



## INTISARI

### STUDI EPOKSIDASI, HIDROKSILASI, DAN HIDROGENASI TERHADAP SITRANELAL

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Telah dilakukan sintesis senyawa 5-(3,3-dimetiloksiran-2-il)-3-metilpentanal, 7-hidroksi-3,7-dimetil-6-oksooktanal, 3,7-dimetiloktanal dan sitronelol dari sitronelal melalui reaksi adisi. Adisi dilakukan melalui: reaksi epoksidasi, reaksi hidroksilasi, dan reaksi hidrogenasi.

Sitronelal diisolasi dari minyak sereh dengan metode kimiawi. Isolasi sitronelal dilakukan menggunakan natrium bisulfit 6 M dilanjutkan dengan  $\text{Na}_2\text{CO}_3$  0,8 M. Reaksi epoksidasi dengan peroksimonokarbonat dilakukan melalui 2 metode. Metode pertama dilakukan tanpa pengadukan selama 24 jam dalam temperatur kamar, sedangkan metode kedua dilakukan melalui pengadukan selama 4 jam pada temperatur 20°C dengan adanya katalis  $\text{MnSO}_4$ . Hidroksilasi dengan  $\text{KMnO}_4$  dilakukan dalam kondisi basa (pH 12) pada temperatur 0-3°C selama 1,5 jam baik dengan pelarut  $\text{H}_2\text{O}$  maupun pelarut metanol. Hidrogenasi dengan katalis Raney-nikel diawali dengan aktivasi katalis melalui pencucian aloi Al-Ni menggunakan  $\text{NaOH}$  6,5 M dan dilanjutkan dengan hidrogenasi selama 2 jam.

Sitronelal yang diperoleh melalui metode kimiawi memiliki rendemen 63,68% dengan kemurnian 93,81%. Senyawa 5-(3,3-dimetiloksiran-2-il)-3-metilpentanal diperoleh melalui epoksidasi sitronelal dengan peroksimonokarbonat dan  $\text{MnSO}_4$  dengan rendemen sebesar 76,5% sedangkan epoksidasi sitronelal dengan peroksimonokarbonat tanpa  $\text{MnSO}_4$  memberikan rendemen 27,48%. Senyawa 7-hidroksi-3,7-dimetil-6-oksooktanal yang diperoleh sebagai hasil hidroksilasi sitronelal dengan  $\text{KMnO}_4$  dalam pelarut air dengan rendemen 69,89% sedangkan hidroksilasi dalam pelarut metanol dengan rendemen sebesar 91,40%. Senyawa 3,7-dimetiloktanal dan sitronelol diperoleh melalui hidrogenasi sitronelal dengan katalis Raney-nikel dengan persen konversi total sebesar 88,46% dengan kadar sebesar 5,13% dan 31,21%.

Kata kunci : sitronelal, epoksidasi, hidroksilasi, hidrogenasi



## ABSTRACT

### STUDY OF EPOXIDATION, HYDROXYLATION, AND HYDROGENATION TO CITRONELLAL

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Synthesis of 5-(3,3-dimethyloxiran-2-il)-3-methylpentanal, 7-hydroxy-3,7-dimethyl-6-oxooctanal, 3,7-dimethyloctanal and citronellol from citronellal via addition have been carried out. Additions have been done by: epoxidation, hydroxylation, and hydrogenation.

Citronellal was isolated from citronella oil by chemical methods. Citronellal was isolated by  $\text{NaHSO}_3$  6 M and followed with  $\text{Na}_2\text{CO}_3$  0.8 M. Epoxidation with peroxymonocarbonate was done by two methods. The First method of the reaction was accomplished at room temperature without stirring for 24 hours while the second method with  $\text{MnSO}_4$  as catalyst was stirred at  $20^\circ\text{C}$  for 4 hours. Hydroxylation was done by  $\text{KMnO}_4$  at  $0-3^\circ\text{C}$  for 1.5 hours in alkaline condition with water and methanol as solvent. Hydrogenation by Raney-nickel as catalyst was started with washing alloy Al-Ni using NaOH 6.5 M and followed by hydrogenation for 2 hours.

Citronellal produced by chemical method was in 63.68% yield and 93.81% purity. 5-(3,3-Dimethyloxiran-2-il)-3-methylpentanal was obtained by epoxidation of citronellal with peroxymonocarbonate and  $\text{MnSO}_4$  in 76.5% yield whereas epoxidation of citronellal with peroxymonocarbonate gave 27.48% yield. 7-Hydroxy-3,7-dimethyl-6-oxooctanal was produced by hydroxylation citronelal with  $\text{KMnO}_4$  in  $\text{H}_2\text{O}$  as solvent in 69.89% yield while hydroxylation in methanol as solvent gave 91.40% yield. 3,7-Dimethyloctanal and citronellol were produced by hydrogenation of citronellal using Raney-nickel as catalyst with total percentage of conversion of 88.46% within 5.13% and 31.21% purity.

**Keywords:** citronellal, epoxidation, hydroxylation, hydrogenation