

PHYTOCHEMICAL SCREENING OF *SPHAGNETICOLA TRILOBATA* (WEDELIA) PLANT EXTRACTHannah Lea G. Pulga<sup>1</sup>, Felisa L. Sanico<sup>2</sup><sup>1</sup>Department of Physical Sciences, College of Science, University of Eastern Philippines<sup>2</sup>Vice-President for Academic Affairs, University of Eastern Philippines

## ABSTRACT

This study was conducted to determine the physical properties secondary metabolites of *Sphagneticola trilobata* plant extract in terms of: boiling point, color, density, odor, pH and solubility. The study showed, in terms of its physical properties, Wedelia leaf and stem extract has a below 100°C boiling point which is 99°C. The odor of the 2 sample is unpleasant, comparing the color of Wedelia leaf and stem extract, stem has a chocolate brown color while the leaf has a dark brown color. When it comes to density leaf extract is less dense than the stem, and stem is basic than the leaf extract. In solubility, Wedelia leaf and stem extract is a polar substance. There were secondary metabolites positively present in Preliminary Test, such as: alkaloid and saponin. The researcher recommends a similar study should be conducted of *Sphagneticola trilobata* using other solvents for extraction to verify, amplify, or negate the findings of this study.

**Keywords:** *Sphagneticola trilobata*, phytochemical screening, secondary metabolites

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## Introduction

Plants produce a high diversity of natural products or secondary metabolism which are important for the communication of plants with other organism. Many of secondary metabolites had interesting biological properties and quite a number are of medicinal uses, because the production of the valuable natural products.

They are not useless compound, the ecological fitness of the plants producing them secondary metabolites have apparently evolved as a means for plant to protect themselves against insects and mammals. The knowledge of chemical constituents of plants would further be valuable in discovering the actual value of folkloric remedies. There are thousands of herbal medicines identified here in the Philippines, out of this only a few of this known plant have been thoroughly by scientific institutions.

*Sphagneticola trilobata* or Wedelia, a perennial plant with stem rooting at the nodes, is one of those plants discovered by some researchers that have a potential to cure dysmenorrhea, amenorrhea, colds, flu, fever and inflammation. This study aimed to determine the secondary metabolites present in Wedelia plant extracts.

## Materials and Methods

### Collection and Preparation of Plant Extract

The fresh flower and leaves of Wedelia plant was collected from UEP, Catarman Northern Samar. About 50 grams of the stem and leaves were weighed and finely cut. The finely cut

stem and leaves were plunged in flask with hexane up to a volume where the

flowers were completely submerged. This was done to prevent enzyme hydrolysis and simultaneously extract the plant constituent. The flask was stoppered and the flowers were soaked for 24 hours. After soaking, the mixtures were squeezed with the use of cheesecloth to separate the hexane extract. The solvent was distilled off at a temperature of 69 °C. And the extract was stored in a clean bottle ready for phytochemical screening. The same procedure was followed for the leaves.

### Determination of Percent yield

Percent yield was determined by dividing the weight of the crude extract by the amount of plant sample extracted and then multiplying it by 100

### Physical properties

The physical properties of the stem and leaf extract were determined separately using the procedure that follows:

#### Boiling point

About 5mL of a sample extract of wedelia was placed in a test tube. The test tube was submerged in an oil bath and the temperature where the sample extract started to boil was recorded, the process was repeated thrice.

#### Color

The color of the extract was observed and recorded by the five (5) respondents.

#### Density

The density was determined by weighing about ten (10) mL of the Wedelia extracts on a triple beam balance. The weight of the wedelia stem and leaf extract was recorded and divided by the volume of wedelia stem and leaf extract used (in mL). The procedure was repeated thrice. The formula used is shown below:

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

#### Odour

Odour was also observed and recorded by the five (5) respondents. It was done by wafting the air above the test tube containing the extracts.

#### pH

pH was determined by dipping the pH meter into a 50 mL beaker containing 10mL of the extract. Then, its reading was recorded.

#### Solubility

About 2 mL of the extract was placed in three (3) separate test tubes. To the first test tube was added 2mL hexane,

to the second test tube 2mL ethanol and to the third test tube 2mL water. Each tube was shaken vigorously. And the results were noted.

#### Phytochemical Screening

The method of (Guevara, 2005) was used to identify the secondary metabolites in the extracts of Wedelia. The test for alkaloids, anthraquinones, leucoanthocyanin, phenolic compounds, saponins, steroids, terpenoids, and tannins.

#### Results and Discussion

The result of the study on the stem and leaf extract of wedelia from, Catarman N. Samar are herein presented. This includes the determination of percent yield of crude stem and leaf extract, the physical characteristics in terms of boiling point, color, density, odor, pH and solubility, and the determination of secondary metabolites.

**Table I. Summary of the Physical Properties of Wedelia Leaf & Stem Extracts.**

Physical Properties	Leaf	Stem
Boiling point	99°C	99°C
Color	Dark brown	Chocolate brown
Density	0.7 g/mL	0.9 g/mL
Odor	unpleasant	unpleasant
pH	7.5	8.6
Solubility	polar	polar

Table I shows the Boiling point of Wedelia Leaf and Stem extract in °C, Wedelia leaf and stem extract started to boil when it reaches 99°C, changes from liquid to gaseous state. The result implies that the boiling point of the samples is below

100°C which is 99°C. The color and odor of the 2 samples were observed by the 5 evaluators. The result implies the odor of wedelia leaf and stem extract was unpleasant, the color of the leaf was darker than the stem Density is the mass

of an object divided by its volume. It is a measure of compactness, of how tightly mass is squeezed into a given volume. The leaf extract was less dense compared to the stem extract, means that stem was more compact rather than the leaf extract. pH measures the acidity and alkalinity of the leaf and stem extract. Stem extract was basic while leaf extract was slightly basic. The result implies that stem extract is more basic than the leaf.

Ethanol and water are polar molecules while hexane is a non-polar solvent. Comparing the 2 samples, stem extract is immiscible in ethanol because a precipitate formed. The result showed that Wedelia leaf and stem extract are polar molecules because of the factors that affect solubility, "nature of solute and solvent", or "like dissolves like". Although stem extract is immiscible in ethanol, it implies that the Wedelia leaf and stem extract is a polar substance.

**Table II .Percent Yield of Crude Leaf & Stem Extracts.**

Sample	Weight of Sample in (g)	Weight of Extract in (g)	Percent Yield (%)
Leaf	477.5	235	49.2
Stem	469.5	253	53.9

Percentage yield of the stem extract is greater than the leaf extract. The weight of leaf sample is 477.5 g which is higher than the weight of stem 469.5 g, it showed that the volume of stem extract is greater than the leaf. It implies that stem has a greater percentage yield compared to the leaf.

**Table III. Summary of the Secondary Metabolites of Wedelia Leaf & Stem Extracts.**

Secondary Metabolites	Leaf	Stem
alkaloid	P	P
Anthraquinone	N	N
Leucoanthocyanin	N	N
Phenolic compound	N	N
Saponin	N	N
Steroid	N	N
Tannin	N	N
Terpenoid	N	N

Legend:

P= positive

N= negative

Wedelia leaf and stem extract is negative in Confirmatory of alkaloid Dragendorff's and Mayer's test, no color of white and orange precipitate formed. Although in preliminary test Leaf & Stem extract shows positivity in alkaloids. It implies that there is

alkaloid present in Wedelia leaf and stem. The Modified Borntrager's test is used to determine anthraquinone in Wedelia leaf and stem extract. No pink color appears in the solution, an indication of positivity and it shows that

the 2 samples are negative. The Wedelia leaf and stem extract is negative in Leucoanthocyanin test, a yellow color appear, the result implies that the leaf and stem extract is negative.

Table III Wedelia leaf and stem extract is negative in polyphenol. The color of the sample treated with 3% ferric chloride is yellow, which is not an indicator of polyphenols.

In capillary tube test stem extract is negative while leaf extracts shows positivity of saponin. Leaf extract shows an ability to lower the water surface tension while stem extract does not. Froth test is used as a confirmatory of the 2 samples. In froth test, the 2 samples are negative because of poor honeycomb appearance in the samples. The result implies that the leaf and stem extract is negative in saponin even if the leaf shows a positivity in the preliminary test The Liebermann-Burchard test for: unsaturated steroids used in leaf and stem extract. Comparing the control with the other test tube treated with acetic anhydride and conc. Sulfuric acid. Stem extract is clear, no changing of colors while leaf extract appears a slightly cloudy, means absence of steroid/triterpenoid skeleton. The result implies that the 2 sample is negative in steroid test. Leaf and stem extract shows a negative result in tannin test. In leaf extract no color change while in stem a brown precipitate formed. The stem extract has a chemical reaction on the lead acetate and formed a precipitate, but still the result implies that the 2 sample is negative in tannin. Table III shows the result of Terpenoid Test in Wedelia Leaf and Stem Extract, no blue or green ring appear. It implies that the 2 samples are negative in Terpenoids.

## CONCLUSIONS

Based on the findings of the study, the researcher found out the following: the Wedelia leaf and stem extract has a lower boiling point, leaf extract is less dense than the stem. Wedelia leaf and stem extract is a polar substance. Wedelia leaf extract is slightly basic than the stem and stem extract has a higher percent yield compare with the leaf.

There are positively present in Preliminary Test in alkaloid and saponin Test of Wedelia Leaf and Stem Extract but in Confirmatory Test the 2 samples were negative. There is no secondary metabolites present in wedelia leaf and stem extract, such as: anthraquinone, leucoanthocyanin, phenolic compound, steroid, tannin and terpenoid.

## RECOMMENDATIONS

The following recommendations are offered, to conduct similar study using other solvents for plant extraction and to perform further study/confirmatory tests on the presence of the secondary metabolites from *Sphagneticola trilobata*.

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