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 Jumlah Penulis : 4 Orang (**Dwi Sutiningsih**, Mustofa, Tri Baskoro Tunggul Satoto, Edhi Martono)
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- b. Nomor ISSN : eISSN :2151-7924, pISSN : 1819-3455
- c. Vol, No. Bln, Thn : Vol. 11 No. 02 Maret 2017 hal. 77-89
- d. Penerbit : Asian Netork for Scientific Information
- e. DOI artikel (jika ada) : 10.3923/rjmp.2017.77.85
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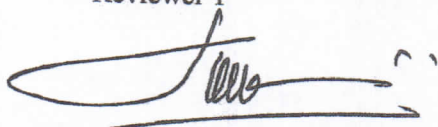
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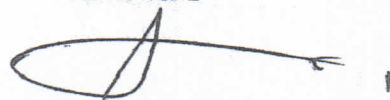
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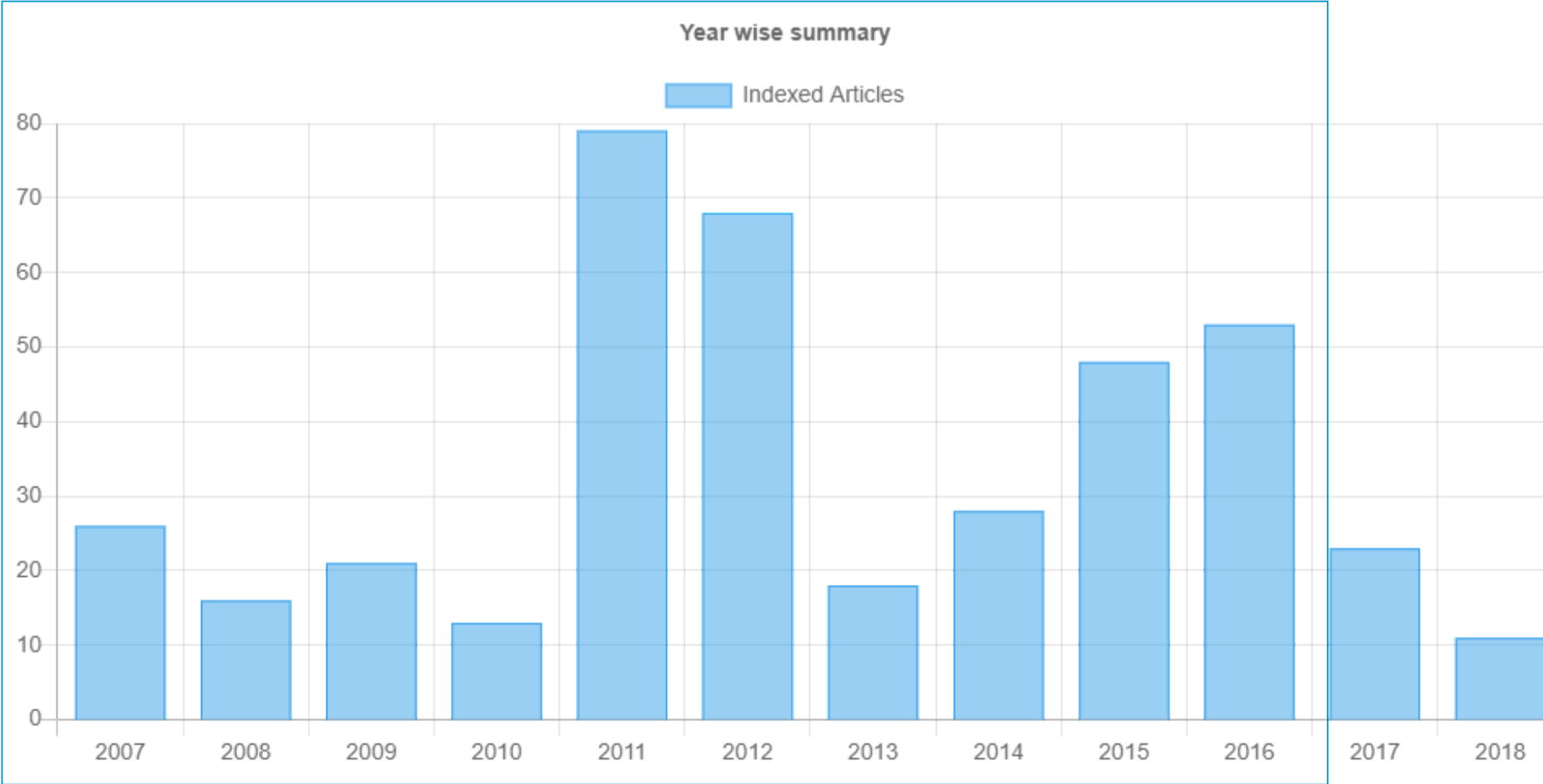
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Improvement of Anti-malarial Artemisinin and Essential Oil Production in Response to Optimization of Irrigation and Nitrogen Supply to Artemisia annua L. Plant

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Neurotoxic Mechanism of Bruceine A Biolarvicide Against Aedes aegypti Linnaeus Larvae

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

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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.



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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

Department of Ornamental Horticulture, Faculty of Agriculture, Cairo University, Giza, [Egypt](#)

Abstract

Background and Objective: Malaria is a major health problem in many developing countries. Artemisinin-based combination therapies are the highly effective against the most prevalent and lethal malaria parasites. *Artemisia annua* plant is the only source of anti-malarial drug artemisinin. There is no research effort with respect to effect of irrigation and chemical fertilization on this modern medicinal plant in Egyptian agriculture. The objective of study was to describe how plant biomass, essential oil production and anti-malarial artemisinin accumulation can be enhanced through irrigation and nitrogen fertilization. **Materials and Methods:** A field experiment was carried out during 2012 and 2013 seasons to determine biomass yield, essential oil and artemisinin content of German *Artemisia* under water stress (2, 3 and 4 weeks irrigation intervals) and nitrogen fertilization (30, 45 and 60 kg N/fed = 0.42 ha). Irrigation intervals and nitrogen rates were laid out in strip-plot design with three replicates. The obtained data were used to determine optimal irrigation interval and nitrogen rate. Statistical analysis was performed based on a strip-plot arrangement in a randomized complete block design. **Results:** Prolonging irrigation intervals up to 4 weeks significantly decreased ($p < 0.05$) biomass yield, essential oil content, artemisinin content, total carbohydrates content and leaves minerals content. Nitrogen nutrition enhanced biomass yield, artemisinin content; total carbohydrates and leaves mineral contents up to 60 kg N. Applying 45 kg N under 2 weeks irrigation interval produced the highest essential oil content, while prolonging irrigation intervals to 3 weeks and applying 60 kg N significantly increased ($p < 0.05$) artemisinin production. Camphor, *Artemisia* ketone and 1,8-cineole were the major constituents of the essential oil profile. **Conclusion:** *Artemisia annua* can be grown as an economically viable crop under Egyptian conditions. Water stress and extensive nitrogen fertilization had adverse effect on essential oil production. Moderate water stress enhanced artemisinin accumulation in leaves of artemisia plants.

Key words: *Artemisia*, malaria, irrigation, nutrition, volatile oil composition, artemisinin

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Competing Interest: The authors has declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.



Review Article

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

^{1,2}Chukwunonso ECC Ejike and ³Macmanus Chinenye Ndukwu

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Abstract

Vernonia amygdalina (VA), a dark green leafy vegetable, is a rich source of chemicals and bioactive compounds such as phenols, flavonoids, terpenoids, resins, essential oils and some vitamins. These compounds are reported to have diverse health benefits including antimicrobial and metabolism regulatory properties. Most of the compounds are found mainly in the leaves of VA and the juice extracted therefrom. The leaves are commonly consumed as fresh vegetable or the fresh juice drunk as tonic/medicine. In addition, the extracts are used in breweries as a substitute for hops. The concentration and stability of these bioactive compounds are nonetheless affected by pre-harvest factors such as phase of development, cultivar, fertilizer application, agro-climatic conditions, on the one hand and postharvest factors such as processing, solvent extraction treatments and storage, on the other hand. This review discusses the pre-harvest and post-harvest factors that influence the functional properties of VA.

Key words: *Vernonia amygdalina*, preharvest, postharvest, bioactive compounds, processing

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