Study on Morphological, Phytochemical, Physico-chemical and elemental analysis of four leaves of some families from Myanmar Medicinal plants Vicinity of West Yangon University

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Abstract

The present study is investigating the morphological characters, traditional uses, phytochemical screening, physico- chemical properties and the content of elemental analyzed by using Energy Dispersive X-ray Fluorescence (EDXRF) Spectroscopy of four leaves from *Eclipta alba*(L.) Hassk. (Kyeik- hman), *Eupatorium odoratum* L. (Bizat) *Tradescantia spathacea* (Sw). Stearn. and *Tadehagi triquetrum* (L) H.Ohashi. (Lauk –thay) and their anti -lung canner uses. In this study, *Eclipta alba* (L.) Hassk. and *Eupatorium odoratum* L. are belonging to the family Asteraceae. *Tradescantia spathacea* (Sw). Stearn. is belonging to the family Commelinaceae. *Tadehagi triquetrum* (L.) H. Ohashi. belongs to the family Fabaceae. These species were collected from Htan-ta-pin Township and its vicinity, Yangon Region. The content of elemental analysis on the powdered of leaves by using Energy Dispersive X-rays, Florescence (EDXRF) Spectrometer and also these species were recorded photographs.

Introduction

Plant parts which have in one or more of it organs of containing substances that can be used for therapeutic purpose are called medicinal plants (Sofowora, 1982). Myanmar is rich in several medicinal plants and most people were traditional medicine for the treatment of diseases (Medicinal Plant of Myanmar, 2000).

Eupatorium odoratum Linn (Bizat) and *Eclipta alba* (L.) Hassk.(Kyeik-hman) are belonging to the family Asteraceae. *Tradescantia spathacea* (Sw). Stearn. (Migwin-gamone) belongs to the family Commelinaceae. *Tradehagi triquetrum* (L.) Ohashi. (Lauk-thay) belongs to the family Fabaceae. *Eupatorium odoratum* L. composed of nearly 12000 species. (Heywood, 1978) .*Eclipta alba* 3-4 species and Australian, a South America and a cosmopolitan tropical weed (Hooker, 1875 and Mat Ali, 2010). Lawrence (1969) had made list that the genus *Tradescantia spathacea* 34 species *Tadehagi triquetrum* is distributed from the central to the Eastern Himalayas, ascending to 4000 ft. (Hooker, 1879). It is distributed kumaun, Sikkim, Khasi hills, Southern India and in Srilanka.

Hall *et.al*, (1972) mentioned that *Eupatorium odoratum* is perennial much branched shrubs. The leaves are opposite and decussate, simple, slender petiole, exstipulate. Inflorescence is arranged in corymbs at the end of branches and capitula types. The flowers are whitish-purple all of tubular types. Fruit is achene and ribbed. Backer (1965) reported that *Eclipta alba* is annual herbaceous. Leaves are opposite and decussate, lance- shaped, sub-sessile to sessile, and exstipulate; Inflorescence solitary axillary terminal, flowers white, two types; ray forest and disc floret. Fruit is achene (Dassanyake, 1980). *Tradescantia spathacea* is an ever green foliage plant. It has long narrow fresh leaves, from a central stem, olive green above and purple underneath, sheathing at the bases. It has tiny white flowers, growing two boat-

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shaped, purple bracts. In each inflorescence fascicles cymes, 3 petals, 6 stamens, hairs at the bases of filaments. Fruit is capsule and 2 seeds ellipsoid angle. *Tadehgi triquetrum* is sub-shrub. Leaves are alternate, unifoliate, ovate- lanceolate, wings petioles and stipulate. Inflorescences is axillary ,terminal racemose usually 2-3 flowers. Flowers are papilionaceous, bracts diamorpic, pinkish- yellow, zygomorphic, stamens 10, ovary superior, pubescent. Fruit is pod, slightly curved (Hong Kong., 2008).

In Myanmar, *Eupatorium odoratum* 100% medication relieve cough, fever. The fresh juice of the leaves is given to children for cough. (Khin Myat Lwin, 2007). It is popular for its antispasmodic, anti-inflammatory, astringent, and antifungal. *Eclipta alba* is by herbalist to treat various cancers. The juice of leaves is sometimes taken for asthma and bronchitis (Ardnew, 1996). Kirtikar and Basu (1933) stated that the leaves have tonic and expectorant. It is used to purify the blood.The decoction of the leaves *Tradescantia spathacea* is daily free consumed as curative of cancer. It is treatment of expectorant, anticancer, insecticide and antitumor properties. In Java, the leaves *Tadehagi traquetrum*_ are well known remedy for hemorrhoids, usually taken as a decoction. In Philippines a decoction is also used as mouth wash and as expectorant. Umedum (2013) found that *Eupatorium odoratum* showed the presence of alkaloids saponins, tannins, flavonoids, phenolic, resins, glycosides and steroids. Accumulation of free radicals can cause pathological conditions such as asthma, arthritis and inflammation. *Eclipta alba* contains a large amount of resins, alkaloids principle ecliptine, apigenin, wedelolactone alkaloide, nicotine 0.008% and glycosides (Chopea ,1982). The leaves contain wedelolactone 1.6%, flavonoids, and ecliptine. Many phytochemicals classified as phenolic, terpenoids, sterols, alkaloids, saponin and glycoside, carotenoids and anthocyanins present in *Tradescantia spathacea* (Hill, 1952).The leaves of this plant contain tannins, alkaloids, hyperforin, trigonelline and silicic acid and condensed tannins.

. The aqueous and ethanol extracts from leaves of *Eupatorium odoratum* are potential sources of antiviral anti inflammatory activity antitumor and antimicrobial agents. Physico-chemical properties contain 22% of total ash, water soluble ash 15%, insoluble ash. The extract from the leaves of *Eclipta alba* is also used by herbalists to treat various cancer. An alcoholic extraction of *Eclipta alba* inhibited the growth cancer. Aqueous extracts of *Tradescantia spathacea* blocks the antiallergics action of bretylium. The chloroform and alcohol extracts of *Tadehagi triquetrum* were reported for their antibacterial activity.

The aims and objectives of this present research were promoting Myanmar traditional medicinally broadly, to verify the identification and morphology of *Eupatorium odoratum* L. *Eclipta alba* (L.) Hassk. *Tradescantia spathacea* (Sw.) Stearn. and *Tadehagi triquetrum* (L.) H.Ohashi. to determine the phytochemical, physicochemical properties and analyze the concentration of elements dried powered leaves and to study medicinal uses of *Eupatorium odoratum* L. *Eclipta alba* (L.) Hassk. *Tradescantia spathacea* (Sw.) Stearn. and *Tadehagi triquetrum* (L.) H.Ohash. of Myanmar.

Results

Botanical Study

Scientific Name- ***Eupatorium odoratum*** **L.**

Medicinal Part used - Leaves

Perennials shrubs 1-3m height, stem erect, densely pubescent, branches; Leaves opposite and decussate, lamina ovate-deltoid, 4.0-9.5 cm long and 1.5-5.0cm wide, bases broadly truncate, margins dentate, tips, acuminate, densely pilose on the both surfaces, deep- green on upper surfaces, light-green on lower surfaces, with glandular pilose, pungent aromatic odor when crushed, tri-nerved distinct, petiolate, the petioles cylindrical, 1.0-2.3 cm long, pilose, exstipulate; Inflorescences capitula, with involucres bracts, terminal, capitula, 25-30 florets,all tubular, pedunculate; Flowers terminal, pinkish-white, involucre bracts, cylindrical 7.0-9.0mm x 3.0-4.0mm; Phyllaries 4-5 series, yellowish-grey, outer phyllary ovate, puberulent, inner phyllary elliptic, receptaicle flat, convex, ray floret absent, disc floret tubular, pinkish-white, 5-lobed, pappus present; Stamens filament epipetalous, slender, anther united, syngenesious, dithecous, basifixed, longitudional dehiscence; Carpels(2) bicarpellary syncarpous, style stender, stigma bi-fid, basal placentation, one ovule in each locule, inferior. Fruit is achene, cylindrical blackish-brown, 5-ribbed, pappus present, seed one,crenate.

Habit and leaves of ***Eupatorium odoratum***

Scientific Name - ***Eclipta alba*** **(L.) Hassk**

Medicinal Part used -Leaves

A small annual branched herbs 10.0cm-15.0cm height, stems branched, cylindrical, reddish-green, occasionally rooting at the nodes, oppressed white hairs, nodes distinct, root well developed, lateral roots and tap root, cylindrical grayish-brown; Leaves opposite and decussate, lamina oblong,bases attenuate; margins sub-entire to serrate, tips acute, white strigose on both surface, deep-green on upper surface, light-green on lower surface, subsessile to sessile, exstipulate; Inflorescence capitula, axillary, solitary or two together an unequal axillary peduncles 4.5-6.5 cm long, reddish green, cylindrical, white pubescent, involucres bracts 8, green ovate, hairs; Flowers white, heterogenous, ray floret ligulae 15-20 floret, small not tooth, disc floret tubular ,20-30 floret small, 4-lobed, pappus absent; Stamens.(5) filament epipetalous, slender, free, anther united, syngenesious, basifixed, longitudinal dehiscence; Carpel(2) bicarpellary syncarpous, style slender, stigma bi-fids, basal placentation one ovule in each locule, inferior. Fruit is achene, conical-shaped; seed cuneate, narrow wings , covered with water.

Habit and leaves of *Eclipta alba*(L.) Hassk

Scientific Name -*Tadehagi triquetrum*(L.)H.Ohashi.

Medicinal part used - Leaves

Sub-shrubs up to 4m tall, stems erect, branched, trigonous, with stiff hairs. Leaves unifoliate, alternate, leaf 5-8 leaflet papery, lamina ovate – laneolate, bases shallowly cordate, margins entire, tips acute, light-green and glabrous on the upper surfaces, greenish-grey and pubescence on the lower surface, petiolate, flat, wings present, stipulate, the stipules elliptic; Inflorescences terminal and axillary, recemose, 2-3 flowers at the nodes, peduncles triangular, long silky hairs; Flower papilionaceous, bracteates, the bracts dimorphic, bracteolate, pedicellate, bisexual, zygomorphic, 5-merous, purplish-pink, hypogynous; Calyx (2-3)fused, campanulate, upper 2-lobed fused, deltoid, hairs, lower 3 lobed, linear-lancelate, greenish-pink, imbricate; Corolla(5)fused papilionaceous, the standard orbicular, emarginated, tips, the wings oblong-elliptical, auricule bases, the keel elliptical, acute tips; Stamens(9+1) diadelphous, stamina tube, cylindrical, hairs the filaments slender, the anther dithecous, dorsifixd, longitudinal dehiscence; Carpals monocarpellary, one ovule in each locale, marginal placentation, style curved slender, stigma capitates superior. Fruit is pod, oblong, 5-8 segment, seeds broadly-elliptical, blackish-brown.

Habit and leaves of *Tadehagi triquetrum*(L.)H.Ohashi.

Scientific Name *Tradescantia spathacea* (Sw.) Stearn

Medicinal Part used - Leaves

Perennial sub-swollen herbs, 0.3-0.6m tall, fresh rhizomes, stems stout short, unbranched nodes swollen; Leaves alternate, simple, parallel veined, spreading-erect, closely overlapping at the base of stems, lamina linear-lanceolate 100cmx30cm long c 3.0-3.5cm wide, bases scarcely narrow, margins entire, tips acuminate, deeply-green on the upper surfaces, purple on the lower surfaces, sheathing at the bases, of the stem, exstipulate; Inflorescence cymes peduncle short, cylindrical-flat, purplish-green, simple or branched, numerous flowers in such inflorescence enclosed by two boat shaped bracts (spathe); Flowers white, bracteates, pedicellate bracteolate, bisexual, actinomorphic, tri-merous, cyclic, hypogynous; Sepals 3,aposepalous, pinkish-white, valuate, interior; Petals 3, apopetalous, white, ovate-orbicular, white mid rib, distinct, imbricate, interiors; Stamens 3+3 biseries, apostemenous, alternate, the filament slender white, bead-like hairs at the base of filament, the anther dithecous, flat,

orange-white, slightly notch on the upper side of the anther, longitudional dehiscence; Carpel (3), tricarpellary, syncarpous, tri-locular, axile placentation, one ovule in each locule, style simple, stigma capitates, superior. Fruit is capsule, elongated, with 2 seeds ellipsoid.

Habit and leaves of *Tradescantia spathacea* (Sw.) Stearn

Materials and Methods

Eupatorium odoratum L. *Eclipta alba* (L.)Hassk. *Tradescantia spathacea* (Sw.) Stearn. and *Tadehagi triquetrum*(L.) H.Ohashi, leaves sample were collected from Htan- ta pin Township, Yangon Region. After collection, morphological characters of the plant were studied and identified with the help of available literature of Hooker (1879), Backer (1963), Hundley and Chit Ko Ko (1987) and Flora of Hong Kong (2008). The collected specimens were thoroughly washed with water to remove impurities and cut into small pieces and air dried on newspapers at room temperature for 1-2 weeks. These dried samples were crushed with grinding machine and powdered samples were stored in airtight containers for prevention moisture and contamination. The dried powder sample was ready to use for the phytochemical and physicochemical test and also element analysis.

Preliminary phytochemical Investigation

In the study, the phytochemical test of the four leaves of *Eupatorium odoratum Eclipta alba Tradescantia spathacea Tadehagi triquetrum* extracts were carried out to determine the presence or absence of alkaloids, glycosides, saponin glycosides, cyanogenectic glycosides, phenolic glycoside, flavonoids, carbohydrate, steroids, terpenoids, tannins, amino acid, acid or base or neutral compound. This test was carried out in the laboratory of Phytochemistry, Department of Chemistry, West Yangon University, according to the method of Marini Bettolo *et.al*., (1981), Central Council for Research in Unani Medicine (1987)and Trease and Evans (1966,2002). The results were shown in table(1)

Table (1).Phytochemical constituents of the leaves extract of *Eclipta alba* *Eupatorium odoratum*, *Tadehagi triquetrum* and ***Tradescantia spathacea***

No	Chemical Constituents	Extract	Reagent used	Observation	Results
1	Alkaloid	1%HCL	1.Mayer's reagent 2.Dragendoff 's reagent 3.Wagner's reagent	White ppts Orange ppts Yellow ppts	+ + + + + + + + + + + +
2	Glycoside	H_2O	10% lead acetate solution	White ppts	+ + + +
3	Terpenoid	Pet-ether extract	Conc H_2SO_4 + acetic anhydride	Reddish brown	+ + + +
4	Saponin	H_2O	Distilled water	Marked frothing	+ + + -
5	Cyanogenic glycoside	H_2O	Conc.H_2SO_4acid+Sodium picrate paper	No colour change	- - - -
6	Phenolic compounds	H_2O	Ferric chloride	Brown color	+ + + +
7	Amino acid	H_2O	Ninhydrine reagent	Purple spot	+ + + +
8	Carbohydrate	H_2O	10% α-naphthol + Conc H_2SO_4 acid	Pink ring	+ + + +
9	Flavonoid	MeOH extract	Con.HCl&Mg turning	Pink colour	+ + + +
10	Acid /Base/ Neutral	H_2O	Bromocresol green solution	Blue colour	Base,base,acid,base
11	Tannin	H_2O	1% Ferric chloride	Black ppts	- + + +
12	Steroid	Pet-ether	ConcH_2SO_4aceticanhydride	Green color	+ + + +

Physicochemical investigation of *Eupatorium odoratum* L. *Eclipta alba* (L.) Hassk. and *Tradescantia spathacea* (Sw.) Stearn. *Tadehagi triquetrum* (L.) H.Ohashi leaves extracts

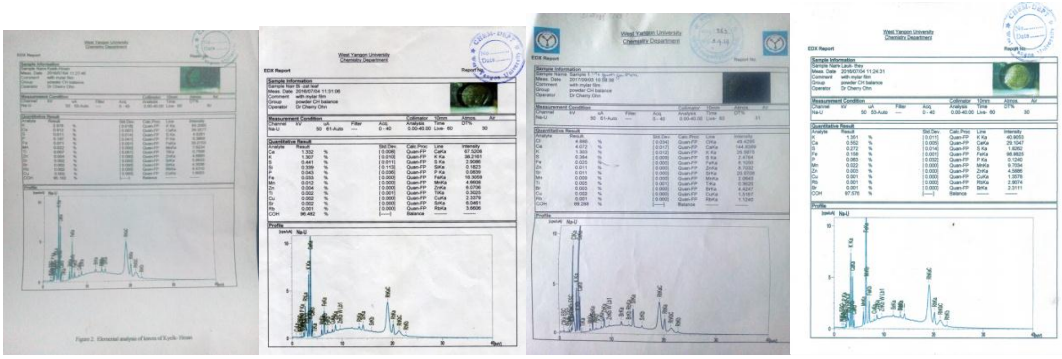
Physicochemical properties including the percentage of moisture content, total ash, acid insoluble ash, water soluble ash; extractive value such as EtOH, MeOH,PE, EtOAc, $CHCL_3$, acetone and distilled water of dried powdered leaves were carried out as British Pharmacopeia (1968), World Health Organization

(1998) and Trease and Evans (2002). The results were shown in**Table (2). Physicochemical Characterization Leaves Powder of *Eclipta alba* (L.) Hassk. *Eupatorium odoratum* L. *Tadehagi triquetrum* (L.) H.Ohashi** and ***Tradescantia spathacea* (Sw.) Stern.**

Sr No	Physicochemical characters	Quality Determined %
1	Loss of drying	8.38,8.64, 8.61, 8.26
2	Total ash	6.71,4,26,4.03,8.4
3	Acid insoluble ash	4.22,3.46,9.16,3.2
4	Water soluble ash	35.74,24.56,48.3,4.4,
5	EtOH soluble extractive	7.63,7.93,4,11,9.2
6	MeOH soluble extractive	1.42,8.26,3.57,7.6
7	Pet-ether soluble extractive	8.473.13,2,48,0.16
8	EtOAc soluble extractive	3.56,3.64,3.32,3.8
9	$CHCL_3$ soluble extractive	2.14,2.14,2.14,2,28
10	Acetone soluble extractive	2.76,3.14,2.16,3.22
11	Water soluble extractive	10.14,10.24,11.96,16.82

Qualitative elemental analysis of dried powdered leaves by Energy Dispersive X-ray Fluorescence (ED-XRF) Spectroscopy

For these measurements, pellet of the sample was first made. X-rays spectrometer permits simultaneous analysis of light element to heavy element (Griken *et.al,*1986). Energy dispersive X-ray fluorescence spectrometer (Shimadzu, EDX-8000) can analyze the elements from sodium (Na) to Uranium (U) under vacuum conditions. X-ray fluorescence uses X-rays to excite an unknown sample. The individual element in the sample remits their characteristic X-rays. They are detected by using semiconductor detector {Si (li)} that permits multi elements simultaneous analysis. In this way EDX-8000 spectrometer determines elements that are present in the sample. applied to element analysis.



Figure(5). Elemental analysis on the leaves of *Eupatorium odoratum* L., *Eclipta alba* (L.)Hassk., *Tradescantia spathacea* (Sw.)Stearn. and *Tadehagi triquetrum* (L.) H.Ohashi

Discussion and conclusion

In this research paper, morphological characters, phytochemical constituents, physico-chemical properties, and elementals analysis of *Eupatorium odoratum* L. (Bizat), *Eclipta alba* (L.) Hassk. (kyeik-hman), *Tadehagi triquetrum* (L.)H.Ohashi. (Lauk-thay), and *Tradescantia spathacea* (SW.) Stearn. (Migwin-gamone) (Syn. *Rhaeo discolor* Hence.) have been described.

The morphological study, *Eupatorium odoratu*. is perennial erect, shrubs, leaves opposite and decussate, simple; Inflorescence capitula and long peduncle. Flower is whitish-purple, all tubular types. Fruit is achene. *Eclipta alba* is annual herb. Leaves are opposite and decussate, eiliptical and sub-sessile; Inflorescence capitulum, 2, together an unequal axillary peduncles, with involucre bracts; Flowers white, heterogenous. Fruit is achene. The morphological characters are agreed with mentioned by Dassanyake,(1980). *Tadehagi triquetum* is sub-shrubs, erect; Leaves unifoliate, wings petioles; Inflorescences, racemes, axillary and terminal; Flowers pinkish-yellow, bracts dimorphic, papilionaceous; Stamens 10, ovary superior. Fruit is pod. These characters are agreed that stated by Hong Kong (2008). *Tradescantia spathacea* is foliage herb, stem swollen node; leaves linear-lanceolate, erect, fresh, olive-green above and bright-purple underneath, sheathing at the bases; Inflorescence cymes, numerous flowers in each inflorescences enclosed by two purple bracts, boat-shaped; Flower white, ovary superior. Fruit is capsule. The characters are revealed that described by Dassanyake (2000). The result of phytochemical test of *Eupatorium odoratum* was consisted with Umedum(2013), saponins present in this species. The phytochemical analysis was carried out on *Eclipta alba* showed that consist of bioactive chemical constituents are alkaloids, ecliptine, and wedelolactone. It is selective inhibitors of inflammatory.. These characters are agreed with described by Hussain, (2011). *Tadehagi triquetrum* was found glycosides, saponins, phenolic compounds, tannins and flavonoids in the powdered of the leaves samples. The results are agreement with Chopea (1982) cyanogenic glycoside was absence in the samples. Burkill, (1935) Saponins was absence in *Tradescantia spathacea* plant. These characters are revealed that(Chopea (1982). In this study the powdered of leaves of *Eupatorium odoratum* were mostly soluble in water white they were moderated soluble in methanol and ethanol. The powdered of leaves of *Eclipta alba* (L.) Hassk acid insoluble ash is a part of total ash.. The total ash *Eclipta alba* is 6.71%. The water soluble extractive value is 35.74%. These characters are as same as mentioned by Throat (2010). The physico-chemical properties of *Tadehagi triquetrum* like ash,

moisture content and water soluble ash, content is highest. The powder leaves of *Tradescantia spathacea* such as moisture content, total ash, solubility in different solvents were investigated. The water soluble ash for this species is 4.4% and moisture content is 8.26%. These characters are agreed with stated by pharamacopoecia (1968) and Unani medicine, ((1987).

According to the EDXRF results *Eupatorium odoratum* the elements such as Ca and K were also presented in the high composition. *Eclipta alba* element K was also presented in the first high composition.*Tadehagi triquetrum*. was shown that organic compounds are predominant in the sample, other element such as K is a major element. *Tradescantia spathacea* was shown that Ca and Cl is major elements. Based on the findings of this study we can conclude that, *Eupatorium odoratum* is biologically active plant and the folk medicine. *Eclipta alba* has been extensively used traditional medicine.This species offers a remarkable activity for using of many diseases such as prevent cancer,and hair growth. *Tadehagi triquetrum* may contribute valuable information in traditional and alternative medicine. *Tradescantia spathacea* is medicinal properties; some of them used in alternative medicine to treat cancer. In conclude, it is hoped that this research paper will serve as an encouragement for others to further explore the pharmacological potentials of these species plants as the most important herbs.

Acknowledgements

We wish to express our sincere thanks to Dr. Thidar Oo, Professor and Head of Botany Department, West Yangon University for her over supervision in valuable suggestions and using departmental facilities during the period of our studies. We would like to extend our gratitude to Dr. Than Than Sint, Professor, for her valuable advises and suggestion for our report. Finally our special thanks go to our friends who helped us in many ways to complete this research paper.

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