

## INTISARI

Piperin merupakan suatu senyawa alkaloid yang terdapat pada tanaman lada (*Piper nigrum* Linn.). Senyawa golongan alkaloid banyak diteliti memiliki spesifitas pada reseptor muskarinik. Proses penyempitan saluran nafas disebabkan oleh kontraksi otot polos pada saluran pernafasan akibat pengaruh dari asetilkolin muskarinik 3 (*AChM<sub>3</sub>*) yang berikatan dengan protein G mengakibatkan peningkatan  $Ca^{2+}$  intraseluler. Tujuan penelitian ini untuk mengetahui pengaruh alkaloid piperin terhadap reseptor asetilkolin pada aktivitas kontraksi otot polos trakea.

Penelitian dilaksanakan secara *in-vitro* menggunakan metode *organ bath* dengan mengisolasi trakea marmut. Larutan *buffer krebs* digunakan sebagai larutan pengganti cairan fisiologis selama proses isolasi. Penggunaan agonis *Acetyl-β-Methylcholine* sebagai pemicu kontraksi otot polos trakea marmut. *Acetyl-β-Methylcholine* diberikan secara bertahap dari konsentrasi  $2 \times 10^{-8} M$  sampai dengan  $2 \times 10^{-2} M$ . Pengujian piperin menggunakan dosis 10  $\mu M$  dan 50  $\mu M$ . Data yang diperoleh berupa kurva persentase respon kontraksi dengan konsentrasi agonis dan nilai pD<sub>2</sub>. Analisis statistik menggunakan *ANOVA* satu arah dengan taraf kepercayaan 95%.

Hasil penelitian menunjukkan bahwa pemberian piperin dosis 10  $\mu M$  dan 50  $\mu M$  mampu menggeser kurva persentase respon kontraksi dengan konsentrasi agonis ke arah kanan. Pemberian piperin 10  $\mu M$  dan 50  $\mu M$  tidak mampu mengembalikan respon kontraksi ke kondisi *E<sub>max</sub>* 100%. Piperin 10  $\mu M$  mencapai nilai respon maksimal sebesar 68,49% dan piperin 50  $\mu M$  sebesar 70,28%. Nilai pD<sub>2</sub> pada kontrol sebesar 5,50; piperin 10  $\mu M$  sebesar 4,67; dan piperin 50  $\mu M$  sebesar 4,41. Dari hasil penelitian dapat disimpulkan bahwa piperin memiliki aktivitas sebagai antagonis nonkompetitif pada reseptor asetilkolin muskarinik 3 (*AChM<sub>3</sub>*).

Kata kunci: Piperin, *in vitro*, isolasi organ, antagonis reseptor *AChM<sub>3</sub>*.

## ABSTRACT

*Piperine is one of the alkaloid compound which contained in the piper (*Piper nigrum* Linn). Alkaloid compound has been studied to bond specifically at AChM<sub>3</sub> receptors. The airway constriction process is caused by smooth muscle contraction of the respiratory tract. It is occurred due to the influence of the muscarinic acetylcholine 3 (AChM<sub>3</sub>) binding to the G protein that resulting in an increase of Ca<sup>2+</sup> intracellular. The purpose of this study determined the effect of piperine alkaloids on acetylcholine receptors toward the tracheal smooth muscle contraction activity.*

*The study implemented in-vitro method which is use organ bath apparatus and isolated guinea pig trachea. Krebs solution is used to substitute physiological buffer. Acetyl-β-Methylcholine agonist was used as a trigger to contract guinea pig trachea smooth muscle. Acetyl-β-Methylcholine is given gradually from the concentration of 2x10<sup>-8</sup> M to 2x10<sup>-2</sup> M. Furthermore, piperine was used at the dose 10 μM and 50 μM. Data was analyzed in the form of curve which depict the correlation between the contraction response percentage and agonist concentration. In addition from the curve pD<sub>2</sub> values also can be obtained. Statistical analysis by using one way ANOVA with 95% confidence level.*

*The results showed that piperine dose at 10 μM and 50 μM was able to shift the curves response percentage contraction with agonist concentration to the right. Piperine at the 10 μM and 50 μM could not restore the contraction response to 100% of E<sub>max</sub>. The trachea which given 10 μM piperine could reach maximum response values at 68.49% contraction. Meanwhile that given 50 μM piperine only has 70.28% contraction. pD<sub>2</sub> value of control, piperine 10 μM, piperine 50 μM group was 5.50; 4.67; 4.41 respectively. Overall, from the research above, it can be conclude that the piperine has role as noncompetitive antagonist at the muscarinic acetylcholine receptor 3 (AChM<sub>3</sub>).*

*Keywords: Piperine, in vitro, isolated organ, antagonist receptor AChM<sub>3</sub>.*