122

by Arie Eko Cahyono 26/01/2019

FILE	122_DWI_NUR_RS_IKIP_PGRI_JEMBER_POSTER_A_-_ARIE_EKO_CAHYONO.PDF (7.36M)		
TIME SUBMITTED	26-JAN-2019 08:11AM (UTC+0700)	WORD COUNT	1823
SUBMISSION ID	1068653048	CHARACTER COUNT	9794

ARTIKEL POSTER SEMINAR INTERNASIONAL

THE POTENTIALS OF BANANA PEEL WASTE OF LUMAJANG VARIETY AS AN ALTERNATIVE TREATMENT OF SKIN DISEASE

[1]Dwi Nur Rikhma Sari
[1,] Departement of Biology Education , FP. MIPA IKIP PGRI JEMBER

[1]dnrs129_dinnurrisa@yahoo.com

ABSTRACT

Lumajang, East Java has two types of bananas which are typical of the city's varieties, namely the Agung Semeru and Mas Kirana. Both types of bananas have been widely used both as fresh fruit that is ready to be eaten or various forms of processed banana. The use of bananas is not comparable to the processing of banana peel, where until now the banana peel is only used as animal feed, so the banana peel of Lumajang variety also plays a role as organic waste in Lumajang. This research is a quantitative descriptive research conducted at the Laboratory of Biology IKIP PGRI Jember. Based on the phytochemical testing results, banana peels contain antimicrobial compounds, namely tannins, quinones, alkaloids, flavonoids, saponins, quinones, phenolics and triterpenoids. The results of antimicrobial activity research showed that the banana peel waste of Lumajang at various concentrations had a significant effect on the growth of bacteria that cause skin diseases which was shown by the diameter of the inhibitory zone of the growth of microorganisms.

***Key Word**: Waste, Banana Skin, Skin Disease*

Introduction

Banana Plant (Musa sp) is one of the most fruit species in Indonesia and is one of the most consumed fruits in the form of fruit and other processed products. Agung Semeru Banana and Banana Kirana Banana are one of the banana plant varieties that are typical in Lumajang Regency. Based on production data for market needs in 2009, the production of banana plants in Lumajang was the largest, namely 50,776.2 tons (in 2008) and increased production every year (Fiqrotul, 2011).

The high demand for Agung Semeru Banana and Mas Kirana Banana fruit in Lumajang Regency resulted in the production of bananas being converted into various forms of processed bananas, including banana chips, banana sale, banana bread and consumed as fruit by eating only the fruit and removing the skin (Fiqrotul, 2011).

Increased production of processed bananas causes an increase in banana peel waste which generally only utilizes the banana fruit, resulting in a buildup of garbage or banana peel waste.

In general, banana peels are only considered as organic waste that does not pollute the environment and is used by some people as animal feed ingredients (goats, cattle, and buffalo) (Susanti, 2006). So it is necessary to do another alternative in the utilization of banana peels to reduce the household industrial waste.

Banana peel of Agung Semeru which is one of the banana varieties in Lumajang which has phytochemical content such as phenol, terpenes, saponins and alkaloids which contain anti-microbial compounds (Sari, 2017), where the compounds have been widely researched and proven to be used as antimicrobial compounds.

Research on the ability of Agung Semeru banana peel extract has been carried out by Kholifah *et al*., (2018) which states that Agung Semeru banana peel extract at a concentration of 100 mg / mL can inhibit the growth of *Staphylococcus aureus*. In addition, the results of research conducted by Zakiyah, *et al.*, (2017), that Agung Semeru banana peel extract Lumajang varieties combined with banana Mas Kirana Lumajang using diffusion method proved to inhibit the growth of *Candida albicans*.

ARTIKEL POSTER SEMINAR INTERNASIONAL

Aim

1. To determine the antimicrobial effects of Agung Semeru and Mas Kirana banana peel extract as an herbal medicine for skin infection caused by fungi and bacteria
2. Creating a cream base dosage form for the manufacture of natural antifungal and antibacterial herbal medicines made from Agung Semeru and Mas Kirana banana peel extract

Method

This research was conducted at the Laboratory of Biologi FP. MIPA IKIP PGRI Jember and the Pharmacy Laboratory of the University of Jember. The methodes is:

1. Preparation of simplicia banana peel extract (Skin collection, Wet sortiration, thinning drying, smoothing and dry sorting)
2. Phytochemical Screening of Materials (Phenolic, Flavonoid, terpenoid, Saponin and Alkaloid)
3. Preparation of PDA and NA media
4. Antimicrobial Activity test extract of Agung Semeru and Mas Kirana banana peel extract
5. Creation of Banana Skin Extract Cream and Organoleptic Cream Test

Result

Analysis of phytochemical content of the extract of Agung Semeru banana peel Lumajang varieties and banana peel extract of Mas Kirana Lumajang variety was carried out to determine the content of antimicrobial compounds. The compounds analyzed in this study were flavonoids, phenolic compounds, terpenes, saponins and alkaloid compounds. The results of the phytochemical test in this study showed that the extract of banana peel Mas Kirana and Agung Semeru banana Lumajang varieties for the test of Flavonoid compounds showed negative results, this was due to the possibility of low levels of flavonoid compounds that did not show a response to the test compounds. For testing alkaloid compounds, it was shown that the extract of banana peel from Mas Kirana Lumajang variety did not produce positive results but on Agung Semeru banana extract Lumajang varieties showed positive results. To test phenol, saponin and terpene compounds, both banana extracts of Mas Kirana and Agung Semeru banana Lumajang varieties showed positive results.

Figure 1. Stages of extraction and manufacture of dried banana simplicia Agung Semeru and Mas Kirana

Tabel 1. Hasil Uji Fitokimia Ekstrak Pisang Mas Kirana varietas Lumajang

Uji Fitokimia	Prosedur	Hasil Penelitian	Keterangan
Flavonoid	Sistem KLT Fase diam : silica gel 60 F_{254} Fase Gerak: butanol : asam asetat : Air (4:5:1) Deteksi : Uap Amonia	Tidak timbul moda kuning intensif,	Flavonoid (-)
Fenolik	Sistem KLT Fase diam : silica gel 60 F_{254} Fase Gerak: Kloroform : Etil asetat (9:1) Deteksi : $FeCl_3$	Timbul Noda dengan warna hitam	Fenolik (+)
Terpenoid/ Steroid	Sistem KLT Fase diam : silica gel 60 F_{254} Fase Gerak: N-heksana : Etil asetat (4:1) Deteksi : Anisaldehid asam sulfat	Timbul noda dengan warna ungu	Terpenoid/Steroid (+)
Sapogenin	Sistem KLT Fase diam : silica gel 60 F_{254} Fase Gerak: N-heksana : Etil asetat (4:1) Deteksi : Anisaldehid asam sulfat	Timbul noda dengan warna ungu	Sapogenin/Triterpenoid (+)
Alkaloid	Sistem KLT Fase diam : silica gel 60 F_{254} Fase Gerak: etil asetat :metanol : Air (4:5:1) Deteksi : Dragendorff	Tidak timbul noda jingga,	Alkaloid (-)

Tabel 2. Hasil Uji Fitokimia Ekstrak Pisang Agung Semeru varietas Lumajang

Uji Fitokimia	Prosedur	Hasil Penelitian	Keterangan
Flavonoid	Sistem KLT Fase diam : silica gel 60 F_{254} Fase Gerak: butanol : asam asetat : Air (4:5:1) Deteksi : Uap Amonia	Tidak timbul moda kuning intensif, kemungkinan kandungan senyawa flavonoid sedikit	Flavonoid (-)
Fenolik	Sistem KLT Fase diam : silica gel 60 F_{254} Fase Gerak: Kloroform : Etil asetat (9:1) Deteksi : $FeCl_3$	Timbul Noda dengan warna hitam	Fenolik (+)
Terpenoid/ Steroid	Sistem KLT Fase diam : silica gel 60 F_{254} Fase Gerak: N-heksana : Etil asetat (4:1) Deteksi : Anisaldehid asam sulfat	Timbul noda dengan warna ungu	Terpenoid/Steroid (+)
Sapogenin	Sistem KLT Fase diam : silica gel 60 F_{254} Fase Gerak: N-heksana : Etil asetat (4:1) Deteksi : Anisaldehid asam sulfat	Timbul noda dengan warna ungu	Sapogenin/Triterpenoid (+)
Alkaloid	Sistem KLT Fase diam : silica gel 60 F_{254} Fase Gerak: etil asetat :metanol : Air (4:5:1) Deteksi : Dragendorff	Timbul Noda warna Jingga	Alkaloid (+)

The results showed that the phytochemical test results of banana peel extract from Mas Kirana Lumajang variety contained phenol, saponin and terpene compounds. While the extract of Agung Semeru banana peel Lumajang varieties contain phenolic compounds, terpenes, saponins and alkaloids. Flavonoid compounds have been shown to be very high antibacterial, antioxidant and antifungal compounds in one of their secondary metabolites (Kawamura et al., 2010). Most antifungal compounds

derived from plants are known to be secondary metabolites of plants, especially phenolic groups and terpenes in essential oils (Vivekanand et al., 2011), as well as alkaloids, saponins, tannins, phenolics, flavonoids and triterpenoids.

Tabel 3. Diameter Zona Hambat Ekstrak Kulit Pisang Agung Semeru

Perlakuan	Ulangan	Metode Perlakuan					
Mikroorganism →		Difusi (cm) *Paper diks*			Dilusi Cair(+/-)		
		S	C	P	S	C	P
A0	1	0,00	0,00	0,00	-	-	-
	2	0,00	0,00	0,00	-	-	-
	3	0,00	0,00	0,00	-	-	-
A1	1	13,10	19,65	13,50	+	++	+
	2	10,60	16,95	15,20	+++	+++	+++
	3	11,80	23,70	13,35	++	+	++
A2	1	14,55	22,85	14,55	+	+	+
	2	12,00	13,40	15,05	++	+++	++
	3	13,05	12,20	14,25	+++	++	+++
A3	1	13,45	36,00	11,90	+	+++	+
	2	16,80	36,90	12,70	+++	++	+
	3	11,15	21,80	13,25	++	+	+
A4	1	18,65	56,80	21,20	+++	+++	+
	2	18,80	29,50	14,50	++	++	+
	3	20,30	28,00	16,95	+	+	+

Catatan : S (*Staphylococcus aureus*); P (*Pseudomonas aeruginosa;* C(*Candida albicans*)
A adalah Perlakuan pada berbagai Konsentrasi A0 (0%), A1(25%), A3(50%), A4(75%) dan A5 (100%)

Tabel 4 Diameter Zona Hambat Ekstrak Kulit Pisang Mas Kirana

Perlakuan	Ulangan	Metode Perlakuan					
Mikroorganism →		Difusi (cm) *Paper diks*			Dilusi Cair(+/-)		
		S	C	P	S	C	P
K0	1	0,00	0,00	0,00	-	-	-
	2	0,00	0,00	0,00	-	-	-
	3	0,00	0,00	0,00	-	-	-
K1	1	12,95	16,50	11,75	++	+++	+++
	2	11,25	15,90	11,85	+	++	++
	3	12,60	16,25	11,50	+++	+	+
K2	1	11,70	23,95	12,55	+	+	+++
	2	11,90	21,15	12,25	+	++	+
	3	11,75	15,15	10,50	++	+++	+
K3	1	12,95	26,96	12,00	+	+	+
	2	12,75	27,75	13,10	+++	+++	+++
	3	13,05	27,20	12,45	++	++	++
K4	1	13,35	31,40	12,10	+	+++	+
	2	13,15	29,35	15,10	+	++	++
	3	15,15	26,25	14,15	+	+	+++

Catatan : S (*Staphylococcus aureus*); P (*Pseudomonas aeruginosa;* C(*Candida albicans*)
A adalah Perlakuan pada berbagai Konsentrasi A0 (0%), A1(25%), A3(50%), A4(75%) dan A5 (100%)

Diameter Zona Hambat Staphylococcus aureus

Duncan[a]

Konsentrasi kombinasi K (Pisang Kirana) dan A	N	Subset for alpha = .05			
		1	2	3	4
A0K0	3	,0000			
A25 K25	3		10,0000		
A25 K50	3		10,0000		
A25 K100	3		10,0000		
A 50 K50	3		10,0000		
A50 K75	3		10,0000		
A75 K25	3		10,0000		
A75 K50	3		10,0000		
A75 K100	3		10,0000		
A100 K25	3		10,0000		
A100 K50	3		10,0000		
A50 K25	3		10,5167	10,5167	
A50 K100	3		10,7500	10,7500	
A100 K75	3			11,3667	11,3667
A75 K75	3			11,4333	11,4333
A25 K75	3				11,8333
A100 K100	3				11,8333
Sig.		1,000	,139	,050	,316

Means for groups in homogeneous subsets are displayed.
a. Uses Harmonic Mean Sample Size = 3,000.

Based on the results of the study showed that the administration of Lumajang Agung Semeru Banana skin extract had antimicrobial activity in inhibiting the growth of Gram-positive bacteria Staphylococcus aureus and Gram Negative Pseudomonas aeruginosa compared to negative control treatments. Based on statistical analysis using 5% ANOVA that the administration of Agung Semeru

banana peel extract at various concentrations (25%, 50%, 75% and 100%) showed a significant value in the inhibitory zone of bacterial growth, both Pseudomonas aeruginosa and Staphylococcus aureus. For the analysis of the Advanced Test using Duncan Test 5% shows that there is a difference in the effect of giving Agung Semeru banana peel extract between various concentration treatments, which according to Simanjutak (2008) that Duncan Test is used to see which treatment has the same or different effects and the smallest effect to the greatest effect from one another.

Comparison of differences in antifungal activity on Agung Semeru banana peel extract and Mas Kirana Lumajang variety banana showed that Agung Semeru banana peel extract was able to inhibit the growth of Candida albicans which was marked by the width of inhibitory zone diameters when compared to all treatments of various concentrations both in Agung Semeru banana peel extract and on banana peel extract Mas Kirana. This can be caused due to the results of phytochemical tests that have shown that Mas Kirana banana peel extract contains alkaloid compounds whereas Mas Kirana banana skin shows negative results for alkaloid compounds, so Agung Semeru banana skin is more able to inhibit the growth of Candida albicans very good (Sari and Susilo, 2017). The alkaloid compounds found in the extract of Agung Semeru Lumajang banana peel are antifungi that work by interfering with the constituent components of the cell so that the cell wall is not completely formed which will cause the cell to die, besides the alkaloid component is also known as a DNA intercelator and inhibits topoisomerase enzymes (Karou et al., 2005).

Figure 3. Semeru Banana Skin Cream preparation (a), Combination extract (b) and banana peel Mas Kirana (c) (Personal document)

Conclusions and Recommendations

The administration of Agung Semeru and Mas Kirana banana peel extract and its combination at various concentrations (0, 10, 15, 75 and 100%) showed an increased in the growth of *Staphylococcus aureus* and *pseudomonas aeruginosa* and *Candida albicans*. Optimal results occur at 100% concentration for all banana peel extract treatment.

REFERENCE

Fiqrotul. 2011.Pemanfaat limbah kulit pisang (Musa sp.) menjadi Tepung Pisang di kecamatan Klakah-Lumajang . Posted by FIQROTUL on SEPTEMBER 15, 2011 https://fiqrotul.wordpress.com/2011/09/15/pemanfaat-limbah-kulit-pisang-musa-sp-menjadi-tepung-pisang-di-kecamatan-klakah-lumajang/

Sari, D.N.R., Susilo, D.K., 2017. Analisis Fitokimia Senyawa Antimikroba Pada Ekstrak Kulit Pisang Agung Semeru Dan Pisang Mas Kirana Varietas Lumajang. Jurnal : Bioma. Universitas Muhammadiyah Jember.Vo.2/No.2.

ari, D. N. R. (2017). Analisis Fitokimia Ekstrak kulit Pisang Agung Semeru dan Mas Kirana. *Bioma: Jurnal Biologi dan Pembelajaran Biologi*, *2*(2).

Susanti, Lina. 2006. Perbedaan Penggunaan Jenis Kulit Pisang Terhadap Kualitas Nata. Skripsi Sarjana Universitas Negeri Semarang. Semarang.

ARTIKEL POSTER SEMINAR INTERNASIONAL

Karou, D., Savadogo, A., Canini, A., Yameogo, S., Montesano, C., Simpore, J., Traore, A. S. (2005). Antibacterial activity of alkaloids from *Sida acuta*. *African Journal of Biotechnology, 4*(12), 195-200.

Kawamura, F., Shaharuddin, N.A., Sulaiman, O.,Hashim, R., and Ohara, S., 2010, Evaluation on Antioxidant Activity, Antifungal Activity ant Total Phenol of 11 Selected Commercial Malaysian Timber Species, JARQ 44 (3), 319-324

Kholifah, S. N., Sari, D. N. R., & Anitasari, S. D. (2018). Pengaruh Tingkat Kematangan Dan Konsentrasi Ekstrak Kulit Pisang Agung Semeru Terhadap *Staphylococcus aureus*. *Bioma: Jurnal Biologi dan Pembelajaran Biologi*, *3*(1).

Vivekanand, P. Dwivedi, N. Pareek, RP Singh. 2011. Banana peel: a potential substrates for laccase production by Aspergillus fumigatus VkJ2.4.5 in solid-state fermentation. Applied Biochemistry and Biotechnology 165 (1), pp. 204-20

Zakiya, S. Z., Sari, D. N. R., & Al Habib, I. M. (2018, February). Uji Daya Hambat Kombinasi Ekstrak Kulit Pisang Agung (*Musa paradisiaca* L.) Dan Pisang Mas Kirana (*Musa acuminata* L.) Terhadap *Candida albicans*. In *Prosiding Seminar Nasional SIMBIOSIS*(Vol. 2).

ORIGINALITY REPORT

%8	%7	%5	%1
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	e-journal.unipma.ac.id Internet Source	%3
2	www.thaimoodle.net Internet Source	%2
3	www.iam.uni-bonn.de Internet Source	%1
4	Dwi Nur Rikhmasari. "PERBANDINGAN KEMAMPUAN EKSTRAK KULIT PISANG AGUNG SEMERU DAN PISANG MAS KIRANA VARIETAS LUMAJANG DALAM MENGHAMBAT PERTUMBUHAN Candida albicans", Florea : Jurnal Biologi dan Pembelajarannya, 2017 Publication	%1
5	pt.scribd.com Internet Source	%1

EXCLUDE QUOTES ON

EXCLUDE MATCHES < 1%

EXCLUDE ON
BIBLIOGRAPHY