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Research Article

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Insecticidal activity of substituted 1,3-diynes

D. Munirajasekhar

Chemistry Division, School of Basic Sciences, Vel Tech Dr. R R & Dr. S R Technical University, Avadi, Chennai, Tamilnadu, India

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ABSTRACT

*In our present study, we evaluated insecticidal activities of substituted 1,3-diyenes (or) alkyne dimers. 1,3-diyenes were prepared by oxidative coupling in presence of Cu (I) catalytic system. All the compounds showed moderate and good insecticidal activity comparing to their standard drug Chloropyrifos. Compounds **2d** and **2f** were showed potential insecticidal activity compared to Chloropyrifos.*

Key words: Alkyne dimmers, 1,3-diynes, Cu (I), Insecticidal activity.

INTRODUCTION

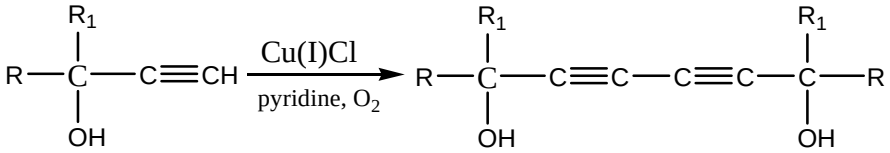
1,3- diyenes or dimers are exhibited diverse activities like antibacterial [1], antifungal [2], anticancer [3], antiinflamatory [4], anti HIV [5] activities etc. In addition, conjugated diynes have found wide applications in the construction of industrial intermediates [6, 7]. Creating high-efficient and environment-friendly pesticides is very important to produce the pollution free agriculture food and maintain the balance of the survival environmental of the human being [8]. The protection of stored grain and seeds against insect pests has been a major problem from the development of agriculture. Plant products have been successfully exploited as insecticides, insect repellents and insect antifeedants [9-11].

However, there is an urgent need to develop safe alternatives that are of low cost, convenient to use and environmentally friendly. Considerable efforts have been focused on synthesized compounds, and potentially useful as commercial insecticides.

In this present study, we evaluated insecticidal activity of newly synthesized (Munirajasekhar et al., 2011) 1,3-Diyenes or alkyne dimers [12].

EXPERIMENTAL SECTION

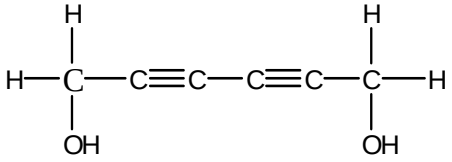
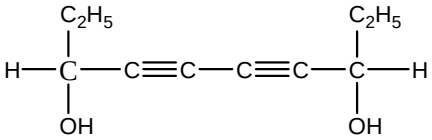
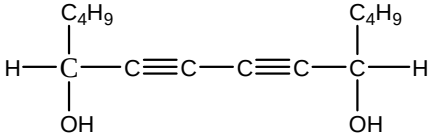
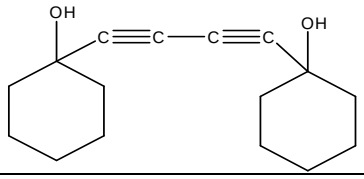
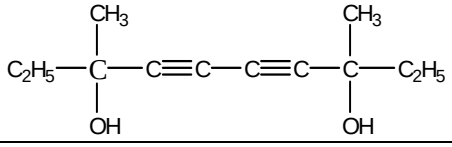
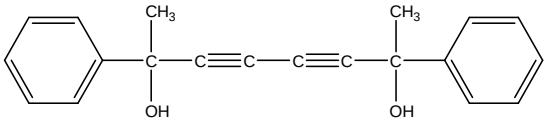
Analytical grade solvents and commercially available reagents were used without further purification. Melting points were determined in open capillary tube and are uncorrected. All the synthesized compounds were well characterized by FT-IR, ^{1}H NMR, mass spectroscopic characterization methods. The reaction Scheme and final synthesized compounds were represented **Scheme 1** and **Table 1.** The termites were obtained from the stored grains in local market.



1(a-f) **2 (a-f)**

Scheme 1: Synthesis of substituted 1, 3-diyens

Table 1: 1,3-Diynes (or) Alkyne dimers 2 (a-f)

S. No.	R	R_1	Product
1	H	H	
2	H	C_2H_5	
3	H	C_4H_9	
4	H	C_6H_{10}	
5	C_3	C_2H_5	
6	CH_3	C_6H_5	

Insecticidal Activity:

Newly synthesized compounds **2 (a-f)** were subjected to insecticidal activity. 100 mg of each test compounds was dissolved in 2 mL of acetone. The solution was uniformly spread on the filter paper of diameter 4.3 cm, dried and placed in a similar sized petri plate. The concentration of each test compound is 0.58 mg/cm^2 area. Standard drug Chloropyrifos and control was maintained in a similar way. The termites were placed on the filter paper in the petri plate which was then closed with the lid containing a thin layer of wet cotton bed. The death time of the insects was

observed for 3 hrs. No death was observed in the control even after 12 hrs. The results were shown in **Table 2** and graphical representation was shown in **Graph 1.**

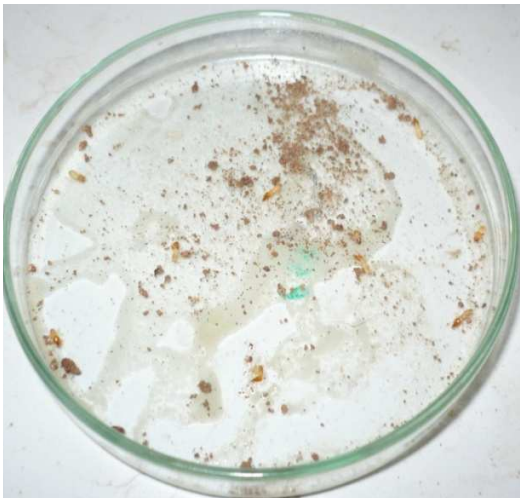
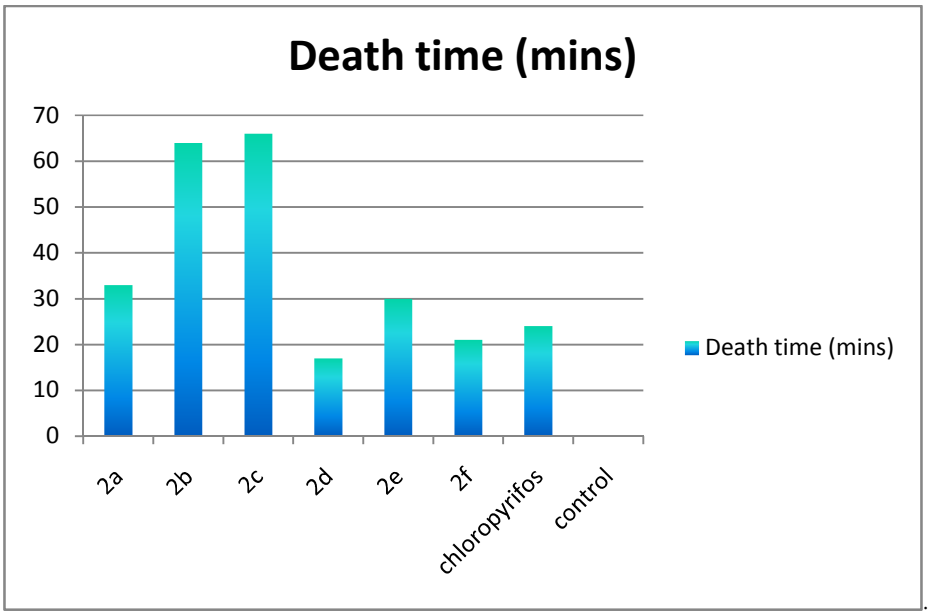


Table 5.2 Insecticidal Activity of 1,3-diynes 2(a-f)

S. NO	Compound No	Concentration of the compound (100mg/66.5cm2 area)	Death time (mins)
1	2a	100	33
2	2b	100	64
3	2c	100	66
4	2d	100	17
5	2e	100	30
6	2f	100	21
7	Chloropyrifos	100	24
8	Control	-	-



Graph 1: Insecticidal Activity of Compounds 2 (a-f)

RESULTS AND DISCUSSION

1,3- diyenes (or) dimers were evaluated their Insecticidal activity against to the termites with respect to the chloropyrifos as a standard drug. All the synthesized compounds were showed good and moderate activity compared to their standard drug. Alkyne chain containing dimers **(2a, 2b, 2c, 2e)** showed moderate activity, compounds cyclohexene bearing dimer (**2d)** and phenyl ring bearing dimer (**2f)** showed potent insecticidal activity comparing to their standard drug.

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