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Navigation

- [Online First](#)
- [Current Issue](#)
- [Previous Issues](#)
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Volume 11, Number 2, 2017

Pre-harvest and Post-harvest Factors Affecting Bioactive Compounds From *Vernonia amygdalina* (Del.)

[Chukwunonso ECC Ejike](#) and [Macmanus Chinenye Ndukwu](#)

Research Journal of Medicinal Plants Volume 11, Number 2, 32-40, 2017

[\[Abstract\]](#) [\[Fulltext PDF\]](#) [\[Fulltext HTML\]](#) [\[XML: Abstract + References\]](#) [\[References\]](#)

Effect of Munghurt *Lactobacillus acidophilus* from Green Beans to Blood Glucose Levels in Alloxan-induced Diabetic Rats

[Eka Noneng Nawangsih](#), [Sayu Putu Yuni Paryati](#), [Yoga L. Baklaes](#) and [Euis Reni Yuslianti](#)

Research Journal of Medicinal Plants Volume 11, Number 2, 41-47, 2017

[\[Abstract\]](#) [\[Fulltext PDF\]](#) [\[Fulltext HTML\]](#) [\[XML: Abstract + References\]](#) [\[References\]](#)

Biochemical Effects of the Aqueous Extract of *Hibiscus sabdariffa* on Liver Marker Enzymes and Lipid Profiles in Acetaminophen-challenged Rats

[Joshua Parker Elijah](#), [Ukegbu Chimere Young](#), [Eze Chuma](#), [Nkwocha Chinenye Chinelo](#), [Okafor Joshua Onyiazogiri](#), [Amaechi Ogara](#), [Nduka Florence Obiageli](#), [Ozougwu Vincent](#), [Eyenike Joshua Oteri](#) and [Ugochukwu Nkiru Emmanuela](#)

Research Journal of Medicinal Plants Volume 11, Number 2, 48-54, 2017

[\[Abstract\]](#) [\[Fulltext PDF\]](#) [\[Fulltext HTML\]](#) [\[XML: Abstract + References\]](#) [\[References\]](#)

Antioxidant Activities and Phenolics Contents of Avocado (*Persea americana* Mill.) Peel *in vitro*

[Irma Antasionasti](#), [Sugeng Riyanto](#) and [Abdul Rohman](#)

Research Journal of Medicinal Plants Volume 11, Number 2, 55-61, 2017

[\[Abstract\]](#) [\[Fulltext PDF\]](#) [\[Fulltext HTML\]](#) [\[XML: Abstract + References\]](#) [\[References\]](#)

Evaluation of *Piper betle* L. Aqueous Extract on *Salmonella* sp. Isolates from Small Intestine of Quails

[Fensa Eka Widjaya](#), [Yuli Retnani](#) and [Widya Hermana](#)

Research Journal of Medicinal Plants Volume 11, Number 2, 62-67, 2017

[\[Abstract\]](#) [\[Fulltext PDF\]](#) [\[Fulltext HTML\]](#) [\[XML: Abstract + References\]](#) [\[References\]](#)

Improvement of Anti-malarial Artemisinin and Essential Oil Production in Response to Optimization of Irrigation and Nitrogen Supply to *Artemisia annua* L. Plant

[Amaal Abd-Elkhalek Mohamed Heikal](#)

Research Journal of Medicinal Plants Volume 11, Number 2, 68-76, 2017

[\[Abstract\]](#) [\[Fulltext PDF\]](#) [\[Fulltext HTML\]](#) [\[XML: Abstract + References\]](#) [\[References\]](#)

Neurotoxic Mechanism of Bruceine A Biolarvicide Against *Aedes aegypti* Linnaeus Larvae

[Dwi Sutningsih](#), [Mustofa](#), [Tri Baskoro Tunggul Satoto](#) and [Edhi Martono](#)

Navigation

- [Online First](#)
- [Current Issue](#)
- [Previous Issues](#)
- [Editorial Board](#)
- [Submit a Manuscript](#)
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Neurotoxic Mechanism of Bruceine A Biolarvicide Against *Aedes aegypti* Linnaeus Larvae

Dwi Sutningsih , Mustofa , Tri Baskoro Tunggul Satoto and Edhi Martono

Abstract: Background and Objectives: *Aedes aegypti* Linnaeus is a mosquito species that plays an important role as a vector of diseases in tropical and subtropical regions. *Aedes aegypti* (L.) resistance against temephos and pyrethroid has been widely reported in several countries including Indonesia. This study aimed to examine the neurotoxic mechanism of bruceine A biolarvicide and to determine the inhibitory activity of the enzyme acetylcholinesterase and gene Voltage-Gated Sodium Channel (VGSC) on *A. aegypti* (L.) larvae. **Materials and Methods:** Bruceine A was obtained by extraction and isolation of Makassar fruit's seeds. Test of inhibition of acetylcholinesterase activity was based on Ellman method. Voltage-Gated Sodium Channel gene inhibitor was tested using PCR. The statistical analysis of inhibition of the enzyme acetylcholinesterase was performed by using Kruskal Wallis test followed by Mann Whitney. The data from observation on behavior response and VGSC gene were descriptively analyzed. **Results:** Bruceine A could inhibit the action of the enzyme acetylcholinesterase as much as $45.083 \pm 0.003\%$, with symptoms of a neurotoxic that is excitation, convulsions, tremors and paralysis. The result of fragment amplification of VGSC gene and electrophoresis on agarose gel 2% generated in a specific band with the size of the fragment bands of 336 bp on samples of larvae that were still sensitive to bruceine A and cypermethrin. **Conclusion:** Bruceine A isolated from the seeds of *Brucea javanica* (L.) Merr. has been demonstrated as biolarvicide against larvae of *A. aegypti* (L.), through its neurotoxic properties. The mechanism of neurotoxicity is mediated through inhibition of enzyme acetylcholinesterase and VGSC gene.



Navigation

- Online First
- Current Issue
- Previous Issues
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- [Previous Issues](#)
- [Editorial Board](#)
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