COMPARISON OF SOXHLETATION AND MACERATION METHODS AGAINST LEVEL TOTAL FLAVONOID EXTRACT ETHANOL 96% LEAF CIPLUKAN *(Physalis angulata)*

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ABSTRACT

Leaf ciplukan has known public Indonesia as plant drug. Leaf ciplukan (*Physalis angulata*) contain secondary metabolite compounds, one of which is flavonoids. Flavonoid compounds from plants are obtained from various processes, one of which is process extraction with method soxhletation and maceration. Objective: Analyzing the differences Soxhletation and maceration methods on total flavonoid content of ethanol extract of ciplukan leaves (*Physalis angulata*). Method: The extraction process of the simple drug was carried out using the soxhlet method and maceration, followed by screening of flavonoid compounds against 96% ethanol extract of ciplukan leaves (*Physalis angulata*). Quantitative tests were conducted to determine the total flavonoid content of the leaves. Ciplukan (*Physalis angulata*) was carried out using the UV-Vis spectrophotometry method at a wavelength of wave 665 nm. Results: Phytochemical screening showed that the extracted ethanol extract use method soxhletation and maceration contain compound flavonoid proven with results screening from both of them positive. Level total flavonoid Which extracted use soxhletation method as much as 11 mgQE/g while extracted using the maceration method as much as 3 mgQE/g. Results from test statistics method *T-Test* known mark sig <0.05. Conclusion: Extraction with method soxhletation produce level total flavonoid Which more tall compared to the maceration method. This proves that soxhletation is a method best used to extract flavonoid compounds in ciplukan leaves *(Physalis angulata)*

Key words: Leaf ciplukan; Flavonoids; Maceration; Physalis angulate; Soxhletation;

INTRODUCTION

Potential production plant drug experience improvement along with development industry drug modern and traditional. In Indonesia use drug traditional Still trusted by public in a number of circles For treat various diseases (Adiyasa & Meiyanti, 2021). Public awareness of the benefits of medicinal plants Which very diverse the very influential so that until Now plant drug Still often used. Plant drug own content compounds, from these compounds medicinal plants can cure various kinds of things disease. One of them is secondary metabolite compounds. Metabolite compounds secondary functioning as Wrong One support Which play a role like agent defense self, oppose disease or condition critical, and play a role as hormone in medicinal plants (Nugroho, 2017). Secondary metabolite compounds that are

commonly found in plant drug is alkaloids, flavonoids, steroids, saponins, terpenoids and tannins.

One type of compound found and includes metabolite compounds secondary namely flavonoids. Flavonoids are compounds that are found in almost all all parts of the plant, namely the roots, stems, bark, leaves, flowers and can also be found in the fruit. Flavonoid compounds from plants can obtained through various processes, one of which is the extraction process with hot method and cold method. Extraction is a process that is carried out for separate a substance using solvent certain.

According to study Which Already done previously about comparison method extraction maceration and soxhletation to level total flavonoids of ethanol extract of cherry leaves, showing that the total flavonoid content Which extracted with method soxhletation more big compared to with using the maceration method (Puspitasari & Proyogo, 2013). This is the same as the research conducted by Great (2022) about level total flavonoid extract leaf basil shows the final result of soxhletation is higher compared to maceration (Agung Budi Prasetyo et al., 2022). However study about comparison method extraction and polarity solvent on the total flavonoid content of breadfruit leaves, indicating that the soxhletation method and the maceration used does not have a significant effect on metabolit secondary which can seen from results determination level Which No too far different between the soxhletation method and maceration. In the research This Also mention that level total flavonoid more tall on extract with solvent ethyl acetate (Riasari et al., 2022).

From the results of research that has been previously conducted by researchers to level total flavonoid from various type plant drug, so makes it possible to research a wider variety of medicinal plants which contains flavonoids to determine the levels. One of the medicinal plants Which Already Enough familiar about the benefits that is plant ciplukan *(Physalis angulata)*. Ciplukan *(Physalis angulata)* is plant Which potential grows in Indonesia. This plant is spread almost throughout Indonesia with Name area Which vary. Ciplukan has utilized as source drug traditional so that can developed as material standard in field pharmacy. Almost all parts of the ciplukan plant have benefits as medicinal plants. One part of the ciplukan plant that is often used public is the leaf part.

Based on the background above, further research needs to be carried out. carry on For know whether There is difference to level total flavonoid on ciplukan leaves *(Physalis angulata)* extracted using the heat method and methods cold.

MATERIAL AND METHODS

The tools used is this research were an *soxhletation, tool maceration, rotary evaporator (IKA) , uv-vis spectrophotometer (shimadzu), analytical balance, oven, glassware , dropper, filter paper, cuvette, test tube.*The materials used in this research were leaf from plant ground cherry (Physalis angulata) old. As well as material chemistry Which used in This research includes 96% ethanol, distilled water, concentrated HCl, quarsetin, aluminum chloride, sodium acetate, magnesium powder.

EXTRACTION OF LEAF CIPLUKAN

Making powder simple done with method to dry material standard, Then refined use blender furthermore sifted use sieve no 40. Extraction done with two methods, namely soxhletation and maceration, the simple ingredients used in each method as much as 100 grams using 96% ethanol. With comparison method soxhletation 1:5 and maceration 1:10.

PHYTOCHEMICAL SCREENING

Flavonoids

Screening compound flavonoid done to all extract results soxhletation and maceration. As many as 1 ml extract leaf ground cherry Which has dissolved with ethanol 70%, Then added A little powder metal Mg and a number of drops HCl concentrated. If formed color red, yellow, or orange show existence flavonoid compounds.

Making Curve Calibration Quartzite

Solution standard made with method weigh 50 mg quarcetine, Then dissolved with use methanol until limit 100 ml. made solution standard with concentrations: 8; 10; 12; 14; 16 ppm. Then each was pipetted 0.5 ml dissolved in 1.5 ml of ethanol then added 0.1 ml of AlCl 3 , added 0.1 ml potassium acetate, add 2.8 ml of distilled water, then let stand for 30 minutes minute and the absorbance value is measured.

Determination Level Total Flavonoid

Determination level total flavonoid done with tool spectrophotometer Uv- vision with use reagent AlCl3 in accordance procedure (Aminah et al., 2017). As many as 0.5 ml solution extract with a concentration of 1000 ppm was added with 1.5 ml of methanol, 0.1 ml aluminum chloride, 0.1 sodium acetate, and 2.8 ml of distilled water, the next stage left alone during 30 minute. Absorbance in measuring with use spectrophotometer Uv-vis on long 665 nm wave.

RESULT AND DISCUSSION

Extraction of Edamame Peel and Seeds

Plant determination results with document number 96/PL17.8/PG/2024 Which state that plant ciplukan with Name species *(Physalis angulata, L)* and family *Solanaceae.* Process extraction with method soxhletation and maceration use ethanol 96% produce extract ethanol as much as 16 grams from the soxhletation method and 11 grams of ethanol extract from the maceration method, percent The yield obtained from the two methods was 16% and 11%. The value yield related with the amount content bioactive Which There is on plant (Senduk et al., 2020).

From the table it can be seen that the results of the calculation of the percentage yield meet the requirements. A good range is not less than 10%. The yield percentage is said to be good if the value more from 10% (Subaryanti et al., 2022). Method maceration and soxhletation own differences in temperature and time during the extraction process, but both of them own principle Which The same that is sum up substance active Which There is on sample. Extraction which uses high temperatures can easily damage the cells of the leaf parts plants so that the active substances in the leaves are easily bound by solvents. On extraction using the soxhlet method has a higher percentage yield compared to with method maceration matter This in line with study Victory (2022) which states that the percentage yield in the soxhletation method is greater compared to the maceration method (Heri et al., 2022). The soxhletation method uses a temperature higher compared to the maceration method during the

active substance extraction process. Process soxhletation use temperature 50-60 ^{o} C whereas process maceration using room temperature. Higher temperatures are more effective for performing process extraction proven with percent yield Which more tall on method soxhletation.

Screening Phytochemicals Compound Flavonoid

Screening phytochemicals done to extract ethanol aiming For to find out whether the extract contains flavonoid compounds. Compound screening flavonoids are made by adding concentrated HCl and Mg powder to solution extract ethanol 96% leaf ciplukan *(Physalis angulata)* Which will forming yellow, orange, to red colors (Andasari et al., 2020).

From table on obtained results from screening phytochemicals compound flavonoid second method soxhletation and maceration positive contain flavonoids. Matter This in line with research conducted by Putri (2023) on ethanol extract which is extracted using the soxhlet and maceration methods shows a color orange which means that the ethanol extract contains flavonoid compound(Amalia, 2023). From screening leaf ciplukan proven contain compound flavonoid Which become one of the secondary metabolites that makes ciplukan leaves effective as plant drug.

Determination Level Total Flavonoid

Furthermore done determination level total flavonoid use spectrophotometry UV-Vis Which started with screening long wave maximum. Long wave maximum taken from absorption maximum the wavelength used to measure the standard absorbance of a sample (Pujiastuti & El'Zeba, 2021) . The maximum wavelength screening results obtained a value of 665 nm. The value This is in line with Marco's research (2021) that plants that absorb The maximum light wave of 665 nm has a total flavonoid significance higher (Santin et al., 2021) . So in this study to analyze the total flavonoid levels extract ethanol leaf ciplukan *(Physalis angulata)* use long wave maximum the.

After obtaining the maximum wavelength, the next step is to... standard determination test for quarcetin with concentration (ppm) 8; 10; 12; 14;16 incubated during 30 minute and measured mark its absorbance use spectrophotometry UV-Vis.

The result of the equation y = 0.0114x – 0.0146 is obtained with R^2 = 0.99. Where y is absorbance, x is concentration from quarcetine, and R^2 is. Factor correlation. Where equality regression can used if factor the correlation 0.99 (Haresmita & Pradani, 2022).

Sample analysis is carried out to find the absorbance value of Ethanol extract samples extracted by soxhletation and maceration methods. The average absorbance value obtained is entered into the equation for determine level total flavonoid extract ethanol leaf ciplukan *(Physalis angulata).* Equality to determine total level flavonoid as follows :

$$\text{KTF} = \frac{V(mL) * X(mg/mL) * FP}{g\ ekstrac}$$

Based on these results, it shows that the extract with this method soxhletation and maceration have different results. The total flavonoid content that high obtained from the extract of ciplukan leaves *(Physalis angulata)* using the method soxhletation is

11 mgQE/g. The results are influenced by the difference the temperature used during the extraction process between the soxhlet and maceration methods different. In this study, the higher the temperature used during the process, the extraction so compound flavonoid Which identified in the extract also the more tall. Results which obtained in study this in line with study Which done by Great (2022) about level total flavonoid extract leaf basil the results obtained were that the total flavonoid content in the extract with method soxhletation more tall compared to with extract with method maceration (Agung Budi Prasetyo et al., 2022). Test statistics data done use SPSS with method T-Test, from the statistical test shows a sig value of <0.05 so it can be stated that method soxhletation and maceration are different.

CONCLUSION

Ethanol extract of ciplukan leaves *(Physalis angulata)* from qualitative analysis with identification using concentrated HCl and Magnesium positive contains Flavonoid compounds are proven by extract solutions from both colored methods orange. Result from the analysis quantitatively by UV-Vis spectrophotometry method The total flavonoid content obtained from soxhlet extraction was higher, namely 11%. mgQE/g extract compared to with and level total flavonoid extraction maceration that is as big as 3 mgQE/g extract. Results from analysis statistics show mark sig <0.05 which means that the soxhletation and maceration methods are different. Extraction with Soxhletation or maceration method based on statistical analysis results is proven affects the total flavonoid content of 96% ethanol extract of ciplukan leaves *(Physalis angulata)*. High total flavonoid content was obtained from extraction with method soxhletation because of on process extraction use temperature Which tall compared to with method maceration that only use room temperature just in the process its extraction.

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TABLE

Table 1. Percent Yield

Sample	Extract Thick	Yield
Soxhletation	16 gr	16 %
Maceration	11gr	11%

Table 2. Results screening flavonoid

Sample	Sign Positive	Results Observation	information
Extract soxhletation	Color formation yellow, orange, red	Orange	+
Extract maceration	Color formation yellow, orange, red	Orange	+

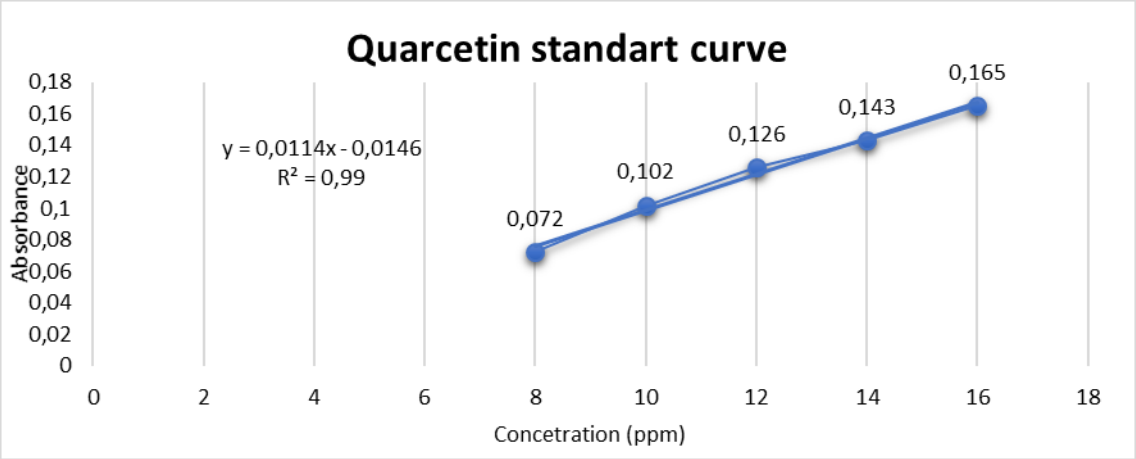
Table 3. Determination standard quarcetin raw material

Concentration (ppm)	Absorbance
8	0.1100
10	0.1400
12	0.1640
14	0.1810
16	0.2030

Table 4. Level total flavonoid

	Average Mark Absorbance Sample (Blank Sample)				Total Level Flavonoid
Method	1	2	3	Average	
Soxhletation	0.1090	0.1120	0.1220	0.1143 ± 0.0629	11 mgQE/extract
Maceration	0.0140	0.0190	0.0170	0.0167 ± 0.0095	3 mgQE/g extract

CURVE



Quercetin standart curve