# YIELD ANALYSIS AND PHYTOCHEMICAL SCREENING LEAF EXTRACT OF Sansevieria Sp

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*Abstract*—. **This study aimed to determine the results of yield analysis on *Sansevieria trifasciata* and *Sansevieria cylindrica* leaf extract. In addition, this study also aimed to determine the qualitative presence of a bioactive group compounds that potentially as antioxidants (phytochemical screening) on the leaves extract *Sansevieria trifasciata* and *Sansevieria cylindrica*. The method used in this research was a stratified extraction method with three types of solvent, ie non-polar solvent in the form of N Hexan; A semi-polar solvent of Aceton; And a polar solvent of Ethanol. Further , identification of six types of phytochemical compounds, namely triterpenoid and steroid, saponin, phenol, flavonoid, quinone, and alkaloid groups was conducted. The result of yield analysis showed that Sansevieria trifasciata's yield more than Sansevieria cylindrica's yield. *Sansevieria trifasciata's obtained 7,89% yield while Sanseviera cylindrica has 6,79% yield* The greater the yield produced, the more efficiently treated applied by not excluding other traits. The result of phytochemical compound analysis obtained three phytochemical compounds contained in *Sansevieria trifasciata*, namely triterpenoid group compounds and steroids and flavonoids. Meanwhile, the results of analysis of phytochemical compounds contained in Sansevieria cylindrica also obtained three phytochemical compounds, namely triterpenoid compounds and steroidal groups and alkaloids.**

*Keywords*— **Yield analysis , phytochemical compound, Sansevieria sp**

## I. INTRODUCTION

Tongue-in-law plant or Snake plant (Sansevieria sp) is often used as an indoor and outdoor ornamental plant. In addition to its function as an ornamental plant, it can also be reproduced as a traditional medicine for influenza, cough, and inflammation of the respiratory tract. Yield is an important value in production. Yield is the ratio of dry weight and wet weight of a raw material of a product (Yuniarifin, Bintoro, and Suwarastuti, 2006). The extract yield was calculated based on the ratio of the final weight (weight of the extract produced) with the initial weight (cell biomass weight used) multiplied 100% (Sani *et al*, 2014). The value of yield is also related to the amount of bioactive compound contained in *Sansevieria sp*. Bioactive compounds are compounds contained in the body of animals and also plants. These compounds have various benefits for human life, such as a resource of antioxidants, antibacterial, anti-inflammatory, and anticancer. Prabowo *et al*. (2014) suggests that studies of bioactive compounds have been conducted for human health purposes, ranging from supplements to drugs to humans. Stars, Sinurat, and Purwadaria (2007) stated that these bioactive compounds have function as antibacterial, anticancer, anti-inflammatory and antioxidant.

Phytochemical screening is an early stage to identify the content of a compound in simplicia or plant to be tested. Phytochemicals or plant chemicals study the diverse of organic compounds that are formed and stockpiled by plants, it is about the chemical structure, the biosynthesis, the subsequent implications, and Its biological physiology. Chemical compounds as a result of secondary metabolites have been widely used as dyes, toxins, food scents, medicines and as traditional medicines thus research on the use of growing - nutritious plants chemistry as traditional medicine is indispensable. Chemical compounds that are secondary metabolic products in plants are very diverse and can be classified into several classes of natural compounds, namely saponins, steroids, tannins, flavonoids and alkaloids (Putranti et al, 2013)

In Indonesia, studies of phytochemical yield and screening of Sansevieria trifasciata and Sansevieria cylindrica extracts are limited. Based on these conditions, it is necessary to conduct research to analyze the rendemen and determine the qualitative presence of bioactive group compounds potentially as an antioxidant in Sansevieria trifasciata and Sansevieria cylindrica.

## II. METHODOLOGY RESEARCH

This research was conducted at Laboratory of Mathematics and Science Faculty, University of Lampung, Bandar Lampung. The study was conducted for 5 months, from March 2016 to August 2016. Methods of data collection consist of:

### *A. Identification and Preparation of S. trifasciata and S. cylindrica*

The preparation of S. trifasciata and S. cylindrica begins with washing, drying and grinding processes. Before it was dried, the sample were weighed to know the wet biomass, then the sample were dried in a protected from direct sunlight place. This were aimed to avoid damage to bioactive compounds material. The dried S. trifasciata were smoothed with a blender, then filtered to obtain uniform grains, inserted in a plastic bag and labeled then weighed with analytical scales and stored in dry conditions for subsequent extraction.

### *B. Extraction Process*

The extraction of active ingredients was carried out were modified with reference to the research of Juniarti et al. (2009) and Santoso et al. (2012). The extraction method used in this research was the extraction plate technique. Harborne (1987) states that extraction plate technique were conducted by soaking the sample with different solvents sequentially, first with a non-polar solvent (n-hexane) then with a semipolar solvent (ethyl acetate) then with a polar solvent (ethanol). Simplicia S. trifasciata Prain and S. Cylindrica were weighed as much as 250 grams and fed into the erlenmeyer, then added the solvent until the final volume reached 1000 ml at a ratio of 1: 4 (w / v). The extraction procedure was carried out by immersing the sample with n-hexane, ethyl acetate and ethanol respectively. The maseration results are then filtered with Whatman 42 filter paper to produce filtrate and residue. Soaking were conducted 3 times until the filtrate close to clear. The obtained filtrate was then concentrated with a vacuum rotary evaporator at 40ºC until a crude extract was obtained in the paste form . The soaking extract was calculated using the formula:

Yield percentage = Total weight of the extract in the form of paste (g) x 100% The amount of dry weight (g)

***C. Phytochemical Analysis***

Phytochemical analysis is a qualitative analysis conducted to determine the bioactive components contained in each solvent of S. trifasciata and S. cylindrica extracts. Phytochemical analyzes performed included alkaloids, triterpenoids and steroid tests, saponins, phenols, flavonoids and quinones. The analytical method used is based on Harborne (1987).

- Alkaloids: Alkaloid test is done by dissolving in a few drops of 2 N sulfuric acid then tested with 2 alkaloid reagents ie dragendorff reagent and meyer reagent. Positive test results obtained when the formation of red deposits to orange with reagent dragendorff and yellowish white sediment with meyer reagent.

Triterpenoids and steroids: Several samples were dissolved in 2 ml of chloroform in a dry reaction tube and then added 10 drops of anhydrous acetate and 3 drops of concentrated sulfuric acid. The positive reaction is shown by the formation of a red solution for the first time then turns into blue and green

- Saponin (foam test): Saponin can be detected by foam test in hot water. A stable foam will continue to be visible for 5 minutes and foam exist on the addition of 1 drop of HCl 2 N indicates the presence of saponins.

- Phenol: A number of samples were extracted with 20 ml of 70% ethanol. The resulting solution was taken as 1 ml then added 2 drops of 5% FeCl3 solution. Positive reaction is indicated by green or blue green.

Flavonoids: A number of samples were added by 0.1 mg magnesium powder and 0.4 ml of amyl alcohol (37% hydrochloric acid mixture and 95% ethanol with the same volume) and 4 ml of alcohol and then the mixtureof ethanol and alcohol was shaken. Positive reactions are indicated by the apperance of red, yellow or orange on the amyl alcohol layer.

- Quinones: Sample NaOH 1 N added then observed the color change. A positive reaction is

## III. RESULT AND DISCUSSION

***Yield Analysis of Sanseviera sp***

The first process before Sansevieria sp yield analysis is extraction process. Sansevieria sp, both Sansevieria cylindrica and Sansevieria trifasciata are extracted by using a extraction method with three types of solvents, ie non-polar solvents of N Hexan; A semi-polar solvent of Aceton; And a polar solvent of Ethanol. Three types of solvent are used to obtain phytochemical compounds from within the cell wall of Sansevieria sp. Although used same solvent , volume used to extract Sansevieria sp is different. The volume of N Hexan, Aceton, and Ethanol used to extract Sansevieria cylindrica is 250 ml. While the volume of N Hexan, Aceton, and Ethanol used to extract Sansevieria trifasciata is 150 ml.

Other similarities between Sanseviera cylindrica and Sanseviera trifasciata is drying's temperature , 6o degrees celcius, and 40 degree c for evaporating. The difference is drying duration, Sanseviera cylindrica was dried for 24 hours and Sanseviera trifasciata dried for 48 hours.Sanseviera sp extraction process shown by Figure 1 below.

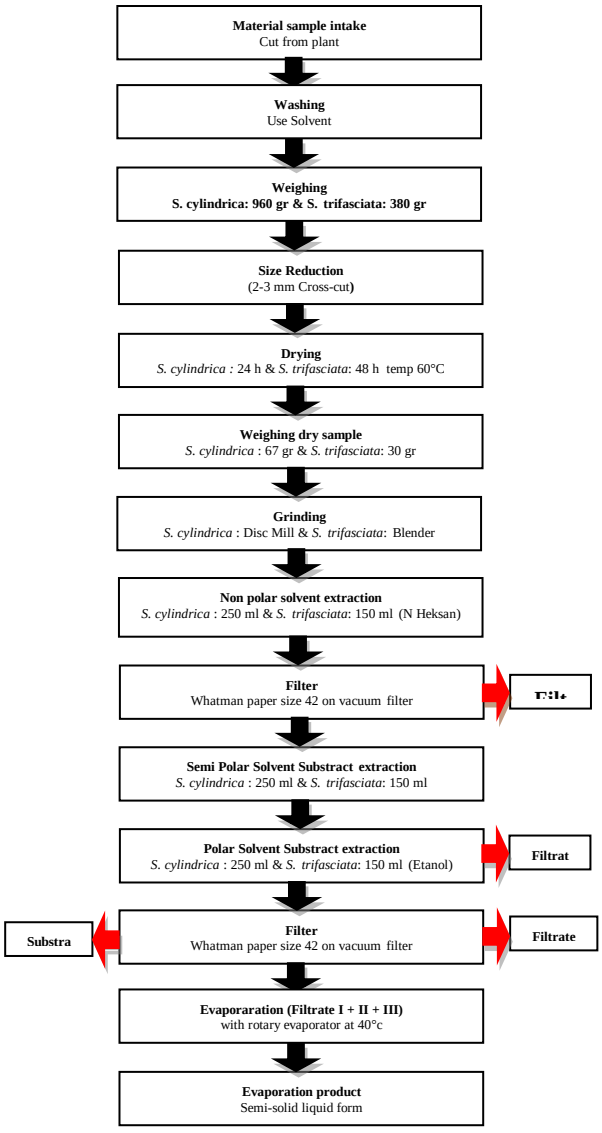

**Figure 5.1 *Sansevieria sp* Extraction Process Flow Chart**

Yield analysis could be executed after extraction process. Sanseviera cylindrica yield could be calculated with equation below :

$$\text{Pr} = \frac{67}{960} x\ 100\% = 6{,}79\%,$$

*While Sanseviera trifasciata yield calculation is*

$$\text{Pr} = \frac{30}{380} x\ 100\% = 7{,}89\%.$$

Based on the calculation above can be said that the yield of Sansevieria trifasciata more than Sansevieria cylindrica yield. Evidently, the yield of Sansevieria trifasciata was 7.89% and Sansevieria cylindrica was 6.79%. The larger the resulting yield, the more efficiently the treatments are applied by not ruling out other traits.

Based on the results of yield it can be assumed that the bioactive components contained in Sansevieria trifasciata more than Sansevieria cylindrica. In line with Nurhayati, Aryanti, and Nurjanah (2009) that the high value of yield in line the number of bioactive components contained in it. To prove this assumption, phytochemical screening was performed.

***Sansevieria sp. Phytochemical compound screening .***

To known the appearance of bioactive compound which is potential as antioxidants in Sanseviera sp extract, six phytochemical compounds was identified. Those phytochemical compounds are triterpenoid and steroids, saponin, phenol, flavonoid, quinone, and alkaloid (Figure 2)


(a)

(b)


(c)


(d)


(e)

**Figure 2. Phytochemical Screening**

Phytochemical Screening was conducted qualitative base on compound solubility characteristic. Analysis result shown Sanseviera trifasciata content three triterpenoid, steroidal, and flavonoid group. Meanwhile, the results of the analysis of phytochemical compounds contained in Sansevieria cylindrica also obtained three phytochemical compounds, the compounds of triterpenoid and steroidal groups and alkaloids.

Phytochemical compounds assay , the results of color stain semi-solid fluid screening are presented in Table 4.1. In assay of triterpenoid and steroid group compounds, semi-solid Sansevieria sp when extracted with anhydrous acetate and concentrated sulfuric acid produce a reddish color at the bottom of the test tube. This means both Sansevieria cylindrica and Sanseviera trifasciata are positive contained triterpenoid and steroids group. The results of this study are in line with Rahimah (2015) and Philip, Kaleena, and Kumar (2011).

Triterpenoid compounds help the body in the process of organic synthesis and recovery of body cells, whereas steroid compounds exhibit antibacterial, antifungal, antitumor, neurotoxic and anti-inflammatory activity beneficial to the pharmaceutical industry (Robinson, 1995). Meanwhile, according to Fessenden (1982) triterpenoid and steroid compounds for plants play a role in the metabolism and formation of male and female gametes. Both of these compounds are bioactive compounds that have antibacterial and antioxidant activity through the isolation and identification of its activity. Riyanto et al. (2013) states that triterpenoid compounds found in plants serve as protectors for resisting insects and microbial attacks. Bangham and Horne (2006) suggest steroids can interact with impermeable cell phospholipid membranes against lipophilic compounds that cause membrane integrity to decrease, morphology of cell membranes change, and eventually lead to fragile cell membranes and lysis.

In Saponin group compounds assay, the two samples showed no foam when the semi-solid liquid of Sansevieria sp extract had been dripped with HCl. This means both Sansevieria cylindrica and Sansevieria trifasciata negatively contain saponin group compounds.

In phenol group compounds assay, when the semi-solid liquid extract of Sansevieria sp driped with FeCl3 drops, it turns out that the color of the two samples remain brownish yellow not green or blue green. This means both *Sansevieria cylindrica* and *Sansevieria trifasciata* negatively containing phenol group compounds

The flavonoid compound assay in the sample test tube Sansevieria trifasciata formed a reddish orange color when mixed with hydrochloric acid, ethanol, and alcohol. Meanwhile, in the sample *Sansevieria cylindrica* remain clear light green. This means that *Sansevieria trifasciata* positively has *flavanoid* compoun ds,while *Sansevieria cylindrica* negatively contains *flavanoid*

group compounds. The results of this study are in line with Lombogia, Budiarso, and Bodhi (2016).

Flavonoid compounds have properties as antioxidants that can protect the pancreatic cells damage from free radicals and can lower blood sugar levels by stimulating pancreatic beta cells to produce more insulin (Arjadi and Susatyo, 2010). Meanwhile, according to Bhat et al (2009) flavonoid compounds for plants act as pigments and attractants for insects that assist pollination, while flavonoid compounds are beneficial to humans as antioxidants. Kar et al. (2006) states that flavonoid compounds are non-polar compounds which found in many plant stems.

In quinone group compounds testing, the two test tubes did not change color to yellow when the NaOH was dripped. This meansboth Sansevieria cylindrica and Sansevieria trifasciata n egatively contain quinone group compounds. In the alkaloid group compound test, in the Sansevieria cylindrica sample tube contained white precipitate when depressed Mayer reagent. Meanwhile, in the Sansevieria trifasciata sample there was no sediment. This means that Sansevieria cylindrica positively contains an alkaloid compound, while Sansevieria trifasciata negatively contains alkaloid group compounds. The results of this study are in line with Philip, Kaleena, Valivittan and Kumar (2011).

According to Harbone (1987), alkaloid compounds in Sansevieria cylindrica serves as a regulator of growing or insects attractant. Raharjo (2013) states that alkaloids are not found in all plant species. Alkaloids are mostly found in high-grade Angiospermae plants especially in dicotyledonous plants. Meanwhile, according to Suhartono, Fujiati and Aflanie (2002), the presence of antioxidant alkaloid alkaloid compounds is expected to reduce free radicals' cancer trigger because these compounds can donate one or more electrons to overcome free radical.

**Tabel 5.1** *Sansevieria sp phytochemical screening result*

| Phytochemical Screening | Sample | | Description |
|---|---|---|---|
| | *Sansevieria trifasciata* | *Sansevieria cylindrica* | |
| Triterpenoid and Steroid | + | + | There was a reddish color at the bottom of the test tube in both samples |
| Saponin | - | - | Both samples showed no foam |
| Phenol | - | - | Green and blueish green was not formed (color remain yellow brown) |
| Flavonoid | + | - | In the *Sansevieria trifasciata* sample reaction tube formed a reddish orange color while in the sample *Sansevieria cylindrica* remain clear green light |
| Quinone | - | - | The two test tubes was not show yellow color change when dripped with NaOh |

## IV. CONCLUSION

Based on the results and discussion, it can be concluded that:

1. Yield analysis result; *Sansevieria trifasciata* yield has more than *Sansevieria cylindrica*
2. *Sansevieria cylindrica* and *Sansevieria trifasciata* positively contain triterpenoid and steroid group compounds as but negatively contain saponins, phenols, quinones group compounds
3. *Sansevieria trifasciata* positively contains flavanoid compounds, while *Sansevieria cylindrica* negatively contains flavanoid group compounds
4. The results of phytochemical compound analysis obtained three phytochemical compounds contained in *Sansevieria trifasciata* are of triterpenoid and steroid and flavonoid groups compound. While *Sansevieria cylindrica* contained the triterpenoid and steroids and alkaloids compound

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