Analysis of Tannin and Flavonoid Contents of Green Sirih Leaves (*Piper betel linn*) of Green Different in Physical Conditions

Sigit Setyabudi[1], Engkus Ainul Yakin[2], Sri Sukaryani[2]
[1]Student of Program Study of Animal Science, Faculty of Agriculture,
Universitas Veteran Bangun Nusantara Sukoharjo
[2]Program Study of Animal Science, Faculty of Agriculture,
Universitas Veteran Bangun Nusantara Sukoharjo
Corresponding author : engkus_ainul@yahoo.com

Abstract

The purpose of this study was to determine the levels of tannins and flavonoids from green sirih leaves which have different physical conditions. Sirih leaf is used as the object of treatment prior to use beam sun dried for 2 days until the color changes, the weight of time, as well as the start crumbly texture, then followed by a drying method using an oven with a temperature of 40^{o}C. The experimental design research in the form of RAL with using observation samples in the form of sirih leaf flour which was dried using sunlight without oven (P0), sirih leaf flour dried in the sun for 6 hours (P1), 7 hours (P2), 8 hours (P3). Sirih leaves that have been made into flour according to the experimental design are then analyzed for the content of tannins and flavonoids. The results of laboratory analysis are then processed using the SPSS application with ANOVA and Duncan analysis. Results of the analysis indicated that there was a very real effect on the old oven for 40^{O}C to contain tannins and flavonoids (P <0.01), followed different test that produces very real differences occurred between treatments. The results of the use of methods oven for 8 hours at a temperature of 40^{o}C after drying sunlight can increase the tannin content of 0,6% and 0,09% flavonoids from sun drying method without oven.

Keywords : Green sirih leaf, Flavonoids, Tannins.

Introduction

Feed is an external factor that has a major influence on the productivity of a livestock business, including the chicken farming industry. The feed used in chicken farms generally consists of a mixture of ingredients obtained by considering several conditions such as a large amount of availability, economical, and having sufficient nutritional content for livestock.

The use of commercial feed which is produced by a number of factories provides a product that consists of a composition of feed ingredients with a relatively high variation in nutrition and price. Innovation in the use of plant feed ingredients is an alternative in an effort to provide various nutritional content and a form of effort to reduce feed costs. One of the uses of plant feed ingredients that have been developed is sirih leaf, in several studies it has shown that green sirih leaf is processed into a solution which can increase the metabolism of broiler chickens.

The role of sirih leaf in the world of animal husbandry research, especially as an additive for broiler feed, aims to improve meat quality by reducing cholesterol levels. Provision of green sirih leaf as an additive in feed can reduce cholesterol levels in broiler chicken by 14 mg / dl, decrease cholesterol levels in broiler chicken meat because the antioxidant content in the form of flavonoids works by increasing the excretion of bile acids and reducing blood viscosity, thereby reducing the deposition of fat in the blood vessels.

The use of sirih leaves in peruvian feed is given more attention to the quantity and quality of its manufacture as flour, because in addition to antioxidants, there are also anti-nutritional substances that have the potential to interfere with the growth and development of livestock, especially broilers, namely tannins. The high content of tannins in sirih leaves needs to be considered again as an addition to feed. Basically, the application of the use of sirih leaf as a research subject is changed in physical condition into a solution and flour. Changing the physical condition of sirih leaves into flour involves a number of heating processes which may change the antinutrients and antioxidants in them.

Withering, drying under the sun followed by heating using an oven with a temperature of 40^{o}C is the processing and application of sirih leaf which involves heat thus potentially altering substances that are thermolabile phytochemicals such as tannins and flavonid, the following background authors hope that the assessment of the content of tannins in sirih leaf with different physical conditions through natural heating is feasible as information to the public in its application, especially in the field of animal husbandry.

Materials and Methods

Research Location

The location used for the analysis of the research sample was conducted at the Chem - Mix Pratama Laboratory in the Kretek Kidul village, Banguntapan District, Bantul Regency, Yogyakarta Special Region.

Materials

This study uses research material in the form of sirih leaf obtained from Hamlet Kersan, Desa Karanganyar, Sub Weru, Sukoharjo, through oven using a temperature of 40^{o}C with an experiment in the form of old different drying namely sirih leaves the oven for 6 hours, 7 hours and 8 hours, as well as for comparison using sun-dried sirih leaves for 2 days without oven. Equipment and analytical materials used in the form of ovens, Moisture Balance, Erlenmeyer, dropper pipette, Follin-Denis reagent, saturated sodium carbonate, distilled water and stationery to record the resulting data.

Methods

The sample grouping method was carried out by giving the following treatment code:

P0: Dry Sirih Leaf Without Oven
P1: Sirih Leaf dried in the oven for 6 hours.
P2: Sirih Leaf dried in the oven for 7 hours.
P3: Sirih Leaf dried in the oven for 8 hours.

Research Parameters

The parameters in the study were tannin levels which were measured in the following manner;

1 Samples were taken using a pipette of 1 ml plus 0,5 Follin-Denis reagent and 1 ml of saturated sodium carbonate solution,
2 then diluted using distilled water to show the number 10,0 ml.
3 Observations were made by reading the absorption at a wavelength of 727,70 nm with an operational time of 25 minutes.

Measurement of flavonoid content was carried out by:

As much as 1 mg of sirih leaf flour was added with 2 drops of FeCl3. The formation of a green or blue green color indicates the presence of flavonoid compounds in the material (Harborne, JB 1987).

Data analysis

The collected data were analyzed using ANOVA analysis of variance with a completely randomized design (CRD) with a unidirectional significance (1% and 5%). If there are differences, continue with the *Duncan Multiple Range Test* (Steel and Torrie, 1990).

Result and Discussion

A. Tannins

ANOVA test showed the results of a long oven using a temperature of 40^{o}C significant effect on the sirih leaf tannin content (P <0,01). Sirih leaf flour which is produced without going through the oven process (P0) produces a tannin content of 3,55%, while P1 which uses the oven for 6 hours increases the tannin content 0,35% higher than P0, P2 results in a tannin content which again increases by 0,14% from P1, and continues to increase at P3 which is higher 0,11% from P2.

Table 1. Average content of tannins (%)

Deuteronomy	Tannins Content (%)			
	P0	P1	P2	P3
1	3.55	3.90	4.05	4.15
2	3.54	3.90	4.05	4.15
3	3.55	3.89	4.04	4.15
Average	3.55^{a}	3.90^{b}	4.04^{c}	4.15^{d}

Description ^{a,b,c,d} : different superscripts on the same line indicate very significant differences (P<0.01).

The tannin content increases at different oven times because the tannin content is resistant to stable temperatures even at different heating times, which should require a high temperature along with sufficient time to reduce the tannin content, so drying sirih leaves in sunlight tends to produce mean tannin content is lower than heating using an oven with a temperature of 40^{o}C, Bernard *et al*.,(2014) reported that the polyphenolic compounds such as tannins in the fruit and vegetables are susceptible to oxidative

degradation of the polyphenol oxidase during drying, resulting in condensation reaction of intermolecular and levels decreased.

Greater degradation can occur not only due to polyphenol oxidase but also by prolonged heating (Mongi *et al*., 2015). Sun drying can degrade the total tannins in the sample. This degradation is caused by prolonged and intensive drying resulting in enzymatic degradation of phytochemical compounds (Bernard *et al*., 2014). Tannins are one type of compound that belongs to the polyphenol group. Sekartini (2011) states that high drying temperatures will lead to oxidation of polyphenol components, namely by adding oxygen molecules. The oxidation of polyphenol components will result in damage to flavonoid compounds.

This results in epigallocatechins and errors condensing to form orthoquinones and then condensing with the addition of hydrogen ions, forming bisflavanols. Bisflavanols will then undergo condensation to form theaflavins and thearubigins. These two components are components of tannin compounds with relatively small amounts of polyphenols.

B. Flavonoids

ANOVA test showed the results of the long oven time using a temperature of 40^{O}C had a very significant effect (P <0.01) on the flavonoid content of sirih leaf. The content of flavonoid compounds produced from P0 was 0,50% and increased by 0,04% in the oven for 6 hours (P1), while the oven for the next 7 hours (P2) resulted in an increase in the flavonoid content of 0,04% from P1, while in the 8 hours oven (P3) the flavonoid content increased again by 0,01% from P2.

Table 2. Average content of flavonoids (%)

Deuteronomy	Flavonoid Content (%)			
	P0	P1	P2	P3
1	0.50	0.54	0.58	0.59
2	0.51	0.54	0.59	0.59
3	0.51	0.54	0.58	0.59
Average	0.50^{a}	0.54^{b}	0.58^{c}	0.59^{d}

Description ^{a,b,c,d} : different superscripts on the same line indicate very significant differences (P <0.01)

The results shown in table 3 can be said that the heating treatment of green sirih leaves using an oven can increase the content of flavonoid compounds in it, this condition is supported by Bernard *et al*. (2014) which states that various drying methods such as drying using an oven, sunlight or drying. can impact the total flavonoids, total phenols and antioxidant activity of certain herbal extracts.

The cause of the high content of flavonoids through the heating process using an oven is because the heat generated in the oven tends to be stable and does not change, contamination or contamination can also be anticipated because the heating process occurs in a closed room in a fairly short time, whereas if the heating is done open spaces using direct sunlight tend to provide an unstable temperature to the sirih leaf which can destroy the phytochemical compound enzymes in it by polyphenoloxidase, this is in accordance with the statement of Bernard *et al*., (2014) which states that drying with

sunlight can degrade total flavonoids. on the sample, This degradation is caused by prolonged and intensive drying resulting in enzymatic degradation of phytochemical compounds.

Drying in open air for a long time causes the enzymatic damage by polyphenoloksidase to be greater. Drying with sunlight can degrade the total phenolic and flavonoids in the sample (Bernard *et al*., 2014).

The mechanism of decreasing flavonoid compounds due to drying temperature is caused by changes in the decomposition of flavonoid compounds. According Susanti (2008) a decrease of flavonoid compounds can be caused due to the levels of phenolic compounds undergo changes in chemical composition due to high drying temperatures, which can mean long oven for 8 hours using a temperature of 40^{o}C is able to maintain the chemical composition of flavonoids green sirih leaf even increase the polyphenol content there in .

Conclusion

Sirih leaf oven with a temperature of 40^{o}C for 6 to 8 hours a significant effect on the content of tannins and flavonoids in green sirih. Further research is needed to determine the optimization of the oven time in the manufacture of sirih leaf flour so that it can produce low tannin compounds and high flavonoid compounds.

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