Organoleptic and phytochemical evaluation of different extracts of *Vernonia cinerea* (L) Less. whole plant of Cambodia

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Abstract: *Vernonia cinerea (L) Less. (Family: Asteraceae) has been used as therapeutic agents exerting the effects of anti-inflammatory, anti-oxidant and anti-microbial activities, and for the treatment of various illnesses including malaria, cancers, gastrointestinal disorders, asthma and liver disease. This research aims to identify organoleptic features of the plants and analyze phytoconstituents including alkaloids, phenolic compounds, tanins, flavonoids, steroids, triterpenoids, cardiac glycosides, essential oils, saponins, quinones, polypeptids and resins from different extracts under aqueous, methanol, ethanol, chloroform and ethyl acetate solvents by Ultrasonication-Associated Extraction (UAE) method. The findings showed that the organoleptic evaluation gave characteristics of the plant's color, ordor, taste and texture. The phytochemical analysis exhibited tanins, flavonoids, polypeptides containing each solvent extract. This organoleptic and phytochemical profiles of Cambodian Vernonia cinerea (L) Less. are of importance in the field of plant drug standardization and of benefit to further drug compound isolation of this plant.*

INTRODUCTION

Vernonia cinerea (L) Less. (Family: Asteraceae) has been used as therapeutic agents exerting the effects of anti-inflammatory, anti-oxidant and anti-microbial activities, and for the treatment of various illnesses including malaria, cancers, gastrointestinal disorders, asthma and liver disease (Latha *et al*., 2010; Abirami & Rajendran, 2012). The study aims to identify organoleptic features and investigate phytochemicals of different extract of *Vernonia cinerea* (L) Less. whole plant native to Cambodia.

METHODOLOGY

Dried whole plant of *Vernonia cinerea* (L) Less. was obtained from the local plant drugstore and authenticated by University of Puthisastra (UP)-Herbarium (UPFPH-050011). Organoleptic evaluation was done by mean of the sense organs including color, odour, taste and texture parameters. The dried plant was extracted with five solvents including distilled water, methanol, ethanol, ethyl acetate and chloroform. Each plant extract was subjected to the phytochemical investigation in the Pharmacongosy Lab of UP.

RESULTS AND DISCUSSION

Figure 1. *V. cinerea* of Cambodia

Class: Magnoliophyta
Order: Astrales
Family: Asteraceae
Genus: Vernonia
Species: *Cinera*
Botanical name: *Vernonia cinera* (L.) Less.
English name: Smaov Ruy
Plant type: Whole plants
GPS: 11°40'37''N 104°55'4''E

Table 1: Organoleptic features of *Vernonia cinerea* (L) Less.

Features	Stems	Flowers	Leaves
Condition	Dried	Dried and crumpled	Dried and broken
Color	Greenish	Whitish	Greenish
Odour	Characteristic	Characteristic	Characteristic
Taste	Bitter	Bitter	Bitter
Texture	Smooth	fine and star shape	Slightly rough

Table 2: Extracting yields (%) of different extracts of whole plant of *Vernonia cinerea* (L) Less.

Extracts of Whole Plant of *Vernonia cinerea* (L) Less.	Extracting Yields (%)
Aqueous extract	1.47
Methanol extract	1.60
Ethanol extract	1.82
Ethyl acetate extract	1.15
Chloroform extract	1.52

Table 3: Phytochemical screening of whole plant of *Vernonia cinerea* (L) Less.

Phytochemicals	Chemical Tests	Solvent Extracts				
		Aqu. Ext.	Met. Ext.	Eth. Ext.	EtOAc Ext.	Chl. Ext.
Alkaloids	Dragendorff	-ve	- ve	- ve	- ve	- ve
	Mayer	- ve	- ve	- ve	- ve	- ve
	Wagner	- ve	- ve	- ve	- ve	- ve
Phenolic compounds	Ferric Chloride	- ve	- ve	- ve	- ve	+ ve
Tanins	Ferric Chloride	+ ve	+ ve	+ ve	+ve	+ ve
Flavonoids	Ammonium	+ve	+ ve	+ ve	+ ve	+ ve
Steroids	Liebermann Burchard	- ve	+ ve	+ ve	- ve	+ ve
Terpenoids	Salkowski	+ ve	+ ve	- ve	- ve	+ ve
Cardiac glycosides	Keller-Kiliani	+ ve	- ve	- ve	+ ve	+ ve
Carbohydrates	Iodine	+ ve	- ve	- ve	+ ve	- ve
Curmarins	1M-NaOH	+ ve	- ve	+ ve	+ ve	+ ve
Essential oils	NaOH-HCl	- ve	- ve	+ ve	- ve	+ ve
Resins	Turbidity	- ve	+ ve	- ve	- ve	- ve
Saponins	Froth	+ ve	- ve	+ ve	+ ve	+ ve
Quinons	H_2SO_4	- ve	- ve	+ ve	+ ve	+ ve
Polypeptides	Biuret	+ ve	+ ve	+ ve	+ ve	+ ve

Note: +ve: Positive (present); **-ve**: Negative (absent); **Aqu. Ext.**: Aqueous Extract; **Met. Ext.**: Methanol Extract; **Eth. Ext.**: Ethanol Extract; **EtOAc Ext.:** Ethyl Acetate Extract; **Chl. Ext.:** Chloroform Extract

Darrodil *et al*. (2014) reported that the methanol ethanol and aqueous extracts of whole plant of *Vernonia cinerea* (L) Less. yielded 9.13%, 9.26% and 10.04%. Etim *et al*. (2015) recorded that the ethanol extract yielded 2.24%. Ethyl acetate echloroform extracts yielded 2.94% and 1.41% respectively (Bhande *et al*. (2010). These are in accordance with our research. The findings of organoleptic features of color, odour, taste and texture, and phytochemicals of tannins, flavonoids and polypeptides containing in *Vernonia cinerea* (L) Less. were consistant with Darrodil *et al*. (2014), Etim *et al*. (2015) and Bhande *et al*. (2010).

CONCLUSION

The qualitative phytochemical screening indicated the positive tests of tannins, flavonoids and polypeptides in aqueous, methanol, ethanol, ethyl acetate and chloroform extracts of *Vernonia cinerea* (L) Less. whole plant. This study provides the scientific data for the proper organoleptic and phytochemical standardization of Cambodian *Vernonia cinerea* (L) Less., which is extremely beneficial to the plant identity and for the assessment of the purity of raw materials.

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