



# STRUCTURE MODIFICATION OF PINOSTROBIN FROM *Boesenbergia pandurata* Roxb. Schlecht HEXANE EXTRACT

Andy Suryadi A. M.<sup>a</sup>, Tri Widiandani<sup>b</sup>, Siswandono<sup>b</sup> and Retno Widayati<sup>a\*</sup>

<sup>a</sup> Department of Pharmacognosy and Phytochemistry, Faculty of Pharmacy, Universitas Airlangga, Surabaya 60286;

<sup>b</sup> Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Universitas Airlangga, Surabaya 60286;



## ABSTRACT

*Boesenbergia pandurata* Roxb. Schlecht. (Zingiberaceae) is one of the ginger plants that has been identified to contain pinostrobin. It determined as an anti-inflammatory and analgesic activities through inhibition of COX2 enzymes. The objective of this research was to obtain a pinostrobin derivative of acylation reactions between pinostrobin and acyl chloride derivatives. The structure modifications of pinostrobin were obtained by Schotten-Baumann method through nucleophilic substitution reactions between pinostrobin and acyl chloride derivatives. The investigation of structure modifications of pinostrobin (1) from this plant has demonstrated the present of pinostrobin acetate (2) and pinostrobin pentanoate (3) based on the spectrometric analysis such as NMR. Pinostrobin acetate (2) and pinostrobin pentanoate (3) which are derivatives of pinostrobin can be synthesized using the Schotten-Baumann reaction.

**Keywords:** Structure modification, *Boesenbergia Pandurata*, pinostrobin, Schotten-Baumann. reaction

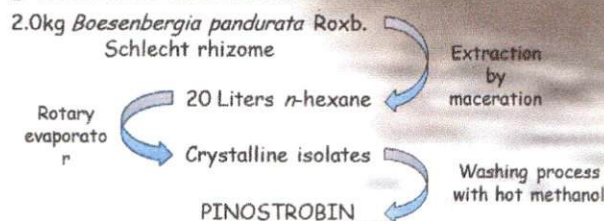
## INTRODUCTOIN

Molecular modification is method that used to obtain a novel drug with the desired activity, such as increasing drug activity, reducing side effects or toxicity, increasing drug selectivity, and prolonging duration of effect [1]. In addition, molecular modification will provide more economical cost, because to get a new drug with the desired activity, the experimental factor is suppressed as small as possible so that the synthesis pathway becomes shorter [1].

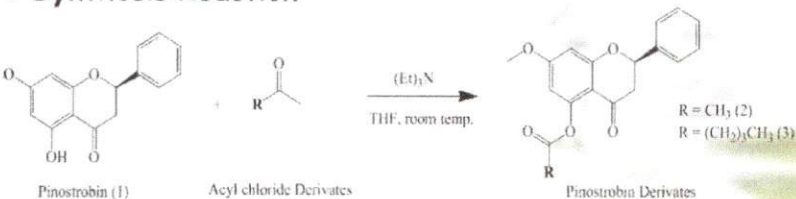
Pinostrobin is a flavonoid compound that found in temukunci (*Boesenbergia pandurata* Roxb. Schlecht) rhizome [2,3]. It is effective as anti-inflammatory [4] and has analgesic activity, because it can inhibit COX-2 enzyme [5,6]. It is an enzyme responsible for prostanoid synthesis involved in acute and chronic inflammatory pathologic processes [7].

## METHOD

### >Extraction and Isolation



### >Synthesis Reaction



### >Synthesized Method of Pinstrobin Derivates

10mmol pinostrobin in 10ml tetrahydrofuran + 35mmol acetyl chloride in 10ml tetrahydrofuran + 62mmol triethylamine

30 minutes at the room temperature

Reaction complete when the spot of pinostrobin had been disappeared with TLC method analys

## DISCUSS

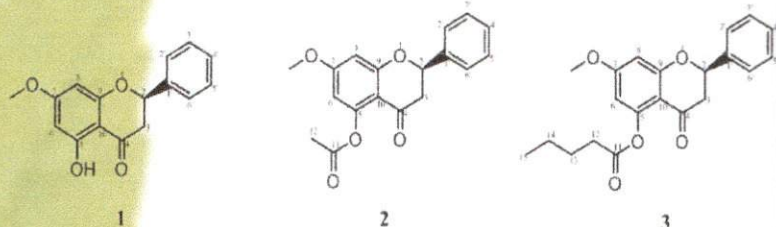


Figure 1. Chemical structure of compounds 1, 2, and 3

Table 1. <sup>1</sup>H and <sup>13</sup>C (400 MHz) NMR data of compounds 1, 2, and 3 in CDCl<sub>3</sub> (δ in ppm)

Pos	1		2		3	
	δ <sub>H</sub> (J in Hz)	δ <sub>C</sub>	δ <sub>H</sub> (J in Hz)	δ <sub>C</sub>	δ <sub>H</sub> (J in Hz)	δ <sub>C</sub>
1	-	-	-	-	-	-
2	5.39 (d, 3.2)	79.33	5.45 (dd, 13.6, 2.4)	79.67	5.45 (dd, 14.8, 3.2)	79.67
3	3.07 (dd, 17.2, 13.2); 2.81 (dd, 17.2, 2.8)	43.48	3.02 (dd, 16.4, 13.2); 2.72 (dd, 16.4, 2.8)	45.15	3.01 (dd, 16.8, 13.6); 2.72 (dd, 14.0, 2.8)	45.20
4	-	195.89	-	188.93	-	188.93
5	-	162.88	-	164.34	-	164.34
5-OH	12.03 (s)	-	-	-	-	-
6	6.07 (d, 3.6)	95.23	6.43 (d, 2.8)	104.88	6.43 (d, 2.4)	104.88
7	-	168.07	-	169.69	-	172.31
7-Ome	3.80 (s)	55.81	3.81 (s)	55.93	3.81 (s)	55.91
8	6.07 (d, 3.6)	94.38	6.28 (d, 2.4)	99.63	6.27 (d, 2.4)	99.56
9	-	164.23	-	165.59	-	165.51
10	-	103.23	-	108.03	-	108.2
11	-	-	-	151.94	-	152.11
12	-	-	2.38 (s)	21.25	2.67 (t, 19.6)	34.07
13	-	-	-	-	1.78 (m)	26.60
14	-	-	-	-	1.47 (m)	22.44
15	-	-	-	-	0.97 (t, 19.2)	13.93
1'	-	138.46	-	138.48	-	138.51
2'	7.42 (m)	126.25	7.41 (m)	126.27	7.42 (m)	126.21
3'	7.42 (m)	126.25	7.41 (m)	126.27	7.42 (m)	126.21
4'	7.42 (m)	128.99	7.41 (m)	128.99	7.42 (m)	128.91
5'	7.42 (m)	126.25	7.41 (m)	126.27	7.42 (m)	126.21
6'	7.42 (m)	126.25	7.41 (m)	126.27	7.42 (m)	126.21

The structure was confirmed using <sup>1</sup>H-NMR and <sup>13</sup>C-NMR. From spectra result can be indicated that compounds 2 and 3 was done to be synthesized. There is no peak signal of OH groups like as Pinostrobin in <sup>1</sup>H-NMR (δH:12.03, 1H, s, 5-OH), on spectra data of compounds 2 and 3. There is also a peak signal from new carbonyl in <sup>13</sup>C-NMR from synthesized of compound 2 (δC: 151.935, C-11) and compound 3 (δC: 152.097, C-11). This indicate that phenol group has changed into ester group.

## CONCLUSION

Pinostrobin can be esterification with Schotten-Baumann method by reacting pinostrobin with acyl chloride derivative (acetyl chloride and pentanoyl chloride) through nucleophilic substitution with ET<sub>3</sub>N as catalyst.

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## SCHEDULE OF ORAL PRESENTERS

DAY 1, 11 JULY 2018		<b>Chairman : Prof. Dr. Sukardiman, MS., Apt.</b>	
R. GARUDA MUKTI			
15.05-17.00			
TIME	PRESENTER NUMBER	TITLE	AUTHOR
15.05 - 15.15	OP-1	Bio-similar Nutraceuticals: Does the commercialization and heavy consumption in the western world will kill the global bio diversity	Yashwant Pathak
15.17 - 15.27	OP-2	Development of New Methods for the Synthesis of Dihydropyrans (DIHP) and Tetrahydropyrans (THP)	Nadiah Mad Nasir*, Dr Paul Clarke
15.29 - 15.39	OP-3	The Pattern of Complementary Alternative Treatment Used by Cancer Patients	Mochamad Djunaedi*, Wahyu Utami, Anila Impian Sukorini
15.41 - 15.51	OP-4	The Utilization of Daun Wungu Ethanol Extract ( <i>Graptophyllum pictum</i> (L) Griff.) As The Endometrial Hyperplasia Inhibitor of Ovariectomy Mice	Listijani Suhargo* and Dwi Winarni
15.53 - 16.03	OP-5	Exploration of Antidiabetic agents from Talang Mamak Medicinal Plants	M. Almurdani*, Adel Zamri, Titania T. Nugroho and Hilwan Yuda Teruna
16.05 - 16.15	OP-6	Antimicrobial Agents from Talang Mamak Medicinal Plants	Hilwan Yuda Teruna*, M. Almurdani, Jasril Karim, and Yum Eryanti
16.17 - 16.27	OP-7	Antibacterial Screening of Mangrove Extract Library: Accelerating Drug Discovery from Indonesian Biodiversity	Kholis Abdurachim Audah*
16.29 - 16.39	OP-8	Lichen of Java Island showing anti-bacterial and anti-cancer activities	Ari Satia Nugraha*, Dwi Koko Pratojo, Yuvita Dian Damayanti, Nadya Dini Lestari, Tinton Agung Laksono, Hardian Susilo Ady, Ludmilla F. Untari
16.41 - 16.51	OP-9	Alstonville ( <i>Tibouchina lepidota</i> ), a Purple Flower, as Antibacterial Agent	Rudi Hendra* and Paul Keller

DAY 1, 11 JULY 2018		<b>Chairman : Pinus Jumaryatno, Ph.D</b>	
R. 300			
15.05 -17.00			
TIME	PRESENTER NUMBER	TITLE	AUTHOR
15.05 - 15.15	OP-10	Isolation of a Flavonol and Two Phenolic Compounds from the Leaves of <i>Macaranga hosei</i> King ex Hook.f.	Mohamad Hamizan Mohd Isa*, Norizan Ahmat, and Aisyah Salihah Kamarozaman
15.17 - 15.27	OP-11	Identification and Determination of Total Flavonoid Content of Extract Pasak Bumi ( <i>Eurycoma longifolia</i> Jack) Root by FTIR and Multivariate Calibration	Liling Triyasmono*, Khoerul Anwar, M Ikhsan Rizky, Ana Ulfa, and Isn Munisa
15.29 - 15.39	OP-12	Two flavones and two phenolic compounds from <i>Asystasia gangetica</i> (L) T. Anderson var. <i>micrantha</i> (Acanthaceae)	Isna Athirah Othman*, Norizan Ahmat
15.41 - 15.51	OP-13	Detection of Potential Antioxidant, Phytochemical Content and Functional Group Analysis of <i>Ficus carica</i> (Tin) Fruit and Leaf Extract	Eva Agustina*, Risa Purnamasari, and Nova Lusiana
15.53 - 16.03	OP-14	Benzopyrones and Fatty Acids from Ethyl Acetate Layer of <i>Spilanthes acmella</i> Murr	Retno Widyowati*, Wiwied Ekasari, and Neny Purwitasari

## SCHEDULE OF POSTER PRESENTERS

Room 301

No. Poster	Poster Title	Authors
PP1	Protective activity of Chitosan Nanoparticle against Cadmium Chloride induced gastric toxicity in Rat	Giftania Wardani Sudjarwo
PP2	Purification and Characterization of <i>E. Coli</i> $\beta$ -Glucuronidase from <i>Plectranthusamboinicus</i> (Spreng.)	Michael Russelle Alvarez*, Punsaldulam Dashnyam, Nitish Verma, Chun-Hung Lin, and Francisco Heralde III
PP3	Antihyperglycemia Effect of Tomato Juice ( <i>Solanum lycopersium</i> ) on White Rats ( <i>Rattusnorvegicus</i> ) Sprague dawley Strain with Induced Alloxan	Hanifa Irma Ika Situmorang, Anita Lidesna Shinta Amat, Kartini Lidia
PP4	<i>Artocarpus altilis</i> leaves activity in inhibiting $\alpha$ -Amylase Enzyme as Oral Antidiabetic Drug Candidate	Lusi Putri Dwita*, Vivi Anggja, and Tri Dewi Prasetyatuti
PP5	In Vitro Antibacterial Activity Test of Jackfruit ( <i>Artocarpus heterophyllus</i> Lam.) Leaf Extract against Methicillin-Resistant <i>Staphylococcus aureus</i> (MRSA)	Ika Ningsih, Dyah Ayu Rosalinda, Ariyani Kiranasari, Beti Ernawati Dewi, Fithriyah Sjatha
PP6	Antibacterial Activity of Several Indonesian Endemic Plants against <i>Staphylococcusepidermidis</i> , <i>Staphylococcus aureus</i> and Methicillin-resistant <i>Staphylococcus aureus</i>	Ariyani Kiranasari, Angela Bonita, Elizabeth Melina, Kevin Winston, Naivedh Baht, Nathania Sutandi, Beti Ernawati Dewi, Ika Ningsih, Fithriyah Sjatha*
PP7	Antiviral Activity of <i>Cynometra ramiflora</i> Linn Leaves Extract Against Replication of Dengue Virus Serotype 2 on Huh 7.5 Cell In Vitro	Amry Irsyada Yusuf, Beti Ernawati Dewi, Fithriyah Sjatha*
PP8	Antimalaria activity of ethanolic extract of <i>Macaranga gigantea</i> leaf and its major constituents	Muhammad*, Yusnaidar, Hilda Amanda, Madyawati Latief, Nurumawati Lase, Anis Yohana Chaerunisaa, Andreas Yoga Aditama and Josephine Elizabeth Siregar
PP9	<i>In vivo</i> antibacterial activity of <i>Cassia fistula</i> L. barks fractions as treatment for resistant pathogenic bacteria	Anis Yohana Chaerunisaa*, Yasmiwar Susilawati, Muhammad, and Tiana Milanda
PP10	Anti-Adipogenic Activity of Fractions of <i>Guazuma ulmifolia</i> Leaves Extract	Nuri*, Sukardiman, and Bambang Prajogo
PP11	Cytotoxic Activity of Selected Medicinal Plants from Papua	Septriyanto Dirgantara*, Rosye H.R.Tanjung, Rahmawati Nurlatifah and Edy Meiyanto
PP12	Identification of Herbal Mixture Metabolites and Its Acute Toxicity in Wistar Rats	Azliana Abu Bakar Sajak*, Azrina Azlan, Hazilawati Hamzah and Faridah Abas
PP13	The Cytotoxic Activity of Fractions from the Ethyl Acetate Extract of Rumpit Gong ( <i>Eriocaulon cinereum</i> R. Br.) on Hela Cervical Cancer Cell	Widyanur Maya Diahandari*, Pinus Jumaryatno, and Arde Toga Nugraha
PP14	Formulation and Characterization of Cosmetic Serum Containing Argan Oil as Moisturizing Agent	Sri Budiasih*, Masyitah Ismail, Jiyauddin Khan, Mohammed Kalcemullah, Samer Al-Dhalli, Fadli Asmani, and Eddy Yusuf
PP15	Comparison of antioxidant properties of fresh and frozen peel of lemon ( <i>Citrus limon</i> ), key lime ( <i>Citrus aurantiifolia</i> ), and musk lime ( <i>Citrus microcarpa</i> )	Nur Fatin Inazlina Noor Azman, Azrina Azlan*, Azliana Abu Bakar Sajak, and Noor Atiqah Aizan Abdul Kadir
PP16	Antibacterial Activities of Ethanol Extract of Karamunting ( <i>Melastoma malabathricum</i> L.) Leaf and Flowers on Bacteria <i>Salmonella typhi</i> , <i>Escherichia coli</i> , <i>Staphylococcus aureus</i>	Isnaini*, Lia Y. Budiarti, Noor Muthmainah, Dimas S. Baringgo, Ririn Frisilia, Nanda Sulistyaningrum, Irawati F. Batubara, Wuri Sofratmi, Wireşa D. Renalta
PP17	Determination of Standard Specific Parameters Extracts and Activity of Purified Extract Belimbing	Dyah Aryantini*, Luwis Rusiana, and Erma Maszuin

	Chia seed ( <i>Salvia hispanica</i> L.) and Flaxseed ( <i>Linum usitatissimum</i> L.)	
PP37	Quality Standardization of Dry Powder of <i>Spilanthes acmella</i> Murr. Herb	Ridho Tryantono*, Neny Purwitasari and Retno Widyowati
PP38	The Effectivity of Butanol Fraction of <i>Calophyllum nodosum</i> as Antiviral Drug to Dengue Virus Serotype 2	Syifa Salsabila, Nabilla Calista, Hidayati Desti, and Beti Ernawati Dewi
PP39	Chromatographic Fingerprinting of <i>Molineria latifolia</i>	Kunthasaya Akkarasiritharattana*, and Siriphatr Chamutpong
PP40	Structure Modifications of Pinostrobin from <i>Boesenbergia pandurata</i> Roxb. Schlecht Extract	Andy Suryadi A. M.*, Retno Widyowati, Tri Widiandani, and Siswandono
PP41	Activity Banana Manurun ( <i>Musa paradisiaca</i> Linn.) Stem Extract Against <i>Staphylococcus aureus</i> , <i>Streptococcus pyogenes</i> and <i>Candida albicans</i> In vitro	Lia Yulia Budiarti, Isnaini, NurIzati Khasanah, and Noorhasanah
PP42	The Activity of <i>Sterculia quadrifida</i> R.br Stembark against Hepatitis C Virus	Maria Ayu Wandira Moi Sola*, Adita Ayu Permanasari, Myrna Adianti, Lidya Tumewu, Aty Widyawaruyanti, and Achmad Fuad Hafid
PP43	Screening on Antihepatitis C Virus Activities of Several Plants from East Kalimantan, Indonesia	Lidya Tumewu*, Farida Ifadotunnikmah, Rosyida Paramita, Rina Puspitasari, Amiroatul Faiqoh, Myrna Adianti, Adita Ayu Permanasari, Suciati, Aty Widyawaruyanti, and Achmad Fuad Hafid
PP44	Total Phenolic, Flavanoid and Antioxidant Activity of Stingless Bee Honey ( <i>Heterotrigona itama</i> ) from suburban and forest in Malaysia	Mohamad Zulhafiz Shafiq*, and Norhaizan Binti M Esa
PP45	Isolation and identification of <i>Bacillus</i> spp. from stingless bee honey ( <i>Heterotrigona itama</i> )	Fatijn Aina Zulkhairi*, Norhasniida Zawawi, Sriana Sabri, Maznah Ismail, and Norhaizan Mohd Esa
PP46	Genotyping Study to Investigate Leprosy Distribution in the Past and Present Time in Indonesia	Dinar Adriaty*, Ratna Wahyuni, Iswahyudi, Toetik Koesbardiati, Bimo Aksono, Cita Rosita Prakoeswa, Indropo Agusni, and Shinzo Izumi
PP47	Assessing the Anti-Aging Capacity of <i>Acalypha indica</i> Associated with Malondialdehyde Levels in Old Sprague-Dawley Rats	Reganedgary Jonlean*, Rani Wardani Hakim, Callen Zulkifli, Desak Gede Budi Krisnamurti, Siti Farida, and Erni H. Purwaningsih
PP48	Brain Derived Neurotrophin Factor (BDNF) Level in Aged Sprague Dawley Rats Brain after the Treatment of <i>Centella asiatica</i> Leaf Extracts	Indah Fitriani*, Rani Wardani Hakim, Nathaniel Aditya, Adisti Dwijayanti, Desak Gede Budi Krisnamurti, and Erni Hernawati Purwaningsih
PP49	Anti-Oxidative Potential of <i>Acalypha indica</i> L. Root Extract on Brain-Derived Neurotrophic Factor Levels in Old Sprague-Dawley Rats	Callen Zulkifli*, Rani Wardani Hakim, Reganedgary Jonlean, Adisti Dwijayanti, Desak Gede Budi Krisnamurti, and Erni Hernawati Purwaningsih
PP50	The Anti-Oxidative Role of <i>Centella asiatica</i> on Brain Malondialdehyde Levels of Aged Sprague-Dawley Rats	Nathaniel Aditya*, Rani Wardani Hakim, Indah Fitriani, Desak Gede Budi Krisnamurti, Siti Farida, and Erni Hernawati Purwaningsih
PP51	A Simple Method for Isolation of Citral Using Column Chromatography	Adijna Savira, Achmad Syahrani, and Marcellino Rudyanto
PP52	Chitosan Nanoparticles as a Promising Topical Delivery System of Vitamin A Palmitate: Preparation and Penetration Property	Etik Mardiyati*, Sjaikhurizal El Muttaqin, and Damai Ria Setyawati
PP53	Metabolite Profiling and Predicted Anticancer Activities of Fruit Trees from Mt. Maliking, Laguna, Philippines	Michael Russelle Alvarez*, Kimberly Delica, Manolo Basingan Jr., Froila Marie Deniega, Leonardo Cadiente III, Rowell Abogado, Isagani Padolina, Gladys Completo, and Ruel Nacario
PP54	The Mechanism of N-Hexane Fraction of <i>Cosmos caudatus</i> against Dengue Virus in HUH7it-1 Cell Line	Nabilla Calista, Dorothy Sinur Christabella, Marissa Angelina, Hidayati Desti, and Beti Ernawati Dewi
PP55	In Vitro Evaluation of Antacid and Antiflatulent Activity in Ethanolic Extract Syrup of Clove Leaves ( <i>Eugenia Caryophyllata</i> Thunberg)	Nurul Widi, Retno Widyowati, Herra Studiawan, and Sukardiman*
PP56	Extract of <i>Ruta angustifolia</i> potentiated anti-hepatitis C activities with direct-acting antiviral agent.	Tutik Sri Wahyuni*, Adita Ayu Permanasari, Achmad Fuad, Aty Widyawaruyanti, and Hak Hotta.

**Structure Modifications of Pinostrobin from *Boesenbergia pandurata* Roxb. Schlecht Extract**

Andy Suryadi A. M.<sup>1\*</sup>, Retno Widyowati<sup>1</sup>, Tri Widiandani<sup>2</sup>, and Siswandono<sup>2</sup>

<sup>1</sup>Department of Pharmacognosy and Phytochemistry, Faculty of Pharmacy, Universitas Airlangga, Surabaya 60286; <sup>2</sup>Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Universitas Airlangga, Surabaya 60286

\*Presenting author

Email: [monsteredans@gmail.com](mailto:monsteredans@gmail.com), Phone: +6282142220770

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**ABSTRACT**

**Background:** *Boesenbergia pandurata* Roxb. Schlecht. (Zingiberaceae) is one of the ginger plants that has been identified to contain pinostrobin. It determined as an anti-inflammatory and analgesic activities through inhibition of COX2 enzymes.

**Objective:** The objective of this research was to obtain a pinostrobin derivative of acylation reactions between pinostrobin and acyl chloride derivatives.

**Methods:** The structure modifications of pinostrobin were obtained by Schotten-Baumann method through nucleophilic substitution reactions between pinostrobin and acyl chloride derivatives.

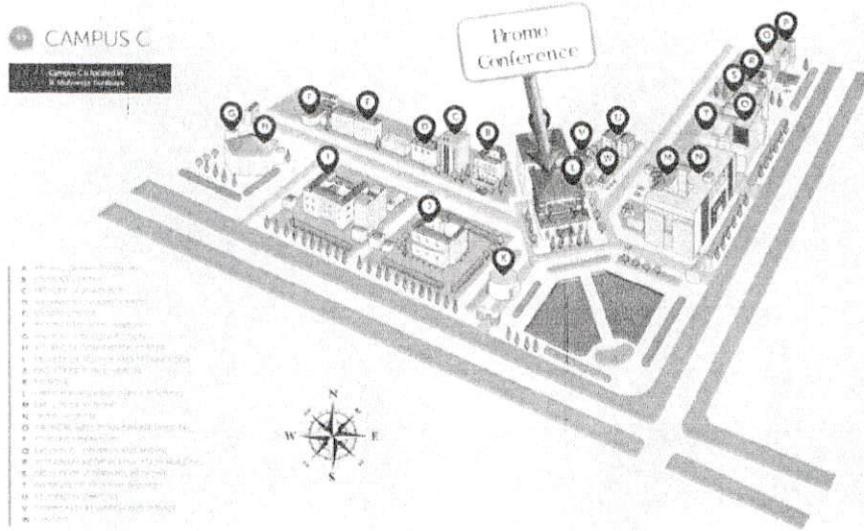
**Results:** The investigation of structure modifications of pinostrobin from this plant has demonstrated the present of pinostrobin acetate (**1**) and pinostrobin butyrate (**2**) based on the spectrometric analysis such NMR.

**Conclusion:** Pinostrobin acetate and pinostrobin butyrate which are derivatives of pinostrobin can be synthesized using the Schotten-Baumann method.

**Keywords:** *Structure modification, Boesenbergia pandurata, pinostrobin, Schotten-Baumann.*

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# BROMO CONFERENCE MAP

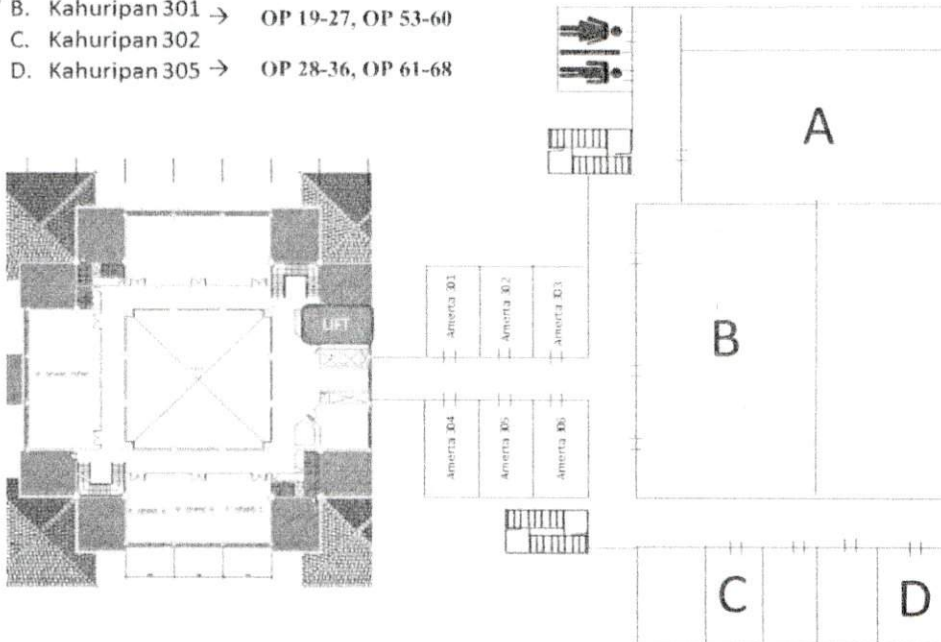


**5<sup>th</sup> floor**  
• Aula Garuda Mukti

**4<sup>th</sup> floor**  
• Aula Amerta

**3<sup>rd</sup> floor**  
• Kahuripan 300  
• Kahuripan 301  
• Kahuripan 302  
• Kahuripan 305

**3<sup>rd</sup> floor**  
 A. Kahuripan 300 → OP 10-18, OP 45-52  
 B. Kahuripan 301 → OP 19-27, OP 53-60  
 C. Kahuripan 302  
 D. Kahuripan 305 → OP 28-36, OP 61-68





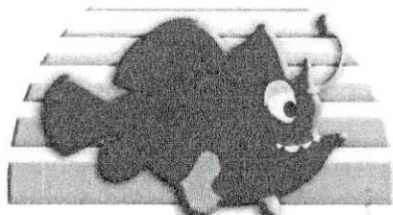
## ACKNOWLEDGEMENT

The Organizing Committee of BROMO CONFERENCE would like to thank to:



### **PT. Dharma Karya Makmur Sentosa**

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