

ANTIBACTERIAL EFFECT OF PROTEIN HYDROLYSATES ISOLATED FROM GIANT AFRICAN SNAIL (*Achatina fulica*) AGAINST *Propionibacterium acnes*

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**DEPARTMENT OF BIOLOGY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
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2024**



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Bogor, August 2024

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ABSTRAK

DIVA AURORA MATAHARI. Uji Aktivitas Antibakteri Hidrolisat Protein dari Bekicot (*Achatina fulica*) terhadap Bakteri *Propionibacterium acnes*. Dibimbing oleh NISA RACHMANIA MUBARIK dan TEERASAK E-KOBON.

Giant african snail atau bekicot (*Achatina fulica*) merupakan salah satu hama dan menjadi ancaman besar bagi pertanian, keanekaragaman hayati, dan ekosistem. Meskipun kerusakan ditimbulkan oleh spesies ini pada ekosistem, bekicot memiliki protein dan mukus yang bermanfaat bagi manusia. Protein *Achatina fulica* diduga memiliki peptida yang mengandung aktivitas antimikroba seperti mytimacin-AF dan achasin-AF. Penelitian ini bertujuan untuk mencari aktivitas antibakteri dari hidrolisat protein yang disintesis dari bekicot terhadap *Propionibacterium acnes*, bakteri yang memiliki peran penting dalam peradangan jerawat. Proses hidrolisis protein digunakan untuk mendegradasi dan menghasilkan protein dengan berbagai ukuran dan asam amino bebas. Hasil dari proses ini dapat menghasilkan berbagai bioaktivitas. Tiga replikasi hidrolisat protein *A. fulica* menunjukkan aktivitas antibakteri terhadap *P. acnes* dengan hasil yang bervariasi. Presentase inhibisi terbesar dihasilkan dari replikasi ketiga hidrolisat protein sebesar $92 \pm 4,8\%$ terhadap strain *P. acnes* JB7. Inhibisi bakteri kemudian dilanjutkan dengan uji *minimum bactericidal concentration* (MBC) dengan konsentrasi 200-1.56 $\mu\text{g/ml}$ dalam metode dilusi padat. Hasil uji MBC menunjukkan efek inhibisi terhadap *P. acnes* dalam rentang konsentrasi 12,5-1,56 $\mu\text{g/mL}$ dengan nilai MBC 3,125 dan 1,54 $\mu\text{g/mL}$. Studi ini menunjukkan adanya peluang bagi hidrolisat protein dari *A. fulica* untuk diuji dan diteliti lebih lanjut pada pengaplikasian dalam industri medis atau perawatan kulit.

Kata kunci : *Lissachatina fulica*, *Cutibacterium acnes*, Hidrolisis, MBC,



ABSTRACT

DIVA AURORA MATAHARI. Antibacterial Effect of Protein Hydrolysated Isolated from Giant African Snail (*Achatina fulica*) Against *Propionibacterium acnes*. Supervised by NISA RACHMANIA MUBARIK and TEERASAK E-KOBON.

The giant African snail is one of the major threats to agriculture, biodiversity, and the ecosystem. Besides the severe damage this alien species has done to the ecosystem, the giant African snail has protein and beneficial mucus for humans. *Achatina fulica* protein is suspected of owning antimicrobial peptides or activities such as mytimacin-AF and achasin-AF. In this recent study, we aimed to focus on the antimicrobial activity of protein hydrolysate from giant African snails against *Propionibacterium acnes*, a bacteria that plays an important role in acne development. The protein hydrolysis process is a degradation process that produces a protein with diverse sizes and free amino acids. The results from this process can yield various bioactivities. Three replicates of *Achatina fulica* hydrolysate protein exhibited antimicrobial activity against *P. acnes*, with multiple results. A third sample of hydrolysate protein *A. fulica* produced the most significant percentage of inhibition in $92 \pm 4,8\%$ against *P. acnes* JB7. Inhibition of *P. acnes* was further observed for searching a minimum bactericidal concentration between 200-1,56 $\mu\text{g/mL}$ in the agar dilution method. Furthermore, the results showed a strong inhibitory effect of *P. acnes* in the 12,5-1,56 $\mu\text{g/mL}$ range with Minimum Bactericidal Concentration (MBC) at 3,125 and 1,56 $\mu\text{g/mL}$. This study demonstrates an opportunity for the hydrolysate protein from *A. fulica* to be tested and further examined for application in the medical or skincare industry.

Keywords: *Lissachatina fulica*, *Cutibacterium acnes*, Hydrolysis , MBC,

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ISOLATED FROM GIANT AFRICAN SNAIL (*Achatina fulica*)
AGAINST *Propionibacterium acnes***

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An Undergraduate Thesis
Submitted in partial fulfillment to acquire
Bachelor of Science Degree
In The Field of Biology from Department of Biology

**DEPARTMENT OF BIOLOGY
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FOREWORDS

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Bogor, August 2024

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CONTENT

LIST OF TABLE	viii
LIST OF FIGURE	viii
APPENDIXES	viii
I INTRODUCTION	1
1.1 Background	1
1.2 Objective	2
II METHOD	3
2.1 Time and Place	3
2.2 Material and Tools	3
2.3 Method	3
III RESULTS	7
3.1 Protein content of <i>Achatina fulica</i> after being Treated with Alcalase	7
3.2 Percentage of Inhibition <i>Achatina fulica</i> Hydrolysate against <i>Propionibacterium acnes</i>	7
3.3 Minimum Bactericidal Concentration of <i>Achatina fulica</i> Hydrolysate Protein	8
IV DISCUSSION	10
V CONCLUSION AND SUGGESTIONS	14
5.1 Conclusion	14
5.2 Suggestions	14
REFERENCES	15
AUTHOR BIOGRAPHY	19



LIST OF TABLE

1	Percentage of inhibition of three samples replicate <i>A. fulica</i> hydrolysate against <i>P. acnes</i> in 24 hours	8
2	The minimum bactericidal concentration (MBC) values of three samples replicate <i>A. fulica</i> hydrolysate protein	9

LIST OF FIGURE

1	Bacteria preparation of JB7, JB13, and Gram coloring bacteria	4
2	The concentration range of treatment from giant African snail hydrolysate protein (µg/mL) with positive control (POS), growth bacteria control (GR) and sterility control	5
3	Minumum bactericidal concentration (MBC) parameter	5
4	Three samples of <i>Achatina fulica</i> were collected around the Faculty of Science, Kasetsart University, Thailand	7
5	BSA Standard Curve using Lowry Assay	7
6	MBC determination or three protein hydrolysate replicates against <i>P. acnes</i> strain JB7	9
7	MBC determination for three protein hydrolysate replicates against <i>P. acnes</i> strain JB13	9

APPENDIXES

1	Taxonomic classification <i>Lissachatina fulica</i> and <i>Propionibacterium acnes</i>	21
2	Flow diagram	22
3	Microplate reader results	23
4	Minimum bactericidal concentration (MBC) results	25