been placed on indigenous plants to produce safe, efficacious, and affordable drugs for primary health care. The impacts of these new technologies have been tremendous especially on the development of potential drugs especially with the presence of indigenous tribes in Mindanao specifically the Manobo and the Mamanwa which is the focus of the study.

The Mamanwas lives in the northeastern provinces of Surigao and Agusan del Norte and they rely on the subsistence economy which was a hand- to- mouth existence. Mostly of the Mamanwas are food gatherers who move from one place to another depending upon the supply of food found in the place.

Due to hardship, the Mamanwa tend to used herbal medicine for their health and medicinal needs, especially for child care. The biggest tribes of Mamanwa were found in Cantugas, Mainit, Surigao del Norte having eighty-eight families and each family has minimum children of seven and a maximum of fifteen children in the family. Most of the herbal medicines are often used for the cure of stomach-ache, bloody diarrhea, wounds, scabies, insect bites, itchiness, burns, scalds, eyesores, fever, headache, skin diseases, asthma, sore throat, cough, colds, incontinence, kidney stones, constipation, snake bite, dyspepsia, mouth ulcers, tongue blisters and inflammation.

The study has envisioned in providing scientific evidence on the use of the study plants traditionally utilized as herbal medicines by the Mamanwa's for child health care. The researcher selected fifteen (15) herbal plants namely; the albahaka (*Ocimum basilicum*), alibangbang (*Bauhinia monandra*), Angelika (*Bryophyllum pinnatum*) , elepante (*Elephantopus Scaber* Linn.), Gabon (*Plectranthi Amboinici Folium*), hilbas (*Artemisia vulgaris* Linn), kalabo (*Origanum vulgare*), lunas (*Lunasia amara* Blanco), makulibhag (*Rabelaisa philippinensis*), sawan-sawan (*Blumea balsamifera*), sinaw-sinaw (*Peperomia pellucide*), tagbak (*Alpinia elegans* K.), talawatawa (Musseanda philippic), tawatawa (*Euphorbia hirta* Linn) and togup (*Artocarpus altilis*) through the process of phytochemical analysis and antimicrobial assay. Plant samples were further subjected to an IR spectroscopy for the

characterization of the fifteen plant ethanolic and methanolic extract for the identification of its functional group present in the sampled medicinal plants.

Methodology

Research setting

This study had employed the descriptive survey and experimental designs. A descriptive survey was used in the identification of the most commonly used medicinal plants by Mamanwa in Caraga and questionnaire about the common perceptions how it was used and traditional method applied to the medicinal plant used by the Mamanwa in Caraga and interview from the local herbolaria and the local people. And the researcher did an IR spectroscopy for the identification of the functional group present in the selected plant extracts. The study was conducted at the three Mamanwa tribes in Caraga namely; Mamanwa tribe in Santiago, Agusan del Norte, Mamanwa tribe in Cantugas, Mainit, Surigao del Norte and Mamanwa tribe in Kitcharao, Surigao del Norte. Mainit is a fourth class municipality in the province of Surigao del Norte, Philippines. It is situated on the north shore of Lake Mainit in the northeastern part of Mindanao. Mainit got its name from the hot sulfuric spring which flows to the river the “Mapaso Hot Spring”. Mapaso literally is “hot”. Santiago is a fourth class municipality in the province of Agusan del Norte, the Philippines comprising of nine barangays wherein the Mamanwa tribe resides in barangay Curva. Kitcharao is a fourth-class municipality in the province of Surigao del Norte wherein the Mamanwa tribe resides in barangay Mahayahay with almost one hundred fifty families. And laboratory analysis was done at Caraga State University Diagnostic Laboratory for the Antimicrobial Bioassay and the Phytochemical Screening of the fifteen herbal plants used by the Mamanwa people as herbal medicine.

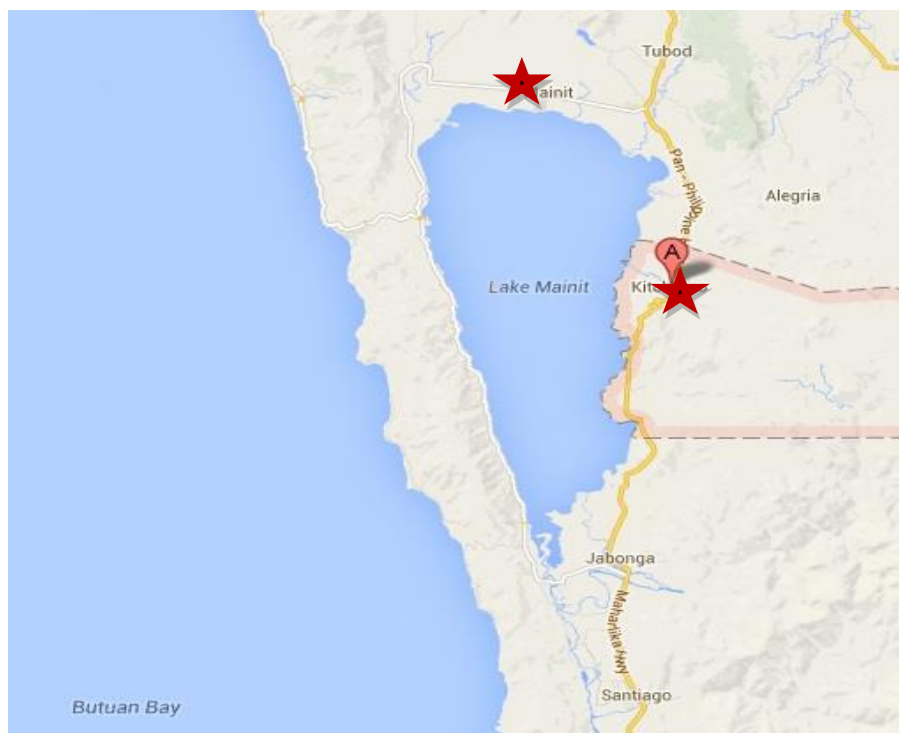


Figure 1. The locale of the study showing the three tribes of Mamanwa in Santiago, Kitcharao, and Cantugas, Maiinit Surigao del Norte

The gathering of plant samples comes from the key informants (known as herbolaria) in the area who had helped in the identification of the medicinal plant that was used for child and maternal health care. The researcher also took pictures to give more concrete evidence of the medicinal plants. The analysis for the identification of the functional group of the sampled plants was done in the Mindanao University of Science and Technology Chemistry Laboratory by IR Spectroscopy.

Collection of plant materials

Fresh plant leaves and barks were collected at Cantugas, Mainit, Surigao del Norte, Kitcharao, Surigao del Sur and Santiago, Agusan del Norte where the Mamanwa tribes were residing. The plant samples were constantly used for the cure of minor to major diseases by an eighty-eight-year-old herbolaria Nanay Felisa Hubasan and the local people of the Mamanwa tribe.

Data collection methods

A total of one hundred respondents were being interviewed from the three Mamanwa tribes in Caraga, forty from the Mamanwa tribe in Cantugas, Mainit, thirty Mamanwa people in Santiago and thirty Mamanwa respondents in Kitcharao on the use of herbal plants and its efficacy and their perceptions about the medicinal plants. On the part of their sociocultural beliefs, the Datu of the tribe was consulted on their cultural practices especially in their beliefs on spirits and god's in the application of the medicinal plants.

Fresh plants leave and bark was cut into smaller pieces and weighed about 100g in an Erlenmeyer flask and mixed with 80% ethanol solution and submerge the plant materials and was kept soaked for 48 hours. The extracts were then filtered using Whatman #2 filter paper with gentle suction. The flask and plant material were rinsed with fresh portions of alcohol. Washing and plant material and was transferred to the funnel, combining the washing of the first filtrate. Gentle suction was applied to complete the collection of the plant extract; then the plant residue was discarded. The filtrate plant extract was concentrated over a steam bath at a temperature below 50°C to about 20 ml. The concentration of the stock plant extract was recorded as grams of dried plant material per mL of the extract that was obtained. The extract was stored in cold (0-5°C) and labeled properly with the name of the plant, concentration of the plant and the date of extraction.

Results and discussion

Commonly Used Ethnomedicinal Plants Use by the Mamanwa in Caraga

From the result of the survey among the one hundred respondents of the three Mamanwa tribe from Mamanwa tribe of Cantugas, Mainit, Surigao del Norte, Mamanwa tribe of Kitcharao, Surigao del Norte and the Mamanwa tribe of Santiago, Agusan del Norte. Knowledge on the herbal medicine was passed down from one generation to the next generation according to the old herbolaria known as Nanay Felisa Hubasan, the oldest herbolaria of the Mamanwa tribe of Cantugas, Mainit, Surigao del Norte. The fifteen herbal plants of the study were from the survey coming out from the common list of herbal plants used by the respondents in their community for the child and maternal health care. Most of the herbal plant used by the respondents were used either by "lina'ga" or decoction especially for cure for stomach pain, dysentery, and fever, another method was a crude way of just smashing the leaves or plant part and squeeze its plant juice in the wounds or the inflamed part of the body as an anti-inflammatory agent or as relieving pain in a toothache or boils.

About fifteen different herbal plants namely: the albahaka (*Ocimum basilicum*), alibangbang (*Bauhinia monandra*), Angelika (*Bryophyllum pinnatum*), elepante (*Elephantopus Scaber* Linn.), Gabon (*Plectranthi Amboinici Folium*), hilbas (*Artemisia vulgaris* Linn), kalabo (*Origanum vulgare*), lunas (*Lunasia amara* Blanco), makulibhag (*Rabelaisa philippinensis*), sawan-sawan (*Blumea balsamifera*), sinaw-sinaw (*Peperomia pellucide*), tagbak (*Alpinia elegans* K.), talawatawa (*Musseanda philipicca*), tawa-tawa (*Euphorbia hirta* Linn) and togup (*Artocarpus altilis*) were obtained from the Mamanwa tribe in Cantugas, Mainit, Surigao del Norte. Table 1 shows the different herbal plants with its specific use by the Mamanwa according to the tribal herbolaria (Nanay Felisa Hubasan) who is known for her indigenous knowledge on herbal plants and people of the tribe. Most of the parts of the herbal plant used are the leaves, stem, bark, roots and the tubers wherein the common way of preparation is decoction, smashing, cutting and chopping into smaller pieces, extracting the juice, and applied directly to the affected area. Most of the medicinal plant samples were used by the tribe people for a child and maternal health care especially for stomach pain, diarrhea cure, for curing of wounds, for anti-inflammatory, lowering of fever, cough, and colds, lowering of blood pressure and for mothers with a menstrual problem.

Table 1. List of Plants recorded with medicinal values among the mamanwa tribe

Scientific Name	Local Name	Medicinal Used of the Mamanwa
<i>Bauhinia monandra</i>	Alibang bang	The chop boiled leaves and roots will serve as a decoction in curing stomach-ache, bloody diarrhea, and purging.
<i>Bryophyllum pinnatum</i>	Angelika	Chop leaves and roots applied to wounds will speed up its healing process, it has also anti-inflammatory effect to boils, and chop leaves relieve a toothache.
<i>Elephantopus Scaber</i> Linn	Elepante	Smash roots applied to burns and scalds reduce infection, boiled root decoction lowers body heat. And dewdrops collected from the flower can be used as eye drops.
<i>Plectranthi Amboinici Folium</i>	Gabon	Leaves of this plant are especially used to treat children if they are not feeling well. The roots and leaves are boiled as decoction are taken to treat flu or another sickness in children. A few leaves and slices of roots placed in warm water is used to bathe children to provide relief from illness, especially for newly giving birth mothers.
<i>Artemia vulgaris</i> Linn	Hilbas	Leaf poultice is a cure for a headache, skin diseases, asthma, and dyspepsia. Its juice is used externally for scabies, eczema, herpes. Infusion leaves will induce menstruation, as an abortifacient and uterine stimulant.
<i>Origanum vulgare</i>	Kalabo	Juice obtained from smashed green leaves can be applied to the throat or taken to cure a sore throat and relieves a cough and cold especially for children.
<i>Lunasia amara</i> Blanco	Lunas	To treat rashes or wounds, poultice from barks are applied on affected areas. The whole plant or only the leaves are boiled and the decoction is taken to treat high blood pressure. The bark, when mixed with coconut oil, cures snake bites, insect bites and skin diseases.
<i>Rabelaisa philippinensis</i>	Makulib hag	During the confinement period, the boiled roots as decoction are taken to cure birth wound and clean the uterus. Roots are boiled as a decoction and could be taken as a contraceptive. The bark is boiled and the decoction is drunk for abortion.
<i>Blumea balsimefir</i>	Sawan-sawan	The leaves and stems are soaked in warm water and used for bathing children with fever, epilepsy (sawan), pale complexion and several other serious illnesses.
<i>Peperomia pellucida</i>	Sinaw-sinaw	Boil the leaves as like tea and drink 3 or more times a day a good as diuretic agent and effective in dissolving kidney stones.
<i>Alpinia elegans</i> K.	Tagbak	Raw or boiled tuber is taken to treat kidney problems and constipation. Smashed tubers are mixed and applied on the patient's head to cure fever. The young shoots (red or white in color) are minced into a paste which is then mixed with some water. The paste is then applied on the forehead to treat a headache.
<i>Mussaenda philippica</i>	Talawat awa	The decoction of the leaves and bark will cure dysentery and emollient. The latex of the bark will cure snake bites and insect bites.
<i>Euphorbia hirta</i> Linn	Tawa-tawa	The roots are boiled and the water is then used for bathing to treat high fever especially when the patient starts shivering. Droplets of water/sap from freshly cut stems are used for eye irritation. Juices gathered from smashing the stem are taken to reduce body heat.
<i>Artocarpus altilis</i>	Togup	The bark is boiled and the decoction drunk to cure stomach-ache, treat mouth ulcers and tongue blisters.

Further, these herbal plants were used by the tribal people either by mixing one plant with another plant. For instance, sawan-sawan, kalabo, and Gabon were mixed by boiling or decoction process and

this will be used for treating hard cough with fever and cold wherein herbal plant mixture is more effective in the cure of a certain sickness or disease.

Functional groups present in the crude extracts

The IR spectra were used to identify the functional group of the active components based on the peak value in the region of infrared radiation. The plant ethanolic extracts were passed into the Spectrophotometer and the functional groups of the components were separated based on its peak ratio and identified through its fingerprint region.

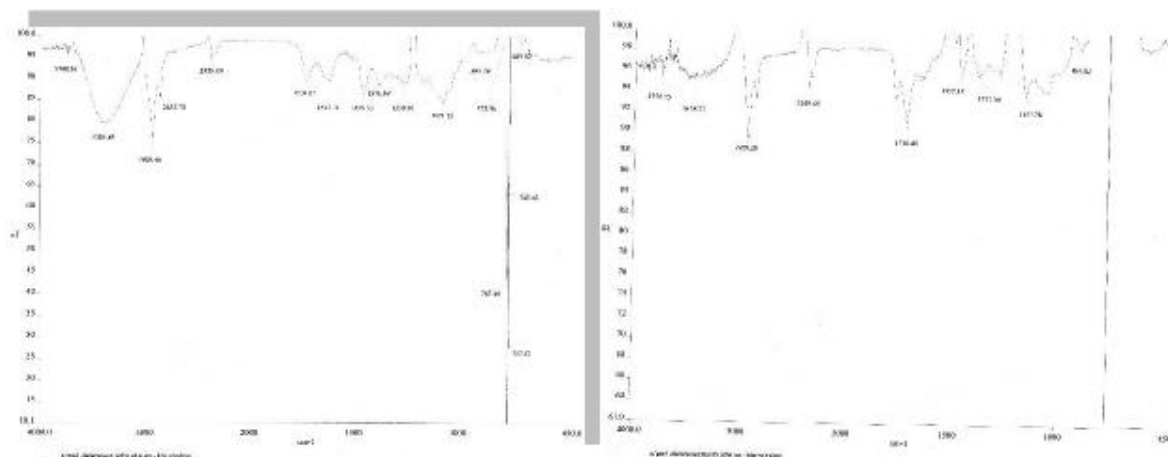


Figure 2a and 2b. The IR spectrum of the crude extract from the albahaka & alibangbang leaves

Figure 2a of albahaka leaves extract shows that there are different functional groups peaks with different intensity. The broad peak observed at 3386.89 cm^{-1} assigned to -COOH carboxylic acids and 1071.53 cm^{-1} assigned to C-F of halogen groups. The medium peak observed at 1731.64 cm^{-1} attributed to C=O stretching of ketones groups and 1617.1 cm^{-1} with C=C from alkenes group. The small peaks observed at 2358 and 2855.73 cm^{-1} correspond to the N-H group and O-H stretching carboxylic acid groups. The strong peak observed at 2929.48 cm^{-1} assigned to O-H stretching of the amide. This reveals the presence of various chemical constituent with ethanolic extract in alibangbang leaves extract (figure 2b). The broad peak is represented by 3438.5 cm^{-1} for N-H stretching from amide group, 1377.08 cm^{-1} for C-O stretching of alcohol group and 1151.78 cm^{-1} for C-F halogen group. For strong peaks, it represents 2929.78 cm^{-1} for O-H of alcohol 1716.46 cm^{-1} for C-O of lactones and 2355.69 cm^{-1} for N-H stretching for the carboxylic acid group.

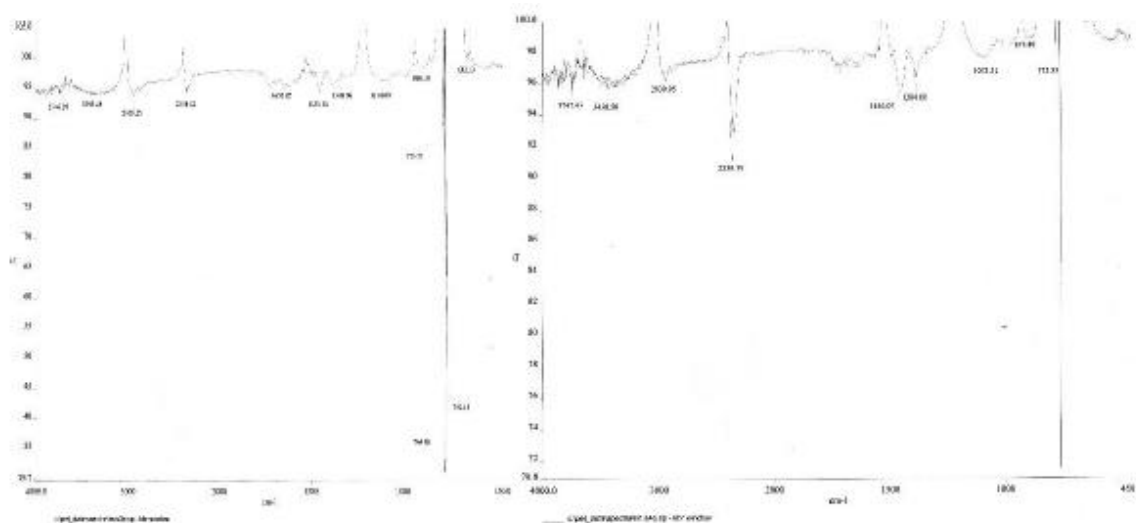


Figure 3a and 3b. The IR spectrum of the crude extract from the Angelika & elepante leaves

The absorption spectra of Angelika leaves extract (fig.3a) conforms to a broadband spectrum of 3746.29cm^{-1} for O-H stretching, 3385.85cm^{-1} for N-H stretching, 1652.87cm^{-1} for C-H stretching and 1114.09cm^{-1} for -C-F stretching represented by functional groups of alcohol, amide, aldehyde and halogen groups. Small peaks with a spectrum of 2938.25cm^{-1} for O-H stretching, 2358.42cm^{-1} for N-H stretching and 1456.16cm^{-1} for -C-H stretching from the functional groups of amide, carboxylic acid, an alkene. The dominant band of the elepante leaves extract (fig.3b) was observed at 2939.95cm^{-1} with O-H stretching, 2359.19cm^{-1} N-H stretching, 1456.07cm^{-1} with C-H stretching and 1384.60cm^{-1} with C-O stretching which represents the amide, carboxylic acid, alkenes, and alcohol. The band at 1073.31cm^{-1} and 878.89cm^{-1} was due to the halogen compound. The band at 773.35cm^{-1} stretching of C-H that shows aromatic compounds.

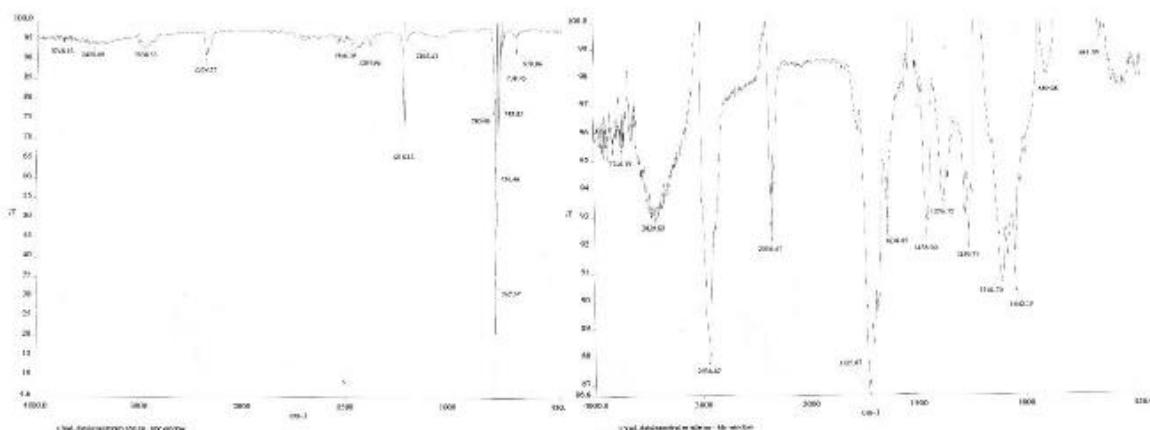


Figure 4a and 4b. The IR spectrum of the crude extract from the Gabon & hilbas leaves

Figure 4a shows a very strong absorption of Gabon leaves extract band between 1218.13 and 1205.4cm^{-1} indicates the presence of nitro compounds derivatives. The vibration of NH_3 shows the presence of a primary amine. The C-H stretching group of bands of 780.69cm^{-1} , 767.37cm^{-1} , 756.46cm^{-1} , 749.82cm^{-1} and 738.76cm^{-1} shows functional groups of aromatic compounds. The bands observed at near 670.06cm^{-1} represent the C-Cl group in halogen. While different bands occurring at 3748.12cm^{-1} for O-H stretching of alcohol, bands between 3450.09cm^{-1} and 2938.53 for stretching's of N-H/O-H which indicates the presence of amides. Further bands of 2359.57cm^{-1} for -COOH stretching for carboxylic acids and finally 1384.96cm^{-1} for stretching of C-H for alkenes group.

Figure 4b of hilbas leaves extract displays more intense bands occurring at 2936.67cm^{-1} , 3439.89cm^{-1} , 2358.87cm^{-1} , 1725.07cm^{-1} corresponding to O-H/N-H/N-H, C=O stretching/ bending vibrations respectively indicate the presence of amide, amino acids, and ketones. The very strong absorption band of 3746.19cm^{-1} may be due to the presence of bonded O-H stretching of alcohol. The very strong absorption around bands of 1638.05cm^{-1} , 1376.75cm^{-1} and 1259.77cm^{-1} in ethanol extract with N=O stretching/ bending vibrations for nitro compounds. The very strong absorption band observed between 1104.70 - 1042.15cm^{-1} region indicates the presence of ether. It also illustrates a band of 885.68cm^{-1} and 641.05cm^{-1} for stretching of the C-Cl band coming from the halogen group.

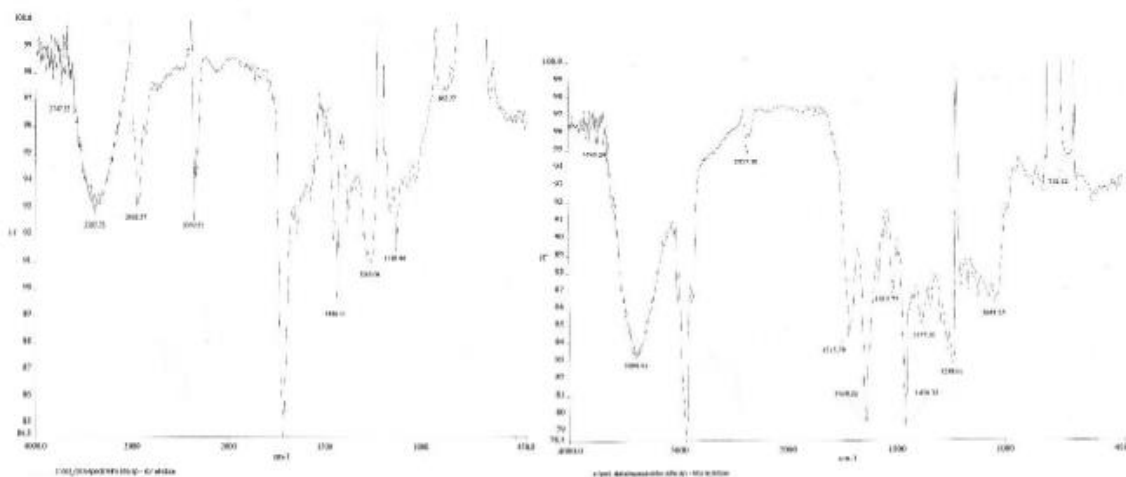


Figure 5a and 5b. The IR spectrum of the crude extract from the kalaboleaves and lunas bark.

The strong peak of (fig.5a) represents a band between 2952.37 cm^{-1} and 1436.61 cm^{-1} with C-H stretching of alkanes group and 2359.27 cm^{-1} from the N-H stretching of an amino acid group. The broad bands of 3747.32 cm^{-1} (O-H stretching), 3385.73 cm^{-1} (N-H stretching), 1263.06 cm^{-1} (N=O stretching), 1130.44 cm^{-1} (C-O stretching) and 862.32 cm^{-1} (C-Cl stretching) represented by alcohol, amide, nitro compounds, ethers and halogen groups.

The strong peak of lunas bark (fig.5b) ethanolic extract appears at the band of 3384.43 cm^{-1} (N-H stretching), 1638.22 cm^{-1} (C-H stretching), 1456.61 cm^{-1} (C-H stretching) and 1238.61 cm^{-1} (N=O stretching) which were associated with groups of amide, aldehyde, alkene and nitro compounds. The broadband absorbance peaks of lunas bark also were having frequencies between 2357.10 cm^{-1} and 1238.61 cm^{-1} represented by the N=O stretching of nitro compounds. Broader band absorbances of 3749.29 cm^{-1} (O-H stretching), 2357.10 cm^{-1} (N-H stretching), 1715.70 cm^{-1} (C=O stretching), 1377.31 cm^{-1} (C-Cl stretching), 1043.25 cm^{-1} (C-O stretching) and 712.12 cm^{-1} (C=O stretching) associated with different functional groups of alcohol, amino acid, lactones, halogen, ethers and aromatic compounds.

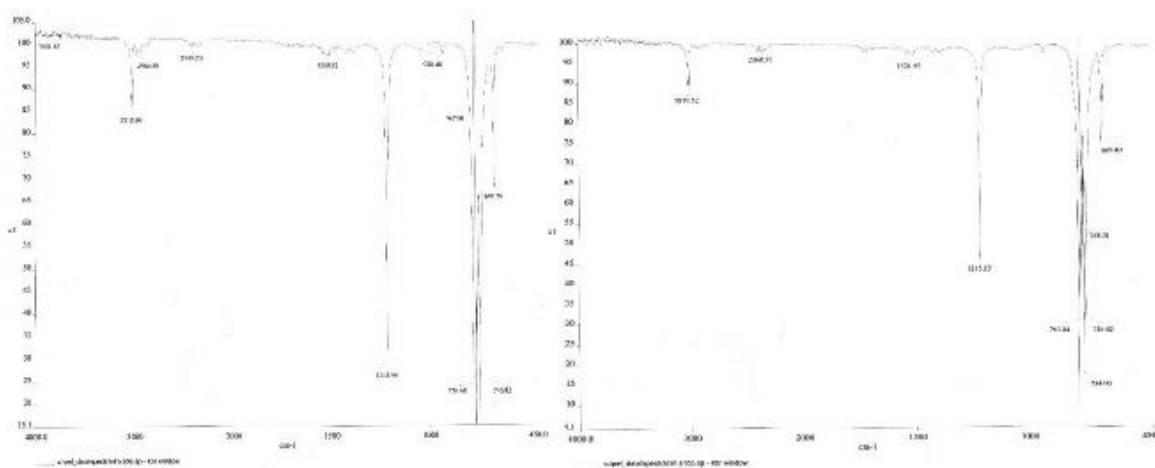


Figure 6a and 6b. The IR spectrum of the crude extract from the makulibhag bark and sawan-sawan leaves

The very strong absorption peak observed with makulibhag bark extract (fig.6a) around 1215.98 cm^{-1} (C-O stretching) may be due to the presence of ethers, absorption peaks of 776.68 cm^{-1} , 746.82 cm^{-1} and 669.70 cm^{-1} associated with C-Cl stretching of halogen groups. The small absorption peaks of different frequencies of 3851.87 cm^{-1} (O-H stretching) for the presence of alcohol, 3018.96 cm^{-1} to 1508.16 cm^{-1} (O-H stretching) for amide group, 2399.70 cm^{-1} (N-H stretching) for the presence of amino acid and 928.48 cm^{-1} (C-O stretching) for the functional group of ethers. The strong absorption bands of sawan-sawan leaves extract (fig.6b) with wave numbers of 3019.52 cm^{-1} in C-H stretching for the presence of alkanes, 2360.57 cm^{-1} in N-H stretching with an amino acid group and 1521.95 cm^{-1}

in N=O stretching with nitro compounds groups. Weak absorption bands represented by different frequencies of 1215.15 cm^{-1} (N=O stretching) for nitro compounds, peaks associated with $745.62/ 758.01/ 669.49\text{ cm}^{-1}$ with C-Cl stretching for the presence of halogen compounds, 763.84 cm^{-1} with C-H stretching of aromatic compounds and finally 754 cm^{-1} with C-O stretching with ether compound in the ethanolic extract of sawan-sawan.

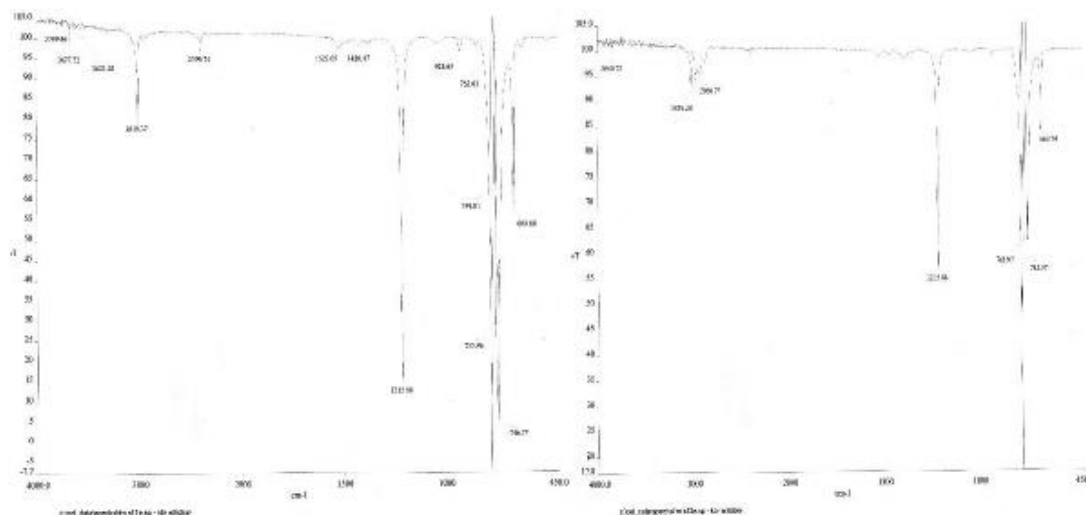


Figure 7a and 7b. The IR spectrum of the crude extract from the sinaw-sinaw leaves and tagbak tubers

Figure 7a above shows the absorbance bands of sinaw-sinaw ethanolic leaves extract with strong peaks of 3019.37 and 1420.47 cm^{-1} (C-H stretching) for alkane groups, 1215.86 and 1522.05 cm^{-1} (N=O stretching) for nitro compounds, 759.81 , 755.96 and 755.96 cm^{-1} (C-H stretching) for aromatic compounds and 669.68 cm^{-1} (C-Cl stretching) for halogen group. For weak peaks of sinaw-sinaw ethanolic extract with spectra of 3799.46 , 3677.72 and 3622.28 cm^{-1} (C-H stretching) represented with alcohol compounds, 2399.74 cm^{-1} (N-H stretching) for amino acids and finally 928.65 cm^{-1} (C-O stretching) for ether group of compounds. The IR absorbance of tagbak ethanolic extract (fig.7b) with prominent peaks of 1215.88 cm^{-1} (C-H stretching) for alkane group, 2360.57 cm^{-1} , 743.57 cm^{-1} and 669.74 cm^{-1} (C-Cl stretching) for halogen compounds. Short waves spectrum of 3850.73 cm^{-1} (O-H stretching) for alcohol, 3010.20 cm^{-1} (O-H stretching) for amide compound and 2966.77 cm^{-1} (C-H stretching) for alkane compounds.

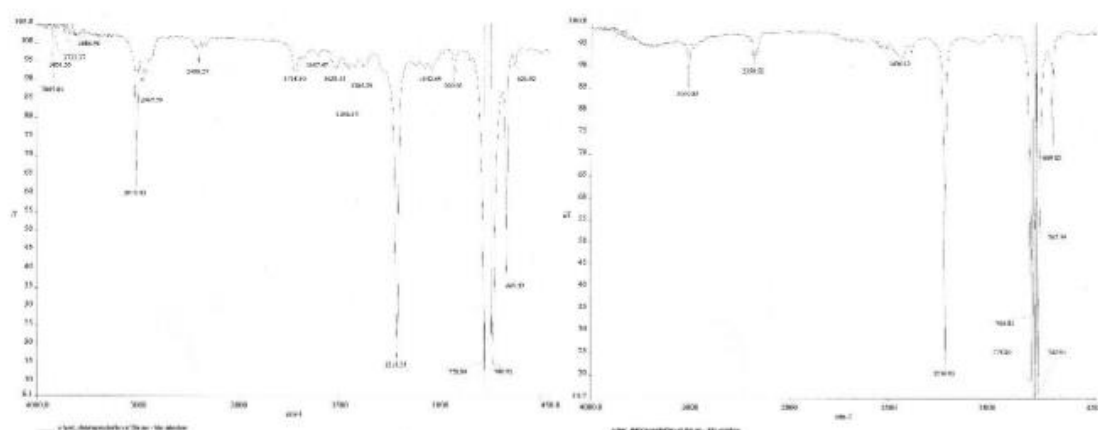


Figure 8a and 8b. The IR spectrum of the crude extract from the talawa-tawa and tawa-tawa leaves

Talawa-tawa leaves extract (fig.8a) subjected to IR shows the strong absorbance of $3865.84/ 3851.55/ 3733.37$ and 3686.96 cm^{-1} for O-H stretchings of an alcohol group, absorbance peaks of 3019.43 to 2967.23 cm^{-1} for O-H stretching of amide groups and strong peaks of 740.95 , 669.32 and 626.92 cm^{-1} for C-Cl stretchings for halogen compounds. Shortwave absorbances of 2400.23 cm^{-1} (-COOH stretching) for carboxylic acids, 1718.10 cm^{-1} (C=O stretching) for lactones, 1601.74 to

1456.13 cm^{-1} (C-H stretching) for alkenes compounds, 1520.11 to 1214.24 cm^{-1} (N=O stretching) for nitro compounds, 1042.59 to 928.03 cm^{-1} (C-O stretching) for ethers and 778.84 cm^{-1} (C-H stretching) for the aromatic compound. The IR spectrum of the crude ethanolic extract of tawa-tawa shows(fig.8b) short peaks of 3019.35 cm^{-1} (O-H stretching) represented by the amide group, 2359.52 cm^{-1} (N-H stretching) for the carboxylic acid group, 1436.12 cm^{-1} (C-H stretching) for alkenes and a short peak of 778.20 cm^{-1} (C-H stretching) for aromatic compounds. For long peak absorbance associated with 1216.65 cm^{-1} (N=O stretching) for nitro compounds, and long peaks of 765.83 cm^{-1} , 762.14 cm^{-1} , 743.14 cm^{-1} and 669.82 cm^{-1} (C-Cl stretching) for halogen group of compounds.

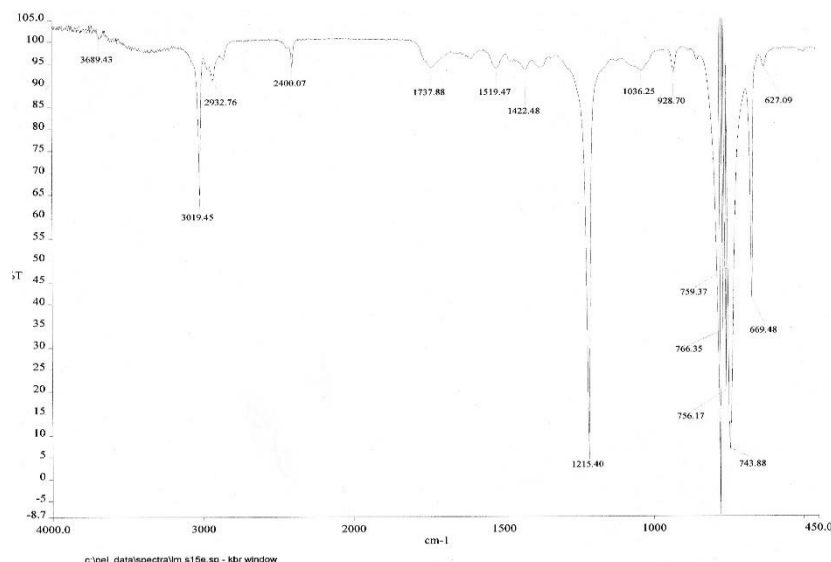


Figure 9.The IR spectrum of the crude extract from the togup bark

Finally the togup bark ethanolic extract (fig.9) has IR spectrum peaks of 3689.43 cm^{-1} (O-H stretching) for alcohol, 3019.45 cm^{-1} (C-H stretching) for alkane group, 2932.76 cm^{-1} / 1519.47 cm^{-1} (O-H & N-H stretching) for amide groups, 2400 cm^{-1} (N-H stretching) for amino acids, 1737.88 cm^{-1} (C=O stretching) for acid anhydride group, 1215.40/1036.25 cm^{-1} (C-O stretching) for ether functional group, 928.70 cm^{-1} (C-H stretching) for aromatic compounds and finally for 766.35/756.17/743.88/669.48 and 627.09 for C-Cl stretching for the components of halogen group of compounds.

Conclusions

A study on the determination of the bioactive compounds present in the fifteen ethnomedicinal plants extracts through IR spectrophotometric analysis for the presence of the different functional group in plant extracts. It was found out that most of the plant samples has different amino acid groups, anhydride group, aromatic compounds, alcohol group, phenolic compounds, alkane, alkene and alkynes groups and many more important organic compounds. And this should undergo structural elucidation using combining simple biological assays with hyphenated HPLC analyses, such as LC/UV, LC/MS, and LC/NMR. Once a candidate plant has been chosen, a suitable isolation procedure can be employed for the isolation of the active principles to come up of a novel compounds which will be beneficial in the cure of certain diseases for children like asthma, cough and colds, fever, diarrhea, stomach pain, urinary tract infection, boils, antiseptic for wounds, skin disorders, snake bite, skin irritations and simple diseases that will help the lack of medicine in the Mamanwa tribe and even poor communities who will resort on the use of herbal medicinal plants.

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