

## **SINTESIS SENYAWA ANALOG ZINGERON DARI BAHAN DASAR VERATRALDEHIDA SECARA SONOKIMIA DAN POTENSINYA SEBAGAI ATRAKTAN LALAT BUAH HAMA**

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### **INTISARI**

Sintesis senyawa 4-(2-bromo-4,5-dimetoksifenil)-2-butanon serta uji potensi sebagai atraktan lalat buah hama dilakukan dengan tujuan untuk mendapatkan senyawa atraktan lalat buah hama baru selain metil eugenol dan *cue lure*, yaitu berupa analog dari senyawa zingeron. Sintesis senyawa analog zingeron dilakukan melalui tiga tahap, tahap pertama yaitu reaksi brominasi terhadap veratraldehida dengan menggunakan  $\text{KBrO}_3$  dan  $\text{HBr}$  dalam kondisi asam dilakukan dengan metode konvensional dan sonokimia. Tahap kedua merupakan reaksi kondensasi aldol silang terhadap senyawa 6-bromoveratraldehida dengan aseton menggunakan katalis  $\text{NaOH}$  20% dilakukan dengan metode konvensional dan sonokimia. Tahap ketiga yaitu sintesis senyawa analog zingeron melalui reaksi reduksi produk kondensasi aldol dengan  $\text{NaBH}_4$  dan  $\text{NiCl}_2 \cdot 6\text{H}_2\text{O}$  dilakukan dengan metode konvensional dan sonokimia. Selanjutnya seluruh produk hasil reaksi dianalisis dengan FT-IR, GC-MS,  $^1\text{H-NMR}$ ,  $^{13}\text{C-NMR}$ .

Reaksi brominasi veratraldehida menghasilkan produk berupa padatan putih dengan persen hasil 74 dan 82% masing-masing untuk metode konvensional dan sonokimia, keduanya memiliki kemurnian 94%. Hasil reaksi kondensasi aldol yaitu senyawa (*E*)-4-(2-bromo-4,5-dimetoksifenil)-3-buten-2-on, berupa serbuk berwarna kuning dengan persen hasil 88% dan kemurnian 97% untuk metode konvensional, sedangkan metode sonokimia memiliki persen hasil sebesar 88% dan kemurnian 98%. Senyawa 4-(2-bromo-4,5-dimetoksifenil)-2-butanon berupa cairan kental berwarna kuning dengan persen hasil 92% dan kemurnian 75% untuk metode konvensional, sedangkan dengan metode sonokimia diperoleh persen hasil 92% dan kemurnian 77%. Hasil uji potensi atraktan lalat buah hama menunjukkan bahwa senyawa hasil sintesis 4-(2-bromo-4,5-dimetoksifenil)-2-butanon tidak menarik lalat buah hama di tempat uji.

Kata kunci: *atraktan, lalat buah, reduksi, zingeron*

## **SYNTHESIS ZINGERONE ANALOGUE FROM VERATRALDEHYDE BY SONOCHEMISTRY AND ITS POTENTIAL AS FRUIT FLY ATTRACTANT**

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### **ABSTRACT**

The synthesis of 4-(2-bromo-4,5-dimethoxyphenyl)-2-butanone and the potential test as an attractant for fruit fly have been completed. The purpose of this study is to explore a new pest fruit fly attractant compound other than methyl eugenol and cue lure, which is an analogue of the zingerone. Synthesis of zingerone's analogue compounds was carried out in three steps, the first step was the bromination reaction of veratraldehyde using  $\text{KBrO}_3$  and  $\text{HBr}$  under acidic conditions using conventional and sonochemistry methods. The second step was a cross aldol condensation reaction of 6-bromoveratraldehyde with acetone using  $\text{NaOH}$  20% as a catalyst, carried out by conventional and sonochemistry methods. The third step was the synthesis of zingerone's analogue compounds through the reduction reaction of aldol condensation products with  $\text{NaBH}_4$  and  $\text{NiCl}_2 \cdot 6\text{H}_2\text{O}$  carried out by conventional and sonochemistry methods. Furthermore, all reaction products were analyzed by FT-IR, GC-MS,  $^1\text{H-NMR}$ ,  $^{13}\text{C-NMR}$ .

The bromination reaction of veratraldehyde produces a white solid with a yield of 74 and 82% for conventional and sonochemistry methods, respectively, both of method have a purity of 94%. The result of the aldol condensation reaction is (E)-4-(2-bromo-4,5-dimethoxyphenyl)-3-buten-2-one, in the form of a yellow powder with a yield of 88% and a purity of 97% for the conventional method, while sonochemistry method has a yield of 88% and a purity of 98%. The compound 4-(2-bromo-4,5-dimethoxyphenyl)-2-butanone was a thick yellow liquid with a yield of 92% and a purity of 75% for the conventional method, the yield with the sonochemistry method yielded 92% and a purity of 77%. The results of the potential test of pest fruit fly attractant have not shown that the compound synthesized from the analogue zingerone 4-(2-bromo-4,5-dimethoxyphenyl)-2-butanone has no attract fruit flies in field.

Keyword: *attractant, fruit flies, reduction, zingerone*