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5. The 1-oxocarbapenam should be purified rapidly. It can be stored in refrigerator under nitrogen atmosphere for a week.
6. **2**, ^{1}H NMR ($CDCl_3$) δ 1.48 (s, 9H, *t*-Bu), 2.72 (dd, 1H, J=14.6, 2.3 Hz, H-3), 3.26 (dd, 1H, J=14.6, 5.1 Hz, H-3), 3.50 (d, 1H, J=18.4 Hz, NCH_2CO_2), 4.08 (d, 1H, J=18.4 Hz, NCH_2CO_2), 4.14-4.33 (m, 1H, H-4), 5.19-5.45 (m, 2H, $=CH_2$), 5.85 (m, 1H, CH=); IR (neat) 1760, 1735, 1150 cm^{-1}. **3**, ^{1}H NMR ($CDCl_3$) δ 1.47 (s, 9H, *t*-Bu), 2.62 (dd, 1H, J=15.0, 2.7 Hz, β-lactam H-3), 2.80-3.50 (m, 2H, CH_2-C=N), 3.14 (dd, 1H, J=15.0, 5.3 Hz, β-lactam H-3), 3.23 (d, 0.6H, J=18.0 Hz, NCH_2CO_2), 3.72 (d, 0.4H, J=18.0 Hz, NCH_2CO_2), 3.84-3.99 (m, 0.4H, β-lactam H-4), 4.03 (d, 0.6H, J=18.0 Hz, NCH_2CO_2), 4.12 (d, 0.4H, J=18.0 Hz, NCH_2CO_2), 4.20 (m, 0.6H, β-lactam, H-4), 4.76-4.92 (m, 0.4H, CH-O), 4.96 (dt, 0.6H, J=9.6, 3.2 Hz, CH-O); IR (neat) 2980, 1755, 1735, 1580, 1150, 835 cm^{-1}. **4**, mp 89-93 ℃; ^{1}H NMR ($CDCl_3$) δ 1.48 (s, 9H, *t*-Bu), 2.44-2.59 (m, 2H, CH_2CN), 2.60-3.40 (m, 2H, H-3), 3.48 (d, 0.4H, J=18.0 Hz, NCH_2CO_2), 3.68 (d, 0.6H, J=18.0 Hz, NCH_2CO_2), 3.77 (m, 1H, H-4), 4.16 (m, 1H OCH), 4.34 (d, 0.4H, J=18.0 Hz, NCH_2CO_2), 4.42 (d, 0.6H, J=18.0 Hz, NCH_2CO_2); IR (neat), 3400, 2980, 2250, 1755, 1735, 1240, 1150 cm^{-1}. **5**, ^{1}H NMR δ 1.47 (s, 9H, *t*-Bu), 2.60-3.40 (m, 2H, H-3), 3.41 (s, 2H, CH_2CN), 3.72 (dd, 2H, J=16.8, 6.8 Hz, NCH_2CO_2), 4.53 (m, 1H, H-4); IR (neat), 2980, 2250, 1755, 1725, 1420, 1240, 1150 cm^{-1}. **6**, ^{1}H NMR ($CDCl_3$) δ 1.47 (s, 9H, *t*-Bu), 2.49-3.38 (m, 2H, H-3), 3.76 (dd, 2H, J=16.8, 7.0 Hz, NCH_2CO_2), 4.50 (m, 1H, H-4); IR (neat) 2980, 2250, 2140, 1755, 1730, 1410, 1100 cm^{-1}. **7**, ^{1}H NMR ($CDCl_3$) δ 1.47 (s, 9H, *t*-Bu), 2.86-3.35 (m, 2H, H-6), 3.52 (d, 0.4H, J=7.8 Hz, H-3), 3.64-3.92 (m, 1H, H-2, H-3), 4.15-4.56 (m, 1H, H-5), 10.92 (s, 0.6H, =C-OH); IR (neat) 3400, 2980, 2250, 1755, 1730, 1430, 1200, 1150 cm^{-1}.

Sex Pheromone of the Perilla Leaf Pyralid Moth : Isolation and Identification

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Recently, the perilla leaf pyralid moth, Pyrausta panopealis Walker, is a major of perilla in Korea and possibly in some parts of China. This pest occurs four times in a year. Usually Korean eat perilla leaves freshly with roasted beef or raw fish, therefore it is desirable that application of insecticides should be kept to a minimum. When larvae become the third instar, they scatter and larvae make the short breakoffs and roll leaves and eat mesophyll. Therefore it is very difficult to apply insecticides on this pest. Thus, the use of sex pheromone in the direct control or forecasting of this insect would be valuable. Here we wish to report the chemical structure of the two components of the sex pheromones of the perilla leaf pyralid moth.

Table 1. Number of males of the perilla leaf pyralid attracted to the abdominal tip extract of virgin females in the labolatory cage

Replications	Number of males attracted					
Treatments	1	2	3	4	5	Mean± SE[a]
Experiment 1						
0.1 female equivalent	2	3	5	2	1	2.6± 0.7
Control (only solvent)	0	0	0	0	0	0.0
Experiment 2						
0.5 F.E.	4	8	6	5	4	5.5± 0.7
Control	0	0	0	0	0	0.0
Experiment 3						
1 F.E.	5	9	8	8	6	7.2± 0.7
Control	0	0	0	0	0	0.0
Experiment 4						
2 F.E.	15	20	14	12	12	14.6± 1.5
Control	0	0	0	0	0	0.0
Experiment 5						
5 F.E.	12	18	14	8	7	11.8± 2.0
Control	0	0	0	0	0	0.0

[a]Means that the same letters are not significant at 5% level with DUNCAN's multiple-range test.

Insects were reared on an artificial diet developed by Seol.[1] Laboratory bioassay of attractiveness for the abdominal tip extracts of virgin females was performed. We have counted the number of male responce due to the quick and strong responce to female extract. As shown in Table 1, strong responces of males to the crude extracts were observed throughout the range of doses tested, 0.1 to 0.5 female equivalent (F.E.). On the whole, the numbers of males attracted to the extracts increased as the doses were increased.

Florisil (60-10 mesh) was used as an adsorbent for partial purification of the sex pheromone in the crude extracts according to a class-separating method for lipids.[2] Hexanes, 5% ether in hexane, and ether were used in this order as eluting solvents. Only the fraction eluted by 5% ether in hexane was potent with respect to EAG response.[3] The active fraction was concentrated and examined by gas chromatography (Shimazu GC 14A) equipped with an effluent splitter and a hydrogen flame ionization detector. Column (OV-101 column) effluents trapped which had retention time 10.0 min to 13.5 min at 150→300 ℃ of 4 ℃/min showed EAG activity (Figure 1).

The active fractions were examined by a gas chromatography-mass spectrometer (GC-MS) (JEOL DX 300) by the

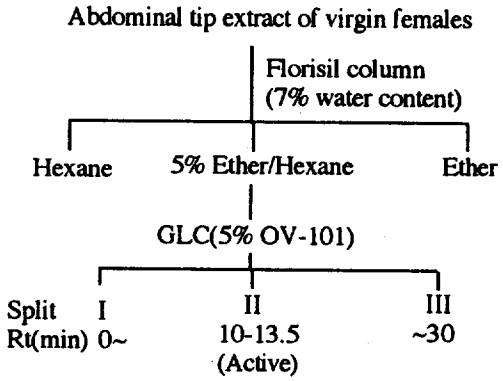


Figure 1. Purification of the extract of the sex pheromone.

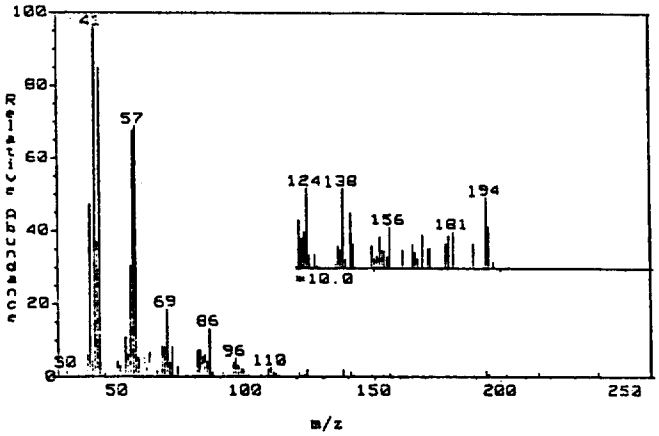
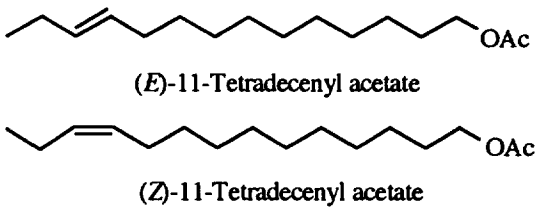


Figure 2. GC-MS of the biologically active fraction of the female extract.



(*E*)-11-Tetradecenyl acetate

(*Z*)-11-Tetradecenyl acetate

Figure 3. The isomers of 11-tetradecenyl acetate.

method of DIP/MS (EI) programmed from room temperature to 400 ℃ at 32 ℃/min. The active fraction which had retention time of ~10.3 min showed two mass spectra of M^+-60 peak at m/z 194 indicating two structures of 11-tetradecenyl acetate isomers (Figure 2). Important fragmentations indicating then presence of double bond at C_{11}-C_{12} bond were observed at m/z 69 ($CH_3CH_2CH{=}CHCH_2^+$) resulting from allylic cleavage, at m/z 70 ($CH_2{=}CHCH_2CH_2CH_3^+$) arising from McLafferty rearrangement, and an interval of 14 amu was observed between the most intense peaks of clusters of fragments. Also, we have observed between the most intense peaks of clusters of fragments. Also, we have observed m/z 61 by "double H-transfer" and m/z 41 ($C_3H_5^+$, base peak), 55 ($C_4H_7^+$), 69 ($C_5H_9^+$) and resonance stabilized peak at m/z 43 (CH_3CO^+). These ion peaks of the compounds identified were compared with the mass spectra of the synthesized (*E*)-and (*Z*)-11-tetradecenyl acetate.[4,5]

Micro-ozonolysis of both compounds yielded 11-acetoxyundecenal, which was also confirmed by GC-MS.

From the above data, (*E*)-and (*Z*)-11-tetradecenyl acetates (Figure 3) were identified as two components of the sex pheromone compounds of the perilla leaf pyralid moth.

Field test and determination of the ratio of (*Z*)-and (*E*)-forms will be the subject of our future research.

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Irreversible Cis-trans Photoisomerization of 1,2-Dibenzoyl-3-Phenylcyclopropane

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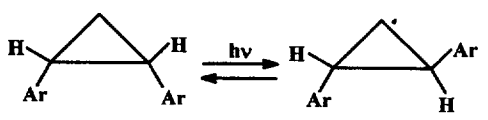
In the early papers of Hammond[1] and Griffin,[2] photochemical *cis-trans* isomerization of 1,2-dibenzoylcyclopropane was investigated. Irradiation of *cis*-1,2-dibenzoylcyclopropane affords trans isomer, and the reaction was shown to be reversible. In this isomerization, maximum stabilization of the diradical would be achieved by cleavage of the bond beta to both carbonyl groups.

A similar photoisomerization *cis*-1-benzoyl-2-phenylcyclopropane to trans isomer has been observed[3] (eq. 1).



1 (cis) **1 (trans)**

Ar = Ph, COPh

(1)