

**SYNTHESIS AND BIOASSAYS OF *Chilo partellus* FEMALE SEX PHEROMONES
AND THEIR ANALOGUES.**

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Abstract

Synthetic sex pheromones could provide valuable alternative means of pest control in Integrated Pest Management (IPM) strategies. Their uses could include population monitoring with pheromone traps to guide other control methods, by mass trapping and mating disruption.

(Z)-11-Hexadecenal ($Z-11-C_4H_9CH=CH(CH_2)_9CHO$) and (Z)-11-hexadecen-1-ol ($Z-11-C_4H_9CH=CH(CH_2)_9CH_2OH$), the major components of spotted stalk borer, *Chilo partellus* (swinhoe) female sex pheromone, were prepared in good yields from readily available 1,10-decanediol by an acetylenic route, and (Z)-9-tetradecenyl formate ($Z-9-C_4H_9CH=CH(CH_2)_7CH_2O-CHO$), an analogous structure was prepared from 1,8-octanediol by the analogous acetylenic route. Simple distillation of the 1-bromo-10-(2-tetrahydropyranyloxy) decane, coupling with 1-hexyne in liquid ammonia and lithamide followed by deprotection gave 11-hexadecyn-1-ol ($C_4H_9C\equiv C(CH_2)_9CH_2OH$) (b.p $96-98^\circ C/0.04$ mmHg; 75% yield). Partial hydrogenation of 11-hexadecyn-1-ol on a Lindlar catalyst gave (Z)-11-hexadecen-1-ol (b.p $75^\circ C/0.01$ mmHg, 95% yield) which on oxidation gave (Z)-11-hexadecenal ($Z-11-C_4H_9CH=CH(CH_2)_9CHO$) (b.p $71^\circ C/0.01$ mmHg; 80% yield) containing 1.3% of the (E) isomer by GC analysis on a methyl silicone column. (E)-11-Hexadecenal and (E)-11-hexadecen-1-ol were prepared via sodium/liquid ammonia reduction of the intermediate $C_4H_9C\equiv C(CH_2)_{10}OTHP$, giving the final product containing 1% of the (Z)-isomer. Pyridinium chlorochromate in dichloromethane was used for the oxidation of the olefinic alcohols to the corresponding

aldehydes (yield, 76-79%). The other analogues were obtained by derivatizing the aldehydes or alcohols of the intermediates or the final products in the synthesis.

The Electroantennographic (EAG) tests showed that the compounds differed in their ability to evoke EAG responses and they were lower than (Z)-11-hexadecenal. The EAG responses confirmed that (Z)-11-hexadecenal was a better stimulant than the corresponding alcohol (Z)-11-hexadecen-1-ol.