AGRICULTURAL AND FOOD CHEMISTRY

Synthesis and Insecticidal Activities of Novel *N*-Sulfenyl-*N*-*tert*-butyl-*N*,*N*-diacylhydrazines. 2. N-Substituted Phenoxysulfenate Derivatives

Qiqi Zhao,[†] Jian Shang,^{‡,†} Zhiqiang Huang,[†] Kaiyun Wang,[§] Fuchun Bi,[†] Runqiu Huang,[†] and Qingmin Wang^{*,†}

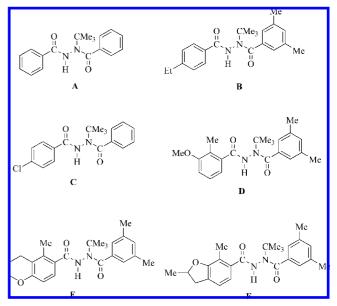
State Key Laboratory of Elemento-Organic Chemistry, Institute of Elemento-Organic Chemistry, Nankai University, Tianjin 300071, People's Republic of China, Chemistry and Biologic College, Yantai University, Yantai 264005, People's Republic of China, and College of Plant Protection, Shandong Agriculture University, Tai'an 271018, People's Republic of China

A series of novel *N*-substituted phenoxysulfenyl-*N*-*tert*-butyl-*N*,*N*-diacylhydrazines were designed and synthesized as insect growth regulators via the key intermediates *N*-chlorosulfenyl-*N*-*tert*-butyl-*N*,*N*-diacylhydrazines. Compared to the parent compounds, these *N*-substituted phenoxysulfenyl derivatives displayed better solubility and improved hydrophobicities. The insecticidal activities of the new compounds were evaluated. The results of bioassays showed that the title compounds possessed a combination of strong stomach as well as contact poison property higher than the corresponding parent compounds. In particular, *N*-(4-chlorophenoxy)sulfenyl-*N*-*tert*-butyl-*N*-4-ethylbenzoyl-*N*-3,5-dimethylbenzoylhydrazide (**IIII**) as a field testing candidate has higher stomach toxicities against oriental armyworm and tobacco cutworm than the corresponding parent compound **RH-5992**. Furthermore, the compound **IIII** exhibits higher contact activities against Asian corn borer, tobacco cutworm, and cotton bollworm than **RH-5992**.

KEYWORDS: *N*-Sulfenate derivative; substituted phenoxysulfenyl; diacylhydrazine; RH-5992; stomach toxicity; contact toxicity; insecticidal activity; insect growth regulator

INTRODUCTION

N-tert-Butyl-N,N'-diacylhydrazines, discovered by Rohm and Haas Company, are a class of chemically and mechanistically novel insect growth regulator which have been found to work as nonsteroidal ecdysone agonists inducing, especially in Lepidoptera, precocious molting, leading to death (1-5). Because of the unique action mechanism, simple structure, low toxicity to vertebrates, and high insecticidal selectivity, diacylhydrazines have attracted considerable attention for decades (6-10). Among these active compounds, N-tert-butyl-N,N'-dibenzoylhydrazine (RH-5849, A) was the first to be thoroughly investigated with regard to the insecticidal effects and the functional modes. *N-tert*-Butyl-*N*'-4-ethylbenzoyl-*N*-3,5-dimethylbenzoyl hydrazide (tebufenozide; RH-5992, B) was the first to be commercialized as a leptidopteran-specific insecticide under the trade names Mimic, Confirm, and Romdan in several countries (11, 12). *N-tert*-Butyl-*N'*-4-chlorobenzoyl-*N*-benzoyl hydrazide (halofenozide, RH-0345, C), developed by Rohm and Haas Company and American Cyanamid Company, was found to bear



high activity against Coleopteran larvae and ova, though the activity against Lepidoptera was lower than that of tebufenozide (13). *N-tert*-Butyl-*N'*-3-methoxy-2-methylbenzoyl-*N*-3,5-dimethylbenzoyl hydrazide (methoxyfenozide, **RH-2485**, **D**), developed by Rohm and Haas Company, exhibited higher

^{*} To whom correspondence should be addressed. Telephone: +86-(0)22-23499842. Fax: +86-(0)22-23499842. E-mail: wang98h@263.net

[†] Nankai University.

^{*} Yantai University.

[§] Shandong Agriculture University.

Scheme 1. General Synthetic Route for Compound III

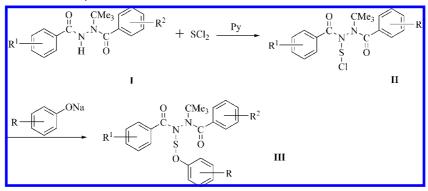


Table 1. Physical Properties and Elemental Analyses of the Compounds IIIa-y

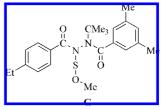
						elemental analysis (%, calcd)		
compd	R	R¹	R ²	mp (°C)	yield (%)	С	Н	N
Illa	Н	Н	Н	85-86	14.9	68.66 (68.55)	5.84 (5.75)	6.91 (6.66)
lllb	4-Cl	Н	Н	121-123	42.9	63.49 (63.36)	5.20 (5.10)	6.42 (6.16)
llic	4-Me	Н	Н	145-146	33.3	68.96 (69.10)	5.93 (6.03)	6.49 (6.45)
llld	Н	3,5-Me ₂	4-Et	75-77	83.9	70.77 (70.56)	6.51 (6.77)	5.74 (5.88)
llle	2-Br	3,5-Me ₂	4-Et	122-124	62.6	60.42 (60.54)	5.49 (5.62)	5.09 (5.04)
IIIf	4-Br	3,5-Me ₂	4-Et	80-82	82.0	60.62 (60.54)	5.72 (5.62)	5.13 (5.04)
lllg	2-Cl	3,5-Me ₂	4-Et	114-116	64.2	65.71 (65.80)	6.31 (6.11)	5.65 (5.48)
IIIĥ	3-Cl	3,5-Me ₂	4-Et	74-76	46.6	65.70 (65.80)	6.12 (6.11)	5.65 (5.48)
IIIi	4-Cl	3,5-Me ₂	4-Et	84-86	85.0	65.70 (65.80)	6.17 (6.11)	5.53 (5.48)
IIIj	2,4-Cl ₂	3,5-Me ₂	4-Et	126-127	62.3	61.44 (61.65)	5.58 (5.54)	5.14 (5.14)
llik	2,4,6-Cl ₃	3,5-Me ₂	4-Et	121-123	16.2	57.84 (57.99)	5.23 (5.04)	5.01 (4.83)
1111	2-Me	3,5-Me ₂	4-Et	111-113	26.2	70.83 (70.99)	7.07 (6.98)	5.91 (5.71)
IIIm	3-Me	3,5-Me ₂	4-Et	65-67	40	70.86 (70.99)	7.03 (6.98)	5.89 (5.71)
llIn	4-Me	3,5-Me ₂	4-Et	87-89	72.4	70.82 (70.99)	6.79 (6.98)	5.94 (5.71)
lllo	3,4-Me ₂	3,5-Me ₂	4-Et	133-135	48.4	71.22 (71.40)	7.20 (7.19)	5.53 (5.55)
llip	2-OMe	3,5-Me ₂	4-Et	89-92	28.2	68.55 (68.75)	6.69 (6.76)	5.57 (5.53)
IIIq	3-OMe	3,5-Me ₂	4-Et	94-96	39.5	68.71 (68.75)	6.71 (6.76)	5.51 (5.53)
IIIr	4-OMe	3,5-Me ₂	4-Et	97-99	48.0	68.74 (68.75)	6.54 (6.76)	5.80 (5.53)
IIIs	2-CO ₂ Me	3,5-Me ₂	4-Et	122-124	70.9	67.49 (67.39)	6.28 (6.41)	5.33 (5.24)
lllt	3-CO ₂ Me	3,5-Me ₂	4-Et	93-95	78.0	67.59 (67.39)	6.25 (6.41)	5.21 (5.24)
Illu	4-CO ₂ Me	3,5-Me ₂	4-Et	104-106	64.7	67.25 (67.39)	6.60 (6.41)	5.39 (5.24)
lllv	4-Ph	3,5-Me ₂	4-Et	132-134	72.3	73.64 (73.88)	6.69 (6.56)	5.05 (5.07)
lllw	4-Cl	3,5-Me ₂	а	72-74	43.1	64.98 (65.14)	5.97 (6.01)	5.21 (5.06)
IIIx	4-Cl	3,5-Me ₂	3-OMe, 2-Me	62-64	74.3	64.04 (63.80)	6.07 (5.93)	5.69 (5.31)
Illy	4-Cl	Η	CI	140-142	62.2	58.86 (58.90)	4.62 (4.53)	5.75 (5.72)

^a R¹ is identical with the corresponding substituents of the parent compound (JS-118).

activity against Lepidoptera and wider insecticidal spectrum than tebufenozide (14, 15). Both methoxyfenozide and halofenozide were characterized with significant root systemic activity. It has been reported that N'-benzoheterocyclecarbonyl-N-tert-butyl-3,5-dimethylbenzohydrazide analogues showed high insecticidal activities (16–18), of which ANS-118 and JS-118 represent successful examples. N'-tert-Butyl-N'-3,5-dimethylbenzoyl-N-5-methyl-6-chromane carbohydrazide (Chromafenozide; ANS-118, E) has been commercialized as insecticide under the trade name Matric (19, 20), and N'-tert-butyl-N'-3,5-dimethylbenzoyl-2,7-dimethyl-2,3-dihydrobenzofuran-6-carbohydrazide (JS-118, F) has been developing by Jiangsu Institute of Agricultural Chemicals, P. R. China (21, 22).

However, the preceding diacylhydraines have low solubility in water and limited solubility in common organic solvents. Moreover, they have poor hydrophobicity and cuticular penetration; thus, they have low contact toxicity. These disadvantages impede their field application (15, 23, 24).

The activity spectrum of a pesticide is often determined by the physical properties of the compound, and it is possible to develop a new insecticide with improved biological properties by attaching an appropriate functional group to an insecticide. Moreover, the physical properties of an insecticidal compound may be manipulated to obtain products with other selected types of activity by proper selection of the derivatizing moiety (24–27). For example, *N*-methoxysulfenyl-*N'-tert*-butyl-*N*-4-ethylbenzoyl-*N'*-3,5-dimethylbenzoylhydrazide (**G**), the *N*-methoxy sulfenate derivative of **RH-5992**, showed higher stomach and contact activities than the parent compound **RH-5992** (28).



It has been reported that phenyl group has better hydrophobicity than short-chain alkyl groups (29). Hence, we developed an idea that the introduction of an substituted phenoxysulfenyl substituent into N'-tert-butyl-N,N'-diacylhydrazines by substituting the hydrogen on the N' atom could improve hydrophobicity and biological properties. Herein, we are reporting the synthesis and insecticidal activities of a series of novel N-substituted phenoxysulfenyl-N'-tert-butyl-N,N'-diacylhydrazines (III) as shown in Scheme 1.

IIIa $7.44 = 5.77 \text{ (m. 15H Ph)}$, 156 (s. 9H (COH ₃) IIIc $7.47 = 5.60 \text{ (m. 14H, Ph)}$, 226 (s. 9H (COH ₃) IIIc $7.47 = 5.60 \text{ (m. 14H, Ph)}$, 226 (s. 9H (COH ₃) IIIc $7.47 = 5.60 \text{ (m. 14H, Ph)}$, 226 (s. 9H (COH ₃) IIIc $7.47 = 5.70 \text{ (m. 14H, Ph)}$, 226 (s. 9H (COH ₃) IIIc $7.46 = 5.71 \text{ (m. 14H, Ph)}$, 226 (s. 9H, POHCH ₃), 228 (s. 9H, POHCH ₃), 126 (s. 9H, COH ₃), 122 (s. ^14m = 75 \text{ Hz}, 3H, POHCH ₃), 228 (s. 9H, POHCH ₃), 126 (s. 9H, COH ₃), 122 (s. ^14m = 75 \text{ Hz}, 3H, POHCH ₃), 228 (s. 9H, POHCH ₃), 126 (s. 9H, COH ₃), 122 (s. ^14m = 75 \text{ Hz}, 3H, POHCH ₃), 228 (s. 9H, POHCH ₃), 127 (s. 9H, OHCH ₃), 228 (s. 9H, POHCH ₃), 127 (s. 9H, OHCH ₃), 128 (s. 9H, POHCH ₃), 228 (s. 9H, POHCH ₃), 228 (s. 9H, POHCH ₃), 128 (s. 9H, POHCH ₃), 128 (s. 9H, POHCH ₃), 228 (s. 9H, POHCH ₃), 228 (s. 9H, POHCH ₃), 128 (s. 9H, POHCH ₃), 228 (s. 9H, POHCH ₃), 228 (s. 9H, POHCH ₃), 128 (s. 9H, POHCH ₃), 228 (s. 9H, POHCH ₃), 228 (s. 9H, POHCH ₃), 128 (s. 9H, POHCH ₃), 228 (s. 9H, POHCH ₃), 228 (s. 9H, POHCH ₃), 128 (s. 9H, OHCH ₃), 128 (s. 9H, OHC	compd	δ (ppm)
lic 7.47 – 6.60 (m, 144, Ph), 2.26 (n, 24, Pr. 75, Fz, 24, Pr. POH2(-H), 2.21 (n, 64, Pr. POH2(-H), 2.21 (n, 64, Pr. POH2(-H), 2.21 (n, 44, Pr. 75, Hz, 34, POH2(-H), 2.24 (n, 64, Pr. POH2(-H)), 2.24 (n, 64, Pr. POH2(-H		
IIId $7,12-6,77$ (m, 12H, Ph), 2.63 (n, $^{3}_{HH} = 7.5 Hz, 3H, PhCH(-Dh, h), 22 (s), 6H, PhCH(-Dh, 12), 24 (s), 6H, PhCH(-Dh, 12), 24 (s), 6H, PhCH(-Dh, 12), 24 (s), 74 (s$		
$ \begin{array}{c} {\rm PhiCH}_{3} 1, 153 (s, 9H, C(CH_3), 1.23 (t, ^{2}_{44}, = 7.5 Hz, 2H, PhiCH_{2}CH_3), 224 (s, 6H, PhiCH_{2}), 150 (s, 9H, C(CH_3), 1.24 (t, ^{2}_{44}, = 7.5 Hz, 2H, PhiCH_{2}CH_3), 222 (s, 6H, PhiCH_{2}), 156 (s, 9H, C(CH_3), 1.22 (t, ^{2}_{44}, = 7.5 Hz, 2H, PhiCH_{2}CH_3), 222 (s, 6H, PhiCH_{2}), 151 (s, 9H, C(CH_3), 122 (t, ^{2}_{44}, = 7.5 Hz, 2H, PhiCH_{2}CH_3), 222 (s, 6H, PhiCH_{2}), 151 (s, 9H, C(CH_3), 122 (t, ^{2}_{44}, = 7.5 Hz, 2H, PhiCH_{2}CH_3), 222 (s, 6H, PhiCH_{2}), 166 (s, 9H, C(CH_3), 122 (t, ^{2}_{44}, = 7.5 Hz, 2H, PhiCH_{2}CH_3), 222 (s, 6H, PhiCH_{2}), 166 (s, 9H, C(CH_3), 122 (t, ^{2}_{44}, = 7.5 Hz, 2H, PhiCH_{2}CH_3), 222 (s, 6H, PhiCH_{2}), 166 (s, 9H, C(CH_3), 123 (t, ^{2}_{44}, = 7.5 Hz, 2H, PhiCH_{2}CH_3), 223 (s, 6H, PhiCH_{2}), 166 (s, 9H, C(CH_3), 124 (t, ^{2}_{44}, = 7.5 Hz, 2H, PhiCH_{2}CH_3), 223 (s, 6H, PhiCH_{2}), 116 (s, 9H, C(CH_3)), 124 (t, ^{2}_{44}, = 7.5 Hz, 2H, PhiCH_{2}CH_3), 223 (s, 6H, PhiCH_{2}), 116 (s, 9H, C(CH_3)), 117 (s, 2H, PhiCH_{2}), 124 (s, 9H, PhiCH_{2}), 111 (t, ^{2}_{44}, = 7.5 Hz, 2H, PhiCH_{2}), 123 (t, ^{2}_{44}$		7.47—6.60 (m, 14H, Ph), 2.26 (s, 3H, PhCH ₃), 1.66 (s, 9H, C(CH ₃) ₃)
Ille 7.50–6.73 (m, 11H, Ph), 266 (n, ${}^{3}_{4,4} = -7.5$ Hz, 241, PiCH-Chb), 222 (s, 6H, PiCH-Chb) III 7.12–6.55 (m, 11H, Ph), 264 (n, ${}^{3}_{4,4} = -7.5$ Hz, 241, PiCH-Chb), 222 (s, 6H, PiCH-Dh), 12 (s, 9H, CCHb), 12 (s, 9H, PiCHcHb),	IIId	
Iff 7.12–6.55 (m, 11H, Ph), 264 (q, $^{3}_{MH} = 7.5$ Hz, 24H, PRCH2(b), 222 (s, 6H, PRCH2(b), 122 (1, $^{3}_{MH} = 7.5$ Hz, 24H, PRCH2(b), 222 (s, 6H, PRCH2(b), 12 (s, 9H, CCH2(b), 12 (s), 4H, CCH2(b), 12 (s), 4H, CCH2(b), 222 (s, 6H, PRCH2(b), 12 (s), 4H, CCH2(b), 12 (s), 4H, CCH2(b), 12 (s), 4H, CCH2(b), 222 (s, 6H, PRCH2(b), 16 (s), 9H, CCH2(b), 12 (s), 4H, CCH2(b), 222 (s, 6H, PRCH2(b), 16 (s), 9H, CCH2(b), 12 (s), 4H, CCH2(b), 222 (s), 6H, PRCH2(b), 16 (s), 9H, CCH2(b), 13 (s), 4H, CCH2(b), 223 (s), 6H, PRCH2(b), 16 (s), 9H, CCH2(b), 13 (s), 4H, CCH2(b), 223 (s), 6H, PRCH2(b), 16 (s), 9H, CCH2(b), 13 (s), 4H, CCH2(b), 223 (s), 6H, PRCH2(b), 176 (s), 9H, CCH2(b), 13 (s), 4H, CCH2(b), 223 (s), 6H, PRCH2(b), 177 (s), 9H, CCH2(b), 11 (s), 2H, CCH2(b), 223 (s), 6H, PRCH2(b), 13 (s), 4H, CCH2(b), 11 (s), 2H, CCH2(b), 223 (s), 6H, PRCH2(b), 13 (s), 9H, CCH2(b), 11 (s), 2H, CCH2(b), 223 (s), 6H, PRCH2(b), 13 (s), 9H, CCH2(b), 11 (s), 2H, CCH2(b), 223 (s), 6H, PRCH2(b), 13 (s), 9H, CCH2(b), 11 (s), 2H, CCH2(b), 220 (s), 9H, PRCH2(b), PRCH2(b), PRCH2(b), PRCH2(b), 220 (s), 9H, PRCH2(b), 120 (s), 9H, PRCH2(b), 220 (s), 9H, PRCH2(b), 120 (s), 9H, PRCH2(b), 220 (s), 9H, PRCH2(b), 220 (s), 9H, PRCH2(b), 221 (s), 6H, PRCH2(b), 223 (s), 6H, PRCH2(b), 225 (s), 6H, PRCH2(b), 226 (s), 9H, CCH2(b), 123 (s), 9H, CCH2(b)	llle	7.50–6.79 (m, 11H, Ph), 2.66 (q, ${}^{3}J_{HH} =$ 7.5 Hz, 2H, PhC H_{2} CH $_{3}$), 2.24 (s, 6H,
Ph(CH_b), 166 (s, 9H, C(CH_b), 122 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III731-6.77 (m, 114, Ph), 264 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.50 (m, 114, Ph), 264 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.50 (m, 114, Ph), 264 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.50 (m, 114, Ph), 264 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.50 (m, 114, Ph), 264 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III722-6.54 (m, 104, Ph), 264 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III722-6.54 (m, 104, Ph), 264 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.60 (m, 114, Ph), 263 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.60 (m, 114, Ph), 263 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.60 (m, 114, Ph), 263 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.60 (m, 114, Ph), 263 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.64 (m, 114, Ph), 263 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.64 (m, 114, Ph), 263 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.64 (m, 114, Ph), 263 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.64 (m, 114, Ph), 263 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.64 (m, 114, Ph), 263 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.64 (m, 114, Ph), 263 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.64 (m, 114, Ph), 263 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.64 (m, 114, Ph), 263 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)III700-6.64 (m, 114, Ph), 264 (t, $^{3}_{AH} = 7.5$ Hz, 2H, PhCH_CH_b)	1114	
$ \begin{array}{c} \mbox{lig} & 7.31-6.77 (m, 11H, Ph), 264 (a, ^3_{AH} = 7.8 Hz, 2H, PhCH_2CH_2) (b, CH_2) (b, PhCH_2CH_2) (c, CH_2) $	1111	
Ph(CH ₂), 161 (s, 9H, C(CH ₂), 122 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₂)III700-6.50 (m, 11H, Ph), 224 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₃)III700-6.50 (m, 11H, Ph), 226 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₃)III700-6.50 (m, 11H, Ph), 246 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₃)III725-6.54 (m, 10H, Ph), 246 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₃)III725-6.54 (m, 10H, Ph), 246 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₃)III700-6.50 (m, 9H, Ph), 249 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₃)III700-6.60 (m, 9H, Ph), 249 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₃)III700-6.60 (m, 11H, Ph), 263 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₃)III700-6.60 (m, 11H, Ph), 263 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₃)III700-6.60 (m, 11H, Ph), 263 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₃), 214 (t, 9H, PCH ₄)III700-6.64 (m, 11H, Ph), 263 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₃), 220 (s, 9H, PCH ₄)III700-6.64 (m, 11H, Ph), 263 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₃), 220 (s, 9H, PCH ₄), 221 (t, 6H, PICH ₃), 125 (t, $^{3}_{4m} = 7.5$ Hz, 3H, PCH ₄ CH ₃)III700-6.62 (m, 11H, Ph), 263 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PCH-CH ₃), 220 (s, 6H, PICH ₄), 216 (s, 3H, PCH ₅), 216 (s, 4H, PCH ₅), 216 (s, 6H, PICH ₅), 123 (t, $^{3}_{4m} = 7.5$ Hz, 3H, PCH ₄ CH ₃)III700-6.62 (m, 11H, Ph), 370 (s, 3H, OCH ₃), 256 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PDCH ₆ CH ₃)III700-6.63 (m, 11H, Ph), 370 (s, 3H, OCH ₃), 265 (s, 9H, C(CH ₃)), 112 (t, $^{3}_{4m} = 7.5$ Hz, 2H, PDCH ₆ CH ₃)III700-6.66 (m, 11H, Ph), 370 (s, 3H, OCH ₃), 265 (s, $^{3}_{4m} = 7.5$ Hz, 2H, PDCH ₆ CH ₃)IIII700-6.66	IIIa	$7.31-6.77$ (m 11H Ph) 2.64 (n $^{3}.h_{HI} = 7.8$ Hz 2H PhCH ₂ CH ₂) 2.22 (s 6H
IIIh 7.09–6.50 (m, 11H, Ph), 2.64 (a, $\frac{3}{2}_{4m} = 7.5$ Hz, 2H, PRCH2CH3, 12) III 7.00–6.60 (m, 11H, ph), 2.64 (a, $\frac{3}{2}_{4m} = 7.5$ Hz, 2H, PRCH2CH3, 12) (a, B) III 7.00–6.60 (m, 11H, ph), 2.64 (a, $\frac{3}{2}_{4m} = 7.5$ Hz, 2H, PRCH2CH3, 12) (a, B) PRCH2CH3, 12) PRCH2CH3, 12) (a, B) PRCH2CH3, 12) (a, B) PRCH2CH3, 12) PRCH2CH3, 12) (a, B) PRCH2CH3, 12) (a, B)		$Ph(CH_{2})_{2}$, 1.61 (s. 9H. $C(CH_{2})_{2}$), 1.22 (t. ${}^{3}J_{HH} = 7.8$ Hz. 3H. $PhCH_{2}CH_{2}$)
III Ph(CH_b), 126 (6, 9.H, C(CH_b), 122 (1, ${}^{3}J_{4H} = 7.5 Hz, 3H, PCH_CCH_b), 226 (6, 5H, PC(CH_b), 126 (1, {}^{3}J_{4H} = 7.5 Hz, 3H, PCH_CCH_b), 228 (6, 6H, Ph(CH_b), 126 (1, {}^{3}J_{4H} = 7.5 Hz, 3H, PCH_CCH_b), 228 (6, 6H, Ph(CH_b), 126 (1, {}^{3}J_{4H} = 7.5 Hz, 3H, PCH_CCH_b), 123 (1, {}^{3}J_{4H} = 7.5 Hz, 3H, PCH_CCH_b), 123 (1, {}^{3}J_{4H} = 7.5 Hz, 3H, PCH_CCH_b), 124 (1, {}^{3}J_{4H} = 7.5 Hz, 3H, PCH_CCH_b), 125 (1, {}^{3}J_{4H} = 7.5 Hz, 3H, PCH_CCH_b), 126 (1, {}^{3}J_{4H} = 7.5 Hz, 3H, PCH_CCH_b), 216 (3, {}^{3}J_{4H} = 7.5 Hz, 2H, PCH_CCH_b), 220 (s, 9H, PCH_CCH_b), 126 (1, {}^{3}J_{4H} = 7.5 Hz, 3H, PCH_CCH_b), 220 (s, 6H, PCH_CCH_b), 216 (s, 6H, PCH_CCH_b), 126 (1, {}^{3}J_{4H} = 7.5 Hz, 3H, PCH_CCH_b), 220 (s, 6H, PCH_CCH_b), 216 (s, 6H, PCH_CCH_b), 216 (s, 9H, CCH_b), 123 (1, {}^{3}J_{4H} = 7.5 Hz, 3H, PCH_CCH_b), 220 (s, 6H, PCH_CCH_b), 216 (s, 6H, PCH_CCH_b), 226 (s, 3H, PCH_CCH_b), 123 (1, {}^{3}J_{4H} = 7.5 Hz, 3H, PCH_CCH_b), 126 (1, {}^{3}J_{4H} = 7.5 Hz, 2H, PCH_CCH_b), 226 (s, 6H, PCH_CCH_b), 226 (s, 6H, PCH_CCH_b), 216 (s, 6H, PCH_CCH_b), 221 (s, 6H, PCH_CCH_b), 123 (1, {}^{3}J_{4H} = 7.5 Hz, 2H, PCH_CCH_b), 221 (s, 6H, PCH_CCH_b), 156 (s, 9H, CCH_b), 123 (t, {}^{3}J_{4H} = 7.5 Hz, 2H, PCH_CCH_b), 221 (s, 6H, PCH_CH_b), 156 (s, 9H, CCH_b), 116 (t, {}^{3}J_{4H} = 7.5 Hz, 2H, PCH_CCH_b), 222 (s, 6H, PCH_CH_b), 156 (s, 9H, CCH_b), 116 (t, {}^{3}J_{4H} = 7.5 Hz, 2H, PCH_CH_CCH_b), $	IIIh	$7.09-6.50$ (m, 11H, Ph), 2.64 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H,
IIIPh(CH_b): 166 (s. 9H. C(CH_b)). 123 (t. $^{2}A_{HF} = 7.5 Hz. 3H. PCH-CH-b).III725-654 (m. 10H. Ph): 264 (d. ^{3}A_{HF} = 7.5 Hz. 3H. PCH-CH-b).IIIK704-668 (m. 9H. Ph): 249 (t. ^{3}A_{HF} = 7.5 Hz. 3H. PCH-CH-b).IIIPh(CH_b): 176 (s. 9H. C(CH_b): 1.121 (t. ^{3}A_{HF} = 7.5 Hz. 3H. PCH-CH-b).III704-668 (m. 11H. Ph): 267 (t. ^{3}A_{HF} = 7.5 Hz. 3H. PCH-CH-b).III7.00-662 (m. 11H. Ph): 267 (t. ^{3}A_{HF} = 7.5 Hz. 3H. PCH-CH-b).III7.00-662 (m. 11H. Ph): 263 (t. ^{3}A_{HF} = 7.8 Hz. 2H. PCH-CH-b).PhCH-CH-b):and PCH-b).PhCH-CH-b):and PCH-b).IIIn7.00-664 (m. 11H. Ph): 263 (t. ^{3}A_{HF} = 7.5 Hz. 2H. PCH-CH-b).PhCH-CH-b):and PCH-b).PhCH-CH-b):and PCH-b).IIIn7.00-664 (m. 11H. Ph): 263 (t. ^{3}A_{HF} = 7.5 Hz. 2H. PhCH_CH-b).IIIn7.00-664 (m. 10H. Ph): 263 (t. ^{3}A_{HF} = 7.5 Hz. 2H. PhCH_CH-b).IIIn7.00-664 (m. 10H. Ph): 263 (t. ^{3}A_{HF} = 7.5 Hz. 2H. PhCH_CH-b).IIIn7.00-664 (m. 10H. Ph): 263 (t. ^{3}A_{HF} = 7.5 Hz. 2H. PhCH_CH-b).IIIn7.00-664 (m. 10H. Ph): 2.63 (t. ^{3}A_{HF} = 7.5 Hz. 2H. PhCH_CH-b).IIIn7.00-624 (m. 10H. Ph).20 (t. ^{3}A_{HF} = 7.5 Hz. 2H. PhCH_CH-b).IIIn7.00-622 (m. 11H. Ph).21 (t. ^{3}A_{HF} = 7.5 Hz. 2H. PhCH_CH-b).IIIn7.00-622 (m. 11H. Ph).22 (t. ^{3}A_{HF} = 7.5 Hz. 2H. PhCH_CH-b).IIIn7.00-623 (m. 11H. Ph).22 (t. ^{3}A_{HF} = 7.5 Hz. 2H. PhCH_CH-b).IIIn7.00-623 (m. 11H. Ph).22 (t. ^{3}A_{HF} = 7.5 Hz. 2H$		Ph(CH ₃) ₂), 1.66 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)
$ \begin{array}{c} \\ \\ (2.5) = -6.54 (m, 104, Ph), 2.64 (q, {}^{3}J_{44} = 7.5 Hz, 24), PhCH_{2}(Ch) \\ (2.5) = -7.5 + 2.54), PhCH_{2}(Ch) \\ \\ \\ (2.5) = -7.5 + 2.54), PhCH_{2}(Ch) \\ (2.5) = -7$	IIIi	
$ \begin{array}{c} C(H_{2})_{2}, 146 (s, 9H, C(CH_{3})_{2}, 124 (t, ^{3}_{4H} = 7.5 Hz, 2H, PPCH_{2}CH_{3}) \\ C(H_{3})_{2}, 1.76 (s, 9H, C(CH_{3})_{2}, 1.11 (t, ^{3}_{4H} = 7.5 Hz, 2H, PPCH_{2}CH_{3}) \\ C(H_{3})_{2}, 1.76 (s, 9H, C(CH_{3})_{2}, 1.11 (t, ^{3}_{4H} = 7.5 Hz, 2H, PPCH_{2}CH_{3}) \\ C(H_{3})_{2}, and PPCH_{3}), 1.53 (s, 9H, C(CH_{3})_{3}, 1.22 (t, ^{3}_{4H} = 7.8 Hz, 3H, PPCH_{2}CH_{3}) \\ C(H_{3})_{2}, and PPCH_{3}), 1.53 (s, 9H, C(CH_{3})_{3}, 1.22 (t, ^{3}_{4H} = 7.8 Hz, 3H, PPCH_{2}CH_{3}) \\ C(H_{3})_{2}, and PPCH_{3}), 1.55 (s, 9H, C(CH_{3})_{3}, 1.22 (t, ^{3}_{4H} = 7.8 Hz, 3H, PPCH_{2}CH_{3}) \\ C(H_{3})_{2}, and PPCH_{3}), 1.55 (s, 9H, C(CH_{3})_{3}, 1.22 (t, ^{3}_{4H} = 7.5 Hz, 2H, PPCH_{2}CH_{3}) \\ C(H_{3})_{2}, 2.16 (s, H, PP(CH_{3})_{2}), 1.53 (s, 9H, C(CH_{3})_{3}), 1.22 (t, ^{3}_{4H} = 7.5 Hz, 2H, PPCH_{2}CH_{3}) \\ C(H_{3})_{2}, 2.16 (s, H, PP(CH_{3})_{2}), 1.53 (s, 9H, C(H_{3}), 1.23 (t, ^{3}_{4H} = 7.5 Hz, 2H, PPCH_{2}CH_{3}) \\ C(H_{3})_{2}, 2.16 (s, 3H, PPCH_{3}), 2.03 (s, 3H, PCH_{3}), 1.23 (t, ^{3}_{4H} = 7.5 Hz, 2H, PPCH_{2}CH_{3}) \\ C(H_{3})_{2}, 2.16 (s, 3H, PPCH_{3}), 2.03 (s, 3H, PCH_{3}), 1.25 (t, ^{3}_{4H} = 7.5 Hz, 2H, PPCH_{2}CH_{3}) \\ C(H_{3})_{2}, 2.16 (s, 3H, PPCH_{3}), 2.03 (s, 3H, PCH_{3}), 1.25 (t, ^{3}_{4H} = 7.5 Hz, 2H, PPCH_{3}), 2.26 (s, 6H, PP(CH_{3})) \\ $:	Ph(CH ₃) ₂), 1.66 (s, 9H, C(CH ₃) ₃), 1.23 (t, ${}^{\circ}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃),
IIIk 7.04 = 6.86 (m, 9H, Ph), 2.49 (m, ${}^{3}J_{eH} = 7.5 Hz, 2H, PhCH_{C}CH_{3}), 2.25 (s, 6H, Ph(CH_{3}), 1.75 (s, 9H, C(CH_{3}), 1.11 (t, {}^{3}J_{eH} = 7.5 Hz, 2H, PhCH_{C}CH_{3}), 2.04 (s, 9H, Ph(CH_{2}), 1.26 (t, {}^{3}J_{eH} = 7.8 Hz, 2H, PhCH_{C}CH_{3}), 2.04 (s, 9H, Ph(CH_{2}), 2.05 (s, 9H, Ph(CH_{2}), 2.05 (s, 9H, Ph(CH_{2}), 2.06 (s, 9H, Ph(CH_{2}), 2.06 (s, 9H, Ph(CH_{2}), 2.06 (s, 9H, CCH_{3}), 1.22 (t, {}^{3}J_{eH} = 7.8 Hz, 2H, PhCH_{C}CH_{3}), 2.06 (s, 9H, Ph(CH_{2}), 2.06 (s, 9H, Ph(CH_{2}), 2.06 (s, 9H, CCH_{3}), 2.20 (s, 9H, Ph(CH_{2}), 2.01 (s, 9H, PhCH_{C}CH_{3}), 2.20 (s, 9H, PhCH_{C}CH_{3}), 2.21 (s, 6H, Ph(CH_{2}), 2.16 (s, 6H, Ph(CH_{2}), 2.16 (s, 6H, Ph(CH_{2}), 2.16 (s, 6H, Ph(CH_{2}), 2.16 (s, 9H, CCH_{3}), 2.20 (s, 6H, Ph(CH_{2}), 2.21 (s, 6H, Ph(CH_{2}), 2.16 (s, 9H, PC(CH_{3}), 1.23 (t, {}^{3}J_{eH} = 7.5 Hz, 2H, PhCH_{C}CH_{3}), 2.20 (s, 6H, Ph(CH_{2}), 2.16 (s, 3H, PhCH_{2}CH_{3}), 2.20 (s, 6H, Ph(CH_{2}), 2.16 (s, 3H, PhCH_{2}CH_{3}), 1.65 (s, 9H, CC(CH_{3}), 1.18 (t, {}^{3}J_{eH} = 7.5 Hz, 2H, PhCH_{C}CH_{3}), 2.21 (s, 6H, Ph(CH_{2}), 2.16 (s, 9H, CC(CH_{3}), 1.16 (t, {}^{3}J_{eH} = 7.5 Hz, 2H, PhCH_{C}CH_{3}), 2.25 (s, 6H, Ph(CH_{2}), 2.16 (s, 9H, CC(CH_{3})), 1.18 (t, {}^{3}J_{eH} = 7.5 Hz, 2H, PhCH_{C}CH_{3}), 2.25 (s, 6H, Ph(CH_{2}), 1.16 (s, 9H, CC(CH_{3})), 1.18 (t, {}^{3}J_{eH} = 7.5 Hz, 2H, PhCH_{C}CH_{3}), 2.21 (s, 6H, Ph(CH_{2}), 1.16 (s, 9H, CC(CH_{3})), 1.18 (t, {}^{3}J_{eH} = 7.5 Hz, 2H, PhCH_{C}CH_{3}), 2.22 (s, 6H, PhCH_{C}CH_{3}), 2.21 (s, 6H, Ph(CH_{2}), 2.21 (s, 6H, Ph(CH_{2})), 1.16 (s, 9H, CC(CH_{3})), 1.12 (t, {}^{3}J_{eH} = 7.5 Hz, 2H, PhCH_{C}CH_{3}), 2.22 (s, 6H, Ph(CH_{C}CH_{3})), 1.15 (t, 9H, CC(CH_{3})), 1.12 (t, {}^{3}J_{eH} = 7.5 Hz, 2H, PhCH_{C}CH_{3}), 2.22 (s, 6H, Ph(CH_{C}CH_{3})), 1.55 (s, 9H, CC(CH_{3})), 1.22 (t, {}^{3}J_{eH} = 7.5 Hz, 2H, PhCH_{C}CH_{3}), 2.22 (t, 6H, Ph(CH_{3})), 1.56 (t, 9H, C(CH_{3})), 1.22 (t, {}^{3}J_{eH} = 7.5 Hz, 2H, PhCH_{C}CH_{3}), 2.21 (t, {}^{3}H_{H} = 7.5 Hz, 2H, PhCH$	111j	
$ \begin{array}{c} PP(CH_0)_{2}, 176 (s, 9H, CC(CH_0)_{3}, 111 (t, ^3_{4H} = 7.5 Hz, 3H, PP(CH_0), 2.14 (s, 9H, PP(CH_0)_{2} and PP(CH_0)_{3}, 1.25 (t, ^3_{4H} = 7.5 Hz, 3H, PP(CH_0), 2.14 (s, 9H, PP(CH_0)_{2} and PP(CH_0), 1.53 (s, 9H, C(CH_0)_{3}), 1.25 (t, ^3_{4H} = 7.8 Hz, 3H, PP(CH_0)_{2} and PP(CH_0), and PP(CH_0)_{3}, and PP(CH_0)_{3}, 1.25 (t, ^3_{4H} = 7.8 Hz, 3H, PP(CH_0)_{3}, and PP(CH_0)_{3}, and PP(CH_0)_{3}, and PP(CH_0)_{3}, and PP(CH_0)_{3}, 1.25 (t, ^3_{4H} = 7.5 Hz, 3H, PP(CH_0)_{4}, and PP(CH_0)_{$	llik	$7.04 - 6.68$ (m, 9H, Ph), 2.49 (g, $3J_{\mu\mu} = 7.5$ Hz, 2H. PhCH ₂ CH ₃). 2.25 (s. 6H.
III 7:30 – 6.62 (m, 11H, Ph), 2.67 (n, ${}^{3}_{4}$, ${}^{4}_{4}$, 7.5 Hz, 2.2H, PhCH ₂ OH ₃), 2.14 (s, 9H, PhCH ₂ OH ₃) IIIm PhCH ₂ OH ₃ 2.67 (n, ${}^{3}_{4}$, ${}^{3}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{3}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{3}_{4}$, ${}^{3}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, ${}^{3}_{4}$, ${}^{2}_{4}$, ${}^{3}_{4}$, 3		
IIIm 7.09-6.60 (m, 11H, Ph), 2.63 (g, ${}^{3}_{} + =7.8$ Hz, 2H, PhCH ₂ CH ₃), 2.20 (s, 9H, PhCH ₂ CH ₃) and PhCH ₃), 1.55 (s, 9H, QCH ₃), 1.22 (t, ${}^{3}_{}$ Hz, 3H, PhCH ₂ CH ₃) IIIn 7.00-6.64 (m, 11H, Ph), 2.63 (g, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃), 2.26 (s, 3H, PhCH ₂ CH ₃) IIIn 7.00-6.64 (m, 11H, Ph), 2.63 (g, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃), 2.26 (s, 3H, PhCH ₃), 2.21 (s, 6H, Ph(CH ₃)), 1.23 (t, ${}^{3}_{}$ Hz, 7.5 Hz, 3H, PhCH ₃ D, 2.21 (s, 6H, PhCH ₂ CH ₃), 1.23 (t, ${}^{3}_{}$ Hz, 7.5 Hz, 2H, PhCH ₂ CH ₃), 1.22 (t, ${}^{3}_{}$ Hz, 7.5 Hz, 2H, PhCH ₂ CH ₃), 2.26 (s, 6H, Ph(CH ₃)), 2.15 (s, 3H, PhCH ₃), 2.09 (s, 3H, PhCH ₃), 2.16 (s, 9H, C(CH ₃)), 1.22 (t, ${}^{3}_{}$ Hz, 7.5 Hz, 2H, PhCH ₂ CH ₃), 1.25 (t, ${}^{3}_{}$ Hz, PhCH ₂ CH ₃), 1.22 (t, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃), 1.22 (t, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃), 1.25 (s, 9H, C(CH ₃)), 1.18 (t, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃), 2.25 (s, 6H, Ph(CH ₃)), 1.65 (s, 9H, C(CH ₃)), 1.21 (t, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃) IIIq 7.10-6.26 (m, 11H, Ph), 3.71 (s, 3H, OCH ₃), 2.63 (t, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃)), 1.65 (s, 9H, C(CH ₃)), 1.22 (t, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃) IIIq 7.10-6.26 (m, 11H, Ph), 3.71 (s, 3H, OCH ₃), 2.63 (t, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃)), 1.65 (s, 9H, C(CH ₃)), 1.22 (t, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃)), 1.22 (t, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃) IIIq 7.0-6.67 (m, 7H, Ph), 6.67 (t, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (t, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (t, ${}^{3}_{}$ Hz, 2H, PhCH ₂ CH ₃) IIIt	1111	
IIIm 7.09-6.60 ² (m, 11H, Ph), 2.63 (g, ${}^{3}_{dett} = -7.8$ Hz, 2H, PhC/HC/H3), 2.20 (g, 9H, PhC/H2/H3), 1.65 (g, 9H, CC/H3)3), 1.22 (t, ${}^{3}_{dett} = -7.8$ Hz, 3H, PhC/H2/H3) IIIn 7.00-6.64 (m, 11H, Ph), 2.63 (g, ${}^{3}_{dett} = 7.5$ Hz, 2H, PhC/H2/H3), 2.26 (g, 3H, PhC/H2/H3), 2.11 (g, 6H, Ph(C/H2)3), 1.23 (t, ${}^{3}_{dett} = -7.5$ Hz, 3H, PhC/H2/H3) IIIo 7.00-6.64 (m, 10H, Ph), 2.63 (g, ${}^{3}_{dett} = 7.5$ Hz, 2H, PhC/H2/H3), 2.20 (s, 6H, PhC/H2/H3), 2.21 (s, 6H, PhC/H2/H3), 2.09 (s, 3H, PhC/H2/H3), 2.20 (s, 6H, PhC/H2/H3), 2.12 (t, 53, HP, PC/H2/H3), 2.09 (s, 3H, PhC/H2/H3), 2.12 (t, 53, HP, PC/H2/H4), 2.09 (s, 3H, PhC/H2/H3), 2.25 (g, 6H, PhC/H2/H3), 2.25 (g, 6H, PhC/H2/H3), 2.25 (g, 3H, PHC/H2/H3), 2.25 (g, 3H, PHC/H2/H3), 2.25 (g, 3H, PHC/H2/H3), 1.22 (t, ${}^{3}_{dett} = 7.5$ Hz, 2H, PhC/H2/H3), 122 (t, 52 (s, 6H, PhC/H2/H2)), 1.65 (s, 9H, C(C/H3)), 1.18 (t, ${}^{3}_{dett} = -7.5$ Hz, 3H, PhC/H2/H4, 2I (s, 6H, PhC/H2/H2), 1.65 (s, 9H, C(C/H3)), 1.22 (t, ${}^{3}_{dett} = -7.5$ Hz, 3H, PhC/H2/CH3), 2.21 (s, 6H, PhC/H2/H2), 1.65 (s, 9H, C(C/H3)), 1.22 (t, ${}^{3}_{dett} = -7.5$ Hz, 3H, PhC/H2/CH3), 2.22 (s, 6H, PhC/H2/H2), 1.65 (s, 9H, C(C/H3)), 1.22 (t, ${}^{3}_{dett} = -7.5$ Hz, 3H, PhC/H2/CH3), 2.22 (s, 6H, PhC/H2/H2), 1.65 (s, 9H, C(C/H3)), 1.22 (t, ${}^{3}_{dett} = -7.5$ Hz, 3H, PhC/H2/CH3), 1.65 (s, 9H, C(C/H3)), 1.22 (t, ${}^{3}_{dett} = -7.5$ Hz, 3H, PhC/H2/CH3), 2.21 (s, 6H, PhC(H3/H2), 1.63 (s, 9H, C(C/H3)), 1.22 (t, ${}^{3}_{dett} = -7.5$ Hz, 3H, PhC/H2/CH3), 1.65 (s, 9H, C(C/H3)), 1.22 (t, ${}^{3}_{dett} = -7.5$ Hz, 3H, PhC/H2/CH3), 2.21 (s, 6H, PhC(H3/H2), 1.63 (s, 9H, C(C/H3)), 1.22 (t, ${}^{3}_{dett} = -7.5$ Hz, 3H, PhC/H2/CH3) IIIs 7.76-6.76 (m, 11H, Ph), 3.31 (s, 3H, OCH3), 2.59 (q, ${}^{3}_{dett} = -7.5$ Hz, 3H, PhC/H2/CH3), 2.22 (s, 6H, Ph(C/H3)), 1.20 (t, ${}^{3}_{dett} = -7.5$ H		Ph(CH ₃) ₂ and PhCH ₃), 1.63 (s, 9H, C(CH ₃) ₃), 1.25 (t, ${}^{3}J_{HH} = 7.8$ Hz, 3H,
$ \begin{array}{c} {\sf Ph}(CH_0)_2 \mbox{ and } {\sf Ph}(CH_0)_1 \mbox{ 1.55} (s, 9H, C(CH_0)_3), 1.22 (t, {}^3J_{eH} = 7.5 Hz, 3H, \\ {\sf Ph}(CH_0CH_0) \\ {\sf T}(0-6.64 (m, 11H, Ph), 2.63 (q, {}^3J_{eH} = 7.5 Hz, 2H, PhCH_0CH_0)_1, 2.26 (s, 3H, \\ {\sf Ph}(CH_0), 2.21 (s, 6H, Ph(CH_0)_2), 1.64 (s, 9H, C(CH_0)_3), 1.23 (t, {}^3J_{eH} = 7.5 Hz, \\ {\sf 3H}, PhCH_0CH_0), 2.21 (s, 6H, Ph(CH_0)_2), 1.64 (s, 9H, C(CH_0)_3), 1.23 (t, {}^3J_{eH} = 7.5 Hz, \\ {\sf 3H}, PhCH_0CH_0), 2.21 (s, 6H, PhCH_0), 2.09 (s, 3H, PhCH_0), 1.66 (s, 9H, C(CH_0)_3), \\ {\sf 122} (t, {}^3J_{eH} = 7.5 Hz, 3H, PhCH_0CH_0), 2.05 (q, {}^3J_{eH} = 7.5 Hz, 2H, \\ {\sf Ph}(CH_0), 2.25 (s, 6H, Ph(CH_0)), 2.16 (s, 9H, C(CH_0)_3), 1.18 (t, {}^3J_{eH} = 7.5 Hz, 2H, \\ {\sf Ph}CH_0CH_0), 2.25 (s, 6H, Ph(CH_0)), 2.16 (s, 9H, C(CH_0)_3), 1.18 (t, {}^3J_{eH} = 7.5 Hz, 3H, \\ {\sf Ph}CH_0CH_3), 2.21 (s, 6H, Ph(CH_0)), 1.65 (s, 9H, C(CH_0)_3), 1.22 (t, {}^3J_{eH} = 7.5 Hz, 2H, \\ {\sf Ph}CH_0CH_3), 2.21 (s, 6H, Ph(CH_0)), 2.16 (s, 9H, C(CH_0)_3), 1.22 (t, {}^3J_{eH} = 7.5 Hz, 3H, \\ {\sf Ph}CH_0CH_3), 2.21 (s, 6H, Ph(CH_0)), 2.63 (s, 9H, C(CH_0)), 1.22 (t, {}^3J_{eH} = 7.5 Hz, 3H, \\ {\sf Ph}CH_0CH_3), 2.21 (s, 6H, Ph(CH_0)), 2.62 (q, {}^3J_{eH} = 7.5 Hz, 2H, \\ {\sf Ph}CH_0CH_3), 2.21 (s, 6H, Ph(CH_0)), 1.65 (s, 9H, C(CH_0)), 1.22 (t, {}^3J_{eH} = 7.5 Hz, 3H, \\ {\sf Ph}CH_0CH_3), 2.21 (s, 6H, Ph(CH_0)), 1.62 (s, 9H, C(CH_0)), 1.22 (t, {}^3J_{eH} = 7.5 Hz, 3H, \\ {\sf Ph}CH_0CH_3), 2.21 (s, 6H, Ph(CH_0)), 1.62 (s, 9H, C(CH_0)), 1.22 (t, {}^3J_{eH} = 7.5 Hz, 2H, \\ {\sf Ph}CH_0CH_3), 2.21 (s, 6H, Ph(CH_0)), 1.62 (s, 9H, C(CH_0)), 1.21 (t, {}^3J_{eH} = 7.5 Hz, 2H, \\ {\sf Ph}CH_0CH_2CH_3) \\ {\sf III} \\ {\sf T}, {\sf T}^{-6-5.66} (m, 11H, Ph), 3.91 (s, 3H, OCH_3), 2.59 (q, {}^3J_{eH} = 7.5 Hz, 2H, \\ {\sf Ph}CH_0CH_0CH_3) \\ {\sf H}, PhCH_0CH_3) \\ {\sf L}, {\sf H}, PhCH_2CH_3) \\ {\sf H},$		
$ \begin{array}{c} {\rm PhCH}_{\mathbb{C}}CH_{2}, \\ {\rm IIIn} & 7.00-6.64 \ (m, 11H, Ph), 2.63 \ (q, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{C}CH_{3}), 2.26 \ (s, 3H, PhCH_{3}), 2.21 \ (s, 6H, PhCH_{5})_{2}), 1.64 \ (s, 9H, C(CH_{3})_{3}), 1.23 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 3H, PhCH_{2}CH_{3}), 2.16 \ (s, 3H, PhCH_{3}), 1.23 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 3H, PhCH_{2}CH_{3}), 2.16 \ (s, 3H, PhCH_{3}), 2.09 \ (s, 3H, PhCH_{3}), 1.65 \ (s, 9H, C(CH_{3})_{3}), 1.22 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 3H, PhCH_{2}CH_{3}), 2.25 \ (s, 6H, PhCH_{3}), 2.25 \ (s, 6H, PhCH_{3}), 2.25 \ (s, 6H, PhCH_{3}), 2.17 \ (s, 3H, OCH_{3}), 2.26 \ (q, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 2.25 \ (s, 6H, PhCH_{3}), 1.18 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 2.25 \ (s, 6H, PhCH_{3}), 1.18 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 2.21 \ (s, 6H, Ph(CH_{3})_{2}), 1.65 \ (s, 9H, C(CH_{3})_{3}), 1.12 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 2.21 \ (s, 6H, Ph(CH_{3})_{2}), 1.65 \ (s, 9H, C(CH_{3})_{3}), 1.22 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 2.22 \ (s, 6H, Ph(CH_{3})_{2}), 1.65 \ (s, 9H, C(CH_{3})_{3}), 1.22 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 2.22 \ (s, 6H, Ph(CH_{3})_{2}), 2.22 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 2.22 \ (s, 6H, Ph(CH_{3})_{2}), 1.65 \ (s, 9H, C(CH_{3})_{3}), 1.22 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 2.22 \ (s, 6H, Ph(CH_{3})_{2}), 1.65 \ (s, 9H, C(CH_{3})_{3}), 1.22 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 2.22 \ (s, 6H, Ph(CH_{3})_{2}), 1.65 \ (s, 9H, C(CH_{3})_{3}), 1.22 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 1.22 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 1.22 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 1.22 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 1.22 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 1.22 \ (t, {}^{3}_{d_{H^{+}}} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 1.22 \ (t, {}^{3}$	IIIm	
IIIn $7.00^{-6}.64^{2}$ (m, 11H, Ph), 2.63 (q, ${}^{3}_{AHH} = 7.5 Hz, 2H, PhCH2CH3), 2.28 (s, 3H, PhCH2CH3), 2.1 (s, 6H, PhC(H3)), 1.23 (t, {}^{3}_{AHH} = 7.5 Hz, 3H, PhCH2CH3), 2.1 (s, 6H, PhC(H3)), 2.1 (s, 9H, CCH3)), 1.23 (t, {}^{3}_{AHH} = 7.5 Hz, 3H, PhCH2CH3), 1.18 (t, S, 9H, CCH3)), 1.16 (s, 9H, CCH3)), 1.12 (t, {}^{3}_{AHH} = 7.5 Hz, 3H, PhCH2CH3), 1.16 (s, 9H, CCH3)), 1.16 (s, 9H, CCH3)), 1.12 (t, {}^{3}_{AHH} = 7.5 Hz, 2H, PhCH2CH3), 2.25 (s, 6H, PhCH2CH3), 2.25 (s, 6H, PhCH2CH3), 2.25 (s, 6H, PhCH2CH3), 1.15 (t, {}^{3}_{AHH} = 7.5 Hz, 2H, PhCH2CH3), 2.25 (s, 6H, PhCH2CH3), 2.25 (s, 6H, PhCH2CH3), 1.15 (t, {}^{3}_{AHH} = 7.5 Hz, 2H, PhCH2CH3), 2.12 (t, {}^{3}_{AHH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (t, {}^{3}_{AH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (t, {}^{3}_{AH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (t, {}^{3}_{AHH} = 7.5 Hz, 3H, PhCH2CH3), 2.22 (t, {}^{3}_{AHH} = 7.5 Hz, 2H, PhCH2CH3), 1.22 (t, {}^{3}_{AHH} = 7.5 Hz, 3H, PhCH2CH3), 2.21 (t, {}^{3}_{AHH} = 7.5 Hz, 2H, PhCH2CH3), 1.22 (t, {}^{3}_{AHH} = 7.5 Hz, 2H, PhCH2CH3), 1.22 (t, {}^{3}_{AHH} = 7.5 Hz, 2H, PhCH2CH3), 2.21 (t, {}^{3}_{AHH} = 7.5 Hz, 2H, PhCH2CH3), 2.21 (t, {}^{3}_{AHH} = 7.5 Hz, 2H, PhCH2CH3), 2.21 (t, {}^{3}_{AHH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (t, {}^{3}_{AH} = 7.5 Hz, 2H, PhCH2CH3), 1.20 (t, {}^{3}_{AHH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (t, {}^{3}_{AH} = 7.5 Hz, 2H, PhCH2CH3), 1.22 (t, {}^$		
PhCH ₃), 2:21 (s, 6H, Ph(CH ₃) ₂), 1.64 (s, 9H, C(CH ₃) ₃), 1.23 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃), 7.05 = 6.48 (m, 10H, Ph), 2.63 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.20 (s, 6H, Ph(CH ₃) ₂), 2.16 (s, 3H, PhCH ₃), 2.09 (s, 3H, PhCH ₃), 1.66 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) 1.29 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) 1.29 (s, 6H, Ph(CH ₃) ₂), 1.55 (s, 9H, C(CH ₃) ₃), 1.12 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) 1.12 (t, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.25 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.13 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)Illq7.10 = 6.29 (m, 11H, Ph), 3.70 (s, 3H, OCH ₃), 2.63 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)Illr7.04 = 6.70 (m, 7H, Ph), 6.67 (d, ${}^{3}J_{HH} = 0.0$ Hz, 2H, Ph), 6.59 (d, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)Ills7.76 = -6.76 (m, 11H, Ph), 3.86 (s, 3H, OCH ₃), 2.62 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃) ₂), 1.62 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)Illt7.76 = -6.56 (m, 11H, Ph), 3.91 (s, 3H, OCH ₃), 2.59 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃) ₂), 1.67 (s, 9H, C(CH ₃) ₃), 1.20 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)Illv7.88 = -6.86 (m, 11H, Ph), 3.90 (s, 3H, OCH ₃), 2.64 (q, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)Illv7.88 = -6.80 (m, 11H, Ph), 3.70 -6.70 (m, 9H, Ph), 2.64 (q, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)Illv7.84	Ilin	
IIIo $7.05-6.46$ (m, 10H, Ph), 2.63 (q, ${}^{3}_{AH1} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.20 (s, 6H, Ph(CH ₃) ₂), 2.16 (s, 9H, CCH ₃) ₂), 1.22 (t, ${}^{3}_{AH1} = 7.5$ Hz, 2H, PhCH ₂ O, H ₃)IIIp $6.99-6.65$ (m, 11H, Ph), 3.71 (s, 3H, OCH ₃), 2.56 (q, ${}^{3}_{AH1} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.25 (s, 6H, Ph(CH ₂) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.18 (t, ${}^{3}_{AH1} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIq $7.10-6.29$ (m, 11H, Ph), 3.70 (s, 3H, OCH ₃), 2.63 (q, ${}^{3}_{AH1} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}_{AH1} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIr $7.0-6.29$ (m, 71H, Ph), 6.67 (d, ${}^{3}_{AH1} = 9.0$ Hz, 2H, Ph), 6.59 (d, ${}^{3}_{AH1} = 9.0$ Hz, 2H, Ph), 3.74 (s, 3H, OCH ₃), 2.62 (q, ${}^{3}_{AH1} = 7.5$ Hz, 3H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}_{AH1} = 9.0$ Hz, 2H, Ph), 3.74 (s, 3H, OCH ₃), 2.62 (q, ${}^{3}_{AH1} = 7.5$ Hz, 3H, PhCH ₂ CH ₃), 2.22 (s, 6H, PhCH ₂ CH ₃), 2.21 (s, 6H, PhCH ₂ CH ₃), 2.22 (t, ${}^{3}_{AH1} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIt $7.76-6.56$ (m, 11H, Ph), 3.96 (s, 3H, OCH ₃), 2.59 (q, ${}^{3}_{AH1} = 7.5$ Hz, 2H, PhCH ₂ CH ₃)IIIt $7.76-6.56$ (m, 11H, Ph), 3.91 (s, 3H, OCH ₃), 2.59 (q, ${}^{3}_{AH1} = 7.5$ Hz, 2H, PhCH ₂ CH ₃)IIIt $7.76-6.56$ (m, 11H, Ph), 3.91 (s, 3H, OCH ₃), 2.59 (q, ${}^{3}_{AH1} = 7.5$ Hz, 2H, PhCH ₂ CH ₃)IIIt $7.76-6.56$ (m, 11H, Ph), 3.91 (s, 3H, OCH ₃), 2.64 (q, ${}^{3}_{AH1} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIt $7.76-6.56$ (m, 11H, Ph), 3.90 (s, 3H, OCH ₃), 2.64 (q, ${}^{3}_{AH1} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)<		
$ \begin{array}{lllll} \begin{tabular}{llll} Ph(CH_0)_2, 2.16 (s, 3H, PhCH_0), 2.09 (s, 3H, PhCH_0), 1.66 (s, 9H, C(CH_0)_3), 1.22 (t, {}^3_{dH1} = 7.5 Hz, 3H, PhCH_0CH_0), 1.25 (s, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0), 2.29 (s, 6H, Ph(CH_0)_2), 1.65 (s, 9H, C(CH_0)_3), 1.18 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0), 2.25 (s, 6H, Ph(CH_0)_2), 1.65 (s, 9H, C(CH_0)_3), 1.28 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0), 2.21 (s, 6H, Ph(CH_0)_2), 1.65 (s, 9H, C(CH_0)_3), 1.22 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0), 2.21 (s, 6H, Ph(CH_0)_2), 1.65 (s, 9H, C(CH_0)_3), 1.22 (t, {}^3_{dH1} = 7.5 Hz, 3H, PhCH_2CH_0), 2.21 (s, 6H, Ph(CH_0)_2), 1.65 (s, 9H, C(CH_0)_3), 1.22 (t, {}^3_{dH1} = 9.0 Hz, 2H, Ph), 6.57 (d, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0), 2.22 (s, 6H, Ph(CH_0)_2), 1.65 (s, 9H, C(CH_0)_3), 1.22 (t, {}^3_{dH1} = 7.5 Hz, 3H, PhCH_2CH_0), 2.22 (s, 6H, Ph(CH_0)_2), 1.65 (s, 9H, C(CH_0)_3), 1.22 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0), 2.21 (s, 6H, Ph(CH_0)_2), 1.62 (s, 9H, C(CH_0)_3), 1.22 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0), 2.21 (s, 6H, Ph(CH_0)_2), 1.62 (s, 9H, C(CH_0)_3), 1.22 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0) , 2.15 (s, 6H, Ph(CH_0)_2), 1.62 (s, 9H, C(CH_0)_3), 1.22 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0), 2.21 (s, 6H, Ph(CH_0)_2), 1.62 (s, 9H, C(CH_0)_3), 1.22 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0) , 2.21 (s, 6H, Ph(CH_0)_2), 1.62 (s, 9H, C(CH_0)_3), 1.20 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0), 2.21 (s, 6H, Ph(CH_0)_2), 1.67 (s, 9H, C(CH_0)_3), 1.20 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0) , 2.21 (s, 6H, Ph(CH_0)_2), 1.63 (s, 9H, C(CH_0)_3), 1.24 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0) , 2.21 (s, 6H, Ph(CH_0)_2), 1.60 (s, 9H, C(CH_0)_3), 1.24 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0) , 2.22 (z, (s, 6H, Ph(CH_0)_2), 1.64 (s, 9H, C(CH_0)_3), 1.24 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0) , 2.22 (z, (s, 6H, Ph(CH_0)_2), 1.64 (s, 9H, C(CH_0)_3), 1.24 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0) , 2.22 (z, (s, 6H, Ph(CH_0)_2), 1.68 (s, 9H, C(CH_0)_3), 1.19 (t, {}^3_{dH1} = 7.5 Hz, 2H, PhCH_2CH_0) , 2.22 (z, (s, 0$		
$ \begin{array}{c} 1.22 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH_{2}CH_{3}) \\ 1.12 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH_{2}CH_{3}) \\ 2.56 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH_{2}CH_{3}) \\ 2.55 (s, 6H, Ph(CH_{3})_{2}), 1.65 (s, 9H, C(CH_{3})_{3}), 1.18 (t, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH_{2}CH_{3}) \\ 1.19 (The CH_{2}CH_{3}) \\ 1.19 (The CH_{2}CH_{3}) \\ 1.10 - 6.29 (m, 11H, Ph), 3.70 (s, 3H, OCH_{3}), 2.63 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH_{2}CH_{3}) \\ 1.10 - 6.29 (m, 11H, Ph), 3.70 (s, 3H, OCH_{3}), 2.63 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH_{2}CH_{3}) \\ 1.11 (The CH_{2}CH_{3}) \\ 1.11 (The CH_{2}CH_{3}) \\ 1.11 (The CH_{2}CH_{3}) \\ 1.12 (t, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH_{2}CH_{3}) \\ 2.22 (s, 6H, Ph(CH_{3})_{2}), 1.65 (s, 9H, C(CH_{3})_{3}), 1.22 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH_{2}CH_{3}) \\ 2.22 (s, 6H, Ph(CH_{3})_{2}), 1.65 (s, 9H, C(CH_{3})_{3}), 1.22 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH_{2}CH_{3}) \\ 2.22 (s, 6H, Ph(CH_{3})_{2}), 1.65 (s, 9H, C(CH_{3})_{3}), 1.22 (t, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH_{2}CH_{3}) \\ 2.22 (s, 6H, Ph(CH_{3})_{2}), 1.62 (s, 9H, C(CH_{3})_{3}), 1.22 (t, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH_{2}CH_{3}) \\ 2.21 (s, 6H, Ph(CH_{3})_{2}), 1.62 (s, 9H, C(CH_{3})_{3}), 1.22 (t, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH_{2}CH_{3}) \\ 1.11 (The CH_{2}CH_{3}) \\ 1.12 (The CH_{2}CH_{3}) \\ 1.12 (The CH_{3}CH_{3}) \\ 1.11 (The CH_{3}CH_{3}) \\ 1.$	Illo	
IIIp $6.99-6.65$ (m, 11H, Ph), 3.71 (s, 3H, OCH_3), 2.56 (q, ${}^{3}J_{eHt} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.25 (s, 6H, Ph(CH ₃) ₂), 1.55 (s, 9H, C(CH ₃) ₃), 1.18 (t, ${}^{3}J_{eHt} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIq7.10-6.29 (m, 11H, Ph), 3.70 (s, 3H, OCH ₃), 2.63 (q, ${}^{3}J_{eHt} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃) ₂), 1.55 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{eHt} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIr7.04-6.70 (m, 7H, Ph), 6.67 (d, ${}^{3}J_{eHt} = 9.0$ Hz, 2H, Ph), 6.59 (d, ${}^{3}J_{eHt} = 9.0$ Hz, 2H, Ph), 3.74 (s, 3H, OCH ₃), 2.62 (q, ${}^{3}J_{eHt} = 7.5$ Hz, 3H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{eHt} = 7.5$ Hz, 3H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{eHt} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{eHt} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃) ₂), 1.62 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{eHt} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃) ₂), 1.62 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{eHt} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIt7.76-6.76 (m, 11H, Ph), 3.91 (s, 3H, OCH ₃), 2.59 (q, ${}^{3}J_{eHt} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃) ₂), 1.67 (s, 9H, C(CH ₃) ₃), 1.20 (t, ${}^{3}J_{eHt} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIu7.88-6.62 (m, 11H, Ph), 3.90 (s, 3H, OCH ₃), 2.64 (q, ${}^{3}J_{eHt} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIu7.54-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, ${}^{3}J_{eH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIv7.68-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH ₃)CH ₂), 3.1-3.19 (m, 1H, PhOCH ₃), 1.69 (s, 9H, C(CH ₃) ₃), 1.59-1.41 (m, 6H, PhOCH(CH ₃)CH ₂), 2.27 (s, 6H, Ph(CH ₃) Ph(CH ₃), 1.69 (s, 9H,		
PhCH ₂ CH ₃), 2.25 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.18 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)Iliq7.10-6.29 (m, 11H, Ph), 3.70 (s, 3H, OCH ₃), 2.63 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.12 (t, 6, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)Ilir7.04-6.70 (m, 7H, Ph), 6.67 (d, ${}^{3}J_{HH} = 9.0$ Hz, 2H, Ph), 6.59 (d, ${}^{3}J_{HH} = 9.0$ Hz, 2H, Ph), 3.74 (s, 3H, OCH ₃), 2.62 (q, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.25 (s, 6H, Ph(CH ₃) ₂), 1.62 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃) ₂), 1.62 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃) ₂), 1.67 (s, 9H, C(CH ₃) ₃), 1.20 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) 2.21 (s, 6H, Ph(CH ₃) ₂), 1.67 (s, 9H, C(CH ₃) ₃), 1.20 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃) ₂), 1.67 (s, 9H, C(CH ₃) ₃), 1.20 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)Illu7.88-6.62 (m, 11H, Ph), 3.90 (s, 3H, OCH ₃), 2.64 (q, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) 2.22 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.24 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)Illv7.64-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) 2.22 (s, 6H, Ph(CH ₃) ₂), 1.68 (s, 9H, C(CH ₃) ₃), 1.19 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)Illv7.68-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH ₃)CH ₂), 3.31-3.19 (m, 1H, PhOCH(CH ₃)CH ₂), 2	IIIn	
IIIq Hz, 3H, PhCH ₂ CH ₃) IIIq 7.10-6.29 (m, 11H, Ph), 3.70 (s, 3H, OCH ₃), 2.63 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, PhCH ₃)2), 1.65 (s, 9H, C(CH ₃)3), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) IIIr 7.04-6.70 (m, 7H, Ph), 6.67 (d, ${}^{3}J_{HH} = 9.0$ Hz, 2H, Ph), 6.59 (d, ${}^{3}J_{HH} = 9.0$ Hz, 2H, Ph), 3.74 (s, 3H, OCH ₃), 2.62 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃)2), 1.65 (s, 9H, C(CH ₃)3), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃)2), 1.65 (s, 9H, C(CH ₃)3), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃)2), 1.62 (s, 9H, C(CH ₃)3), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃)2), 1.62 (s, 9H, C(CH ₃)3), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃)2), 1.67 (s, 9H, C(CH ₃)3), 1.20 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃)2), 1.67 (s, 9H, C(CH ₃)3), 1.20 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃)2), 1.65 (s, 9H, C(CH ₃)3), 1.20 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃)2), 1.65 (s, 9H, C(CH ₃)3), 1.20 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) IIIu 7.86-6.62 (m, 11H, Ph), 3.90 (s, 3H, OCH ₃), 2.64 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃) IIiv 7.84-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃) IIiv 7.84-6.50 (m, 9H, Ph(CH ₃)2), 1.68 (s, 9H, C(CH ₃)3), 1.19 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) IIiv 7.84-6.62 (m, 10H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)	iiib	
IIIrPhCH2CH3), 2.21 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIr7.04-6.70 (m, 7H, Ph), 6.67 (d, ${}^{3}J_{HH} = 9.0$ Hz, 2H, Ph), 6.59 (d, ${}^{3}J_{HH} = 9.0$ Hz, 2H, Ph), 3.74 (s, 3H, OCH3), 2.62 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIs7.76-6.76 (m, 11H, Ph), 3.86 (s, 3H, OCH3), 2.62 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH2CH3), 2.21 (s, 6H, Ph(CH5)2), 1.62 (s, 9H, C(CH5)3), 1.22 (tt, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIt7.76-6.56 (m, 11H, Ph), 3.91 (s, 3H, OCH3), 2.59 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH2CH3), 2.21 (s, 6H, Ph(CH5)2), 1.67 (s, 9H, C(CH5)3), 1.20 (tt, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIt7.76-6.56 (m, 11H, Ph), 3.90 (s, 3H, OCH3), 2.59 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH2CH3), 2.21 (s, 6H, Ph(CH5)2), 1.67 (s, 9H, C(CH5)3), 1.20 (tt, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIu7.88-6.62 (m, 11H, Ph), 3.90 (s, 3H, OCH3), 2.64 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH5)2), 1.65 (s, 9H, C(CH5)3), 1.24 (tt, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIv7.88-6.62 (m, 71H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (tt, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIv7.08-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH3)CH2), 3.31-3.19 (m, 1H, PhOCH(CH3)CH2), 2.33-2.68 (m, 1H, PhOCH(CH3)CH2), 2.27 (s, 6H, Ph(CH3)2), 1.69 (s, 9H, C(CH5)3), 1.59-1.41 (m, 6H, PhOCH(CH3)2)CH2 and PhCH2), 1.69 (s, 9H, C(CH3)3), 1.59-1.41 (m, 6H, PhOCH(CH3)2)CH2 and PhCH2), 1.69 (s, 9H, C(CH3)3), 1.59-1.41 (m, 6H, PhOCH(CH3)2)CH2 and PhCH2)IIIv7.08-6.42 (m, 10H,		
Hz, 3H, PhCH ₂ CH ₃)IIIr $7.04-6.70 (m, 7H, Ph), 6.67 (d, {}^{3}J_{HH} = 9.0 Hz, 2H, Ph), 6.59 (d, {}^{3}J_{HH} = 9.0 Hz, 2H, Ph), 3.74 (s, 3H, OCH3), 2.62 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.22 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.22 (t, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.21 (s, 6H, Ph(CH3)2), 1.62 (s, 9H, C(CH3)3), 1.22 (tt, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.21 (s, 6H, Ph(CH3)2), 1.62 (s, 9H, C(CH3)3), 1.22 (tt, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.21 (s, 6H, Ph(CH3)2), 1.67 (s, 9H, C(CH3)3), 1.20 (t, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.21 (s, 6H, Ph(CH3)2), 1.67 (s, 9H, C(CH3)3), 1.20 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.20 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.20 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.20 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.24 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.12 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.19 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3), 2.28 (s, 6H, Ph(CH3)2), 2.27 (s, 6H, Ph(CH3)2), 1.69 (s, 9H, C(CH3)3), 1.59 - 1.41 (m, 6H, PhOCH(CH3)CH2 and PhCH6(H3))IIIwIIIwIIII + PhOCH(CH3)CH2$	lllq	
IIIr $7.04-6.70 \text{ (m}, 7H, Ph), 6.67 \text{ (d}, ^{3}J_{HH} = 9.0 Hz, 2H, Ph), 6.59 \text{ (d}, ^{3}J_{HH} = 9.0 Hz, 2H, Ph), 3.74 (s, 3H, OCH_3), 2.62 (q, ^{3}J_{HH} = 7.5 Hz, 2H, PhCH_2CH_3), 2.22 (s, 6H, Ph(CH_3)_2), 1.65 (s, 9H, C(CH_3)_3), 1.22 (t, ^{3}J_{HH} = 7.5 Hz, 3H, PhCH_2CH_3)IIIs7.76-6.76 \text{ (m}, 11H, Ph), 3.86 (s, 3H, OCH_3), 2.62 (q, ^{3}J_{HH} = 7.5 Hz, 2H, PhCH_2CH_3), 2.21 (s, 6H, Ph(CH_3)_2), 1.62 (s, 9H, C(CH_3)_3), 1.22 (tt, ^{3}J_{HH} = 7.5 Hz, 2H, PhCH_2CH_3), 2.21 (s, 6H, Ph(CH_3)_2), 1.62 (s, 9H, C(CH_3)_3), 1.22 (tt, ^{3}J_{HH} = 7.5 Hz, 2H, PhCH_2CH_3), 2.21 (s, 6H, Ph(CH_3)_2), 1.62 (s, 9H, C(CH_3)_3), 1.22 (tt, ^{3}J_{HH} = 7.5 Hz, 3H, PhCH_2CH_3), 2.21 (s, 6H, Ph(CH_3)_2), 1.67 (s, 9H, C(CH_3)_3), 1.20 (tt, ^{3}J_{HH} = 7.5 Hz, 2H, PhCH_2CH_3), 2.21 (s, 6H, Ph(CH_3)_2), 1.67 (s, 9H, C(CH_3)_3), 1.20 (tt, ^{3}J_{HH} = 7.5 Hz, 3H, PhCH_2CH_4)IIIu7.86-6.62 \text{ (m}, 11H, Ph), 3.90 (s, 3H, OCH_3), 2.64 (q, ^{3}J_{HH} = 7.5 Hz, 2H, PhCH_2CH_3), 2.22 (s, 6H, Ph(CH_3)_2), 1.65 (s, 9H, C(CH_3)_3), 1.24 (tt, ^{3}J_{HH} = 7.5 Hz, 3H, PhCH_2CH_4)IIIv7.54-7.27 \text{ (m}, 7H, Ph), 7.07-6.70 \text{ (m}, 9H, Ph), 2.61 (q, ^{3}J_{HH} = 7.5 Hz, 2H, PhCH_2CH_3), 2.22 (s, 6H, Ph(CH_3)_2), 1.68 (s, 9H, C(CH_3)_3), 1.19 (tt, ^{3}J_{HH} = 7.5 Hz, 3H, PhCH_2CH_3), 2.22 (s, 6H, Ph(CH_3)_2), 1.68 (s, 9H, C(CH_3)_3), 1.19 (tt, ^{3}J_{HH} = 7.5 Hz, 3H, PhCH_2CH_3), 2.22 (s, 6H, Ph(CH_3)_2), 1.69 (s, 9H, C(CH_3)_3), 1.19 (tt, ^{3}J_{HH} = 7.5 Hz, 3H, PhCH_2CH_3), 2.22 (s, 6H, Ph(CH_3)_2), 1.59 (-14,1) (m, 6H, PhOCH(CH_3)CH_2), 2.27 (s, 6H, Ph(CH_3)_2), 1.69 (s, 9H, C(CH_3)_3), 1.59 - 1.41 (m, 6H, PhOCH(CH_3)CH_2), and PhCH_3)IIIw7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH_3), 2.28 (s, 6H, Ph(CH_3)_2), 1.70 (s, 7.86 - 6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH_3), 2.28 (s, 6H, Ph(CH_3)_2), 1.70 (s, 7.86 - 6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH_3), 2.28 (s, 6H, Ph(CH_3)_2), 1.70 (s, 7.86 - 6.42 (m, 10H, $		
Hz, 2H, Ph), 3.74 (s, 3H, OCH ₃), 2.62 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIs7.76-6.76 (m, 11H, Ph), 3.86 (s, 3H, OCH ₃), 2.62 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃) ₂), 1.62 (s, 9H, C(CH ₃) ₃), 1.22 (tt, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIt7.76-6.56 (m, 11H, Ph), 3.91 (s, 3H, OCH ₃), 2.59 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH ₃) ₂), 1.67 (s, 9H, C(CH ₃) ₃), 1.20 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIu7.86-6.62 (m, 11H, Ph), 3.90 (s, 3H, OCH ₃), 2.64 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.24 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIu7.84-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃) ₂), 1.68 (s, 9H, C(CH ₃) ₃), 1.19 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃)IIIv7.84-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH ₃)CH ₂), 3.31-3.19 (m, 1H, PhOCH(CH ₃)C ₂), 1.69 (s, 9H, C(CH ₃) ₃), 1.59-1.41 (m, 6H, PhOCH(CH ₃)CH ₂ and Ph(CH ₃) ₂), 1.69 (s, 9H, C(CH ₃) ₃), 1.59-1.41 (m, 6H, PhOCH(CH ₃)CH ₂ and Ph(CH ₃)	Ille	
11152.22 (s, 6H, Ph(CH_3) ₂), 1.65 (s, 9H, C(CH_3) ₃), 1.22 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) 11187.76-6.76 (m, 11H, Ph), 3.86 (s, 3H, OCH ₃), 2.62 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH_3) ₂), 1.62 (s, 9H, C(CH_3) ₃), 1.22 (tt, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) 11117.76-6.76 (m, 11H, Ph), 3.91 (s, 3H, OCH ₃), 2.59 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.21 (s, 6H, Ph(CH_3) ₂), 1.67 (s, 9H, C(CH_3) ₃), 1.20 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) 11107.88-6.62 (m, 11H, Ph), 3.90 (s, 3H, OCH ₃), 2.64 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH_3) ₂), 1.65 (s, 9H, C(CH_3) ₃), 1.24 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) 11107.88-6.62 (m, 11H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH_3) ₂), 1.68 (s, 9H, C(CH_3) ₃), 1.19 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) 111v7.64-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH_3) ₂), 1.68 (s, 9H, C(CH_3) ₃), 1.19 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH ₂ CH ₃) 111v7.68-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH ₃)CH ₂), 3.31-3.19 (m, H, PhOCH(CH ₃)CH ₂), 1.69 (s, 9H, C(CH_3) ₃), 1.59-1.41 (m, 6H, PhOCH(CH ₃)CH ₂) and Ph(CH ₃)_2), 1.69 (s, 9H, C(CH_3) ₃), 1.59-1.41 (m, 6H, PhOCH(CH ₃)CH ₂ and Ph(CH ₃) 111x7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH ₃), 2.28 (s, 6H, Ph(CH ₃) ₂), 1.70 (s,	111	
IIIsPhCH2CH3)IIIs $7.76-6.76 (m, 11H, Ph), 3.86 (s, 3H, OCH3), 2.62 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.21 (s, 6H, Ph(CH3)2), 1.62 (s, 9H, C(CH3)3), 1.22 (tt, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3)IIIt7.76-6.56 (m, 11H, Ph), 3.91 (s, 3H, OCH3), 2.59 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.21 (s, 6H, Ph(CH3)2), 1.67 (s, 9H, C(CH3)3), 1.20 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3)IIIu7.76-6.56 (m, 11H, Ph), 3.91 (s, 3H, OCH3), 2.59 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.21 (s, 6H, Ph(CH3)2), 1.67 (s, 9H, C(CH3)3), 1.20 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3)IIIu7.88-6.62 (m, 11H, Ph), 3.90 (s, 3H, OCH3), 2.64 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.24 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3)IIIv7.54-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3)IIIv7.68-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH3)CH2), 3.31-3.19 (m, 1H, PhOCH(CH3)CH2), 2.27 (s, 6H, Ph(CH3)2), 1.69 (s, 9H, C(CH3)3), 1.59-1.41 (m, 6H, PhOCH(CH3)CH2 and PhCH3)IIIx7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s, 7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s, 7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s, 7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s, 7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s, 7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s, 7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s, 7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s, 7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph$		
PhCH2CH3), 2.21 (s, 6H, Ph(CH3)2), 1.62 (s, 9H, C(CH3)3), 1.22 (tt, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIt7.76-6.56 (m, 11H, Ph), 3.91 (s, 3H, OCH3), 2.59 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH2CH3), 2.21 (s, 6H, Ph(CH3)2), 1.67 (s, 9H, C(CH3)3), 1.20 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIu7.88-6.62 (m, 11H, Ph), 3.90 (s, 3H, OCH3), 2.64 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.24 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.24 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.24 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIw7.08-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH3)CH2), 3.31-3.19 (m, 1H, PhOCH(CH3)CH2), 2.83-2.68 (m, 1H, PhOCH(CH3)CH2), 2.27 (s, 6H, Ph(CH3)2), 1.69 (s, 9H, C(CH3)3), 1.59-1.41 (m, 6H, PhOCH(CH3)CH2 and PhCH3)IIIx7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s,		
IIItHz, 3H, PhCH2CH3)IIIt $7.76-6.56 (m, 11H, Ph), 3.91 (s, 3H, OCH3), 2.59 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.21 (s, 6H, Ph(CH3)2), 1.67 (s, 9H, C(CH3)3), 1.20 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3)IIIu7.88-6.62 (m, 11H, Ph), 3.90 (s, 3H, OCH3), 2.64 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.24 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3)IIIv7.54-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3)IIIv7.54-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3)IIIw7.08-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH3)CH2), 3.31-3.19 (m, 1H, PhOCH(CH3)CH2), 2.83-2.68 (m, 1H, PhOCH(CH3)CH2), 2.27 (s, 6H, Ph(CH3)2), 1.69 (s, 9H, C(CH3)3), 1.59-1.41 (m, 6H, PhOCH(CH3)CH2 and PhCH3)IIIx7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s, 10H)$	IIIs	
IIIt $7.76-6.56 (m, 11H, Ph), 3.91 (s, 3H, OCH_3), 2.59 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH_2CH_3), 2.21 (s, 6H, Ph(CH_3)_2), 1.67 (s, 9H, C(CH_3)_3), 1.20 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH_2CH_3)IIIu7.88-6.62 (m, 11H, Ph), 3.90 (s, 3H, OCH_3), 2.64 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH_2CH_3), 2.22 (s, 6H, Ph(CH_3)_2), 1.65 (s, 9H, C(CH_3)_3), 1.24 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH_2CH_3)IIIv7.54-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH_2CH_3), 2.22 (s, 6H, Ph(CH_3)_2), 1.68 (s, 9H, C(CH_3)_3), 1.19 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH_2CH_3)IIIw7.68-6.50 (m, 9H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH_2CH_3), 2.22 (s, 6H, Ph(CH_3)_2), 1.68 (s, 9H, C(CH_3)_3), 1.19 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH_2CH_3)IIIw7.68-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH_3)CH_2), 3.31-3.19 (m, 1H, PhOCH(CH_3)CH_2), 2.83-2.68 (m, 1H, PhOCH(CH_3)CH_2), 2.27 (s, 6H, Ph(CH_3)_2), 1.69 (s, 9H, C(CH_3)_3), 1.59-1.41 (m, 6H, PhOCH(CH_3)CH_2 and PhCH_3)IIIx7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH_3), 2.28 (s, 6H, Ph(CH_3)_2), 1.70 (s, 10H)$		
PhCH2CH3), 2.21 (s, 6H, Ph(CH3)2), 1.67 (s, 9H, C(CH3)3), 1.20 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIu7.88-6.62 (m, 11H, Ph), 3.90 (s, 3H, OCH3), 2.64 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.24 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIv7.54-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIw7.08-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH3)CH2), 3.31-3.19 (m, 1H, PhOCH(CH3)CH2), 2.83-2.68 (m, 1H, PhOCH(CH3)CH2), 2.27 (s, 6H, Ph(CH3)2), 1.69 (s, 9H, C(CH3)3), 1.59-1.41 (m, 6H, PhOCH(CH3)CH2 and PhCH3)IIIx7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s,	10+	
IIIuHz, 3H, PhCH2CH3)IIIu $7.88-6.62 (m, 11H, Ph), 3.90 (s, 3H, OCH3), 2.64 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.24 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3)IIIv7.54-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3)IIIw7.64-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH2CH3)IIIw7.08-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH3)CH2), 3.31-3.19 (m, 1H, PhOCH(CH3)CH2), 2.83-2.68 (m, 1H, PhOCH(CH3)CH2), 2.27 (s, 6H, Ph(CH3)2), 1.69 (s, 9H, C(CH3)3), 1.59-1.41 (m, 6H, PhOCH(CH3)CH2 and PhCH3)IIIx7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s, 1H)$	IIIL	
Illu $7.88-6.62 (m, 11H, Ph), 3.90 (s, 3H, OCH_3), 2.64 (q, {}^3J_{HH} = 7.5 Hz, 2H, PhCH_2CH_3), 2.22 (s, 6H, Ph(CH_3)_2), 1.65 (s, 9H, C(CH_3)_3), 1.24 (t, {}^3J_{HH} = 7.5 Hz, 3H, PhCH_2CH_3)Illv7.54-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, {}^3J_{HH} = 7.5 Hz, 2H, PhCH_2CH_3), 2.22 (s, 6H, Ph(CH_3)_2), 1.68 (s, 9H, C(CH_3)_3), 1.19 (t, {}^3J_{HH} = 7.5 Hz, 3H, PhCH_2CH_3)Illw7.08-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH_3)CH_2), 3.31-3.19 (m, 1H, PhOCH(CH_3)CH_2), 2.83-2.68 (m, 1H, PhOCH(CH_3)CH_2), 2.27 (s, 6H, Ph(CH_3)_2), 1.69 (s, 9H, C(CH_3)_3), 1.59-1.41 (m, 6H, PhOCH(CH_3)CH_2 and PhCH_3)Illx7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH_3), 2.28 (s, 6H, Ph(CH_3)_2), 1.70 (s, 1H)$		
PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.65 (s, 9H, C(CH3)3), 1.24 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIv7.54-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, ${}^{3}J_{HH} = 7.5$ Hz, 2H, PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)IIIw7.08-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH3)CH2), 3.31-3.19 (m, 1H, PhOCH(CH3)CH2), 2.83-2.68 (m, 1H, PhOCH(CH3)CH2), 2.27 (s, 6H, Ph(CH3)2), 1.69 (s, 9H, C(CH3)3), 1.59-1.41 (m, 6H, PhOCH(CH3)CH2 and PhCH3)IIIx7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s,	Illu	
IIIv $7.54-7.27 (m, 7H, Ph), 7.07-6.70 (m, 9H, Ph), 2.61 (q, {}^{3}J_{HH} = 7.5 Hz, 2H, PhCH_{2}CH_{3}), 2.22 (s, 6H, Ph(CH_{3})_{2}), 1.68 (s, 9H, C(CH_{3})_{3}), 1.19 (t, {}^{3}J_{HH} = 7.5 Hz, 3H, PhCH_{2}CH_{3}) IIIw 7.08-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH_{3})CH_{2}), 3.31-3.19 (m, 1H, PhOCH(CH_{3})CH_{2}), 2.83-2.68 (m, 1H, PhOCH(CH_{3})CH_{2}), 2.27 (s, 6H, Ph(CH_{3})_{2}), 1.69 (s, 9H, C(CH_{3})_{3}), 1.59-1.41 (m, 6H, PhOCH(CH_{3})CH_{2} and PhCH_{3}) IIIx 7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH_{3}), 2.28 (s, 6H, Ph(CH_{3})_{2}), 1.70 (s, 10H) (s$		PhCH ₂ CH ₃), 2.22 (s, 6H, Ph(CH ₃) ₂), 1.65 (s, 9H, C(CH ₃) ₃), 1.24 (t, ${}^{3}J_{HH} = 7.5$
PhCH2CH3), 2.22 (s, 6H, Ph(CH3)2), 1.68 (s, 9H, C(CH3)3), 1.19 (t, ${}^{3}J_{HH} = 7.5$ Hz, 3H, PhCH2CH3)Illw7.08-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH3)CH2), 3.31-3.19 (m, 1H, PhOCH(CH3)CH2), 2.83-2.68 (m, 1H, PhOCH(CH3)CH2), 2.27 (s, 6H, Ph(CH3)2), 1.69 (s, 9H, C(CH3)3), 1.59-1.41 (m, 6H, PhOCH(CH3)CH2 and PhCH3)Illx7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH3), 2.28 (s, 6H, Ph(CH3)2), 1.70 (s, 100)		
IIIwHz, 3H, PhCH ₂ C H_3) IIIw 7.08-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOC H (CH ₃)CH ₂), 3.31-3.19 (m, 1H, PhOCH(CH ₃)C H_2), 2.83-2.68 (m, 1H, PhOCH(CH ₃)C H_2), 2.27 (s, 6H, Ph(C H_3) ₂), 1.69 (s, 9H, C(C H_3) ₃), 1.59-1.41 (m, 6H, PhOCH(C H_3)CH ₂ and PhC H_3) IIIx 7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH ₃), 2.28 (s, 6H, Ph(C H_3) ₂), 1.70 (s,	lliv	
Illw $7.08-6.50 (m, 9H, Ph), 4.97-4.79 (m, 1H, PhOCH(CH_3)CH_2), 3.31-3.19 (m, 1H, PhOCH(CH_3)CH_2), 2.83-2.68 (m, 1H, PhOCH(CH_3)CH_2), 2.27 (s, 6H, Ph(CH_3)_2), 1.69 (s, 9H, C(CH_3)_3), 1.59-1.41 (m, 6H, PhOCH(CH_3)CH_2 and PhCH_3)Illx7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH_3), 2.28 (s, 6H, Ph(CH_3)_2), 1.70 (s, 100, 100, 100, 100, 100, 100, 100, 10$		
1H, PhOCH(CH_3)CH_2), 2.83-2.68 (m, 1H, PhOCH(CH_3)CH_2), 2.27 (s, 6H, Ph(CH_3)_2), 1.69 (s, 9H, C(CH_3)_3), 1.59-1.41 (m, 6H, PhOCH(CH_3)CH_2 and PhCH_3)Illx $7.08-6.42$ (m, 10H, Ph), 3.78 (s, 3H, OCH_3), 2.28 (s, 6H, Ph(CH_3)_2), 1.70 (s,	IIIw	, , , , , , , , , , , , , , , , , , , ,
Ph(CH_3) ₂), 1.69 (s, 9H, C(CH_3) ₃), 1.59-1.41 (m, 6H, PhOCH(CH_3)CH ₂ and PhC H_3)IIIx7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH ₃), 2.28 (s, 6H, Ph(CH_3) ₂), 1.70 (s,		
IIIx 7.08-6.42 (m, 10H, Ph), 3.78 (s, 3H, OCH ₃), 2.28 (s, 6H, Ph(CH ₃) ₂), 1.70 (s,		
9H, U(UH3)3), 1.51 (S, 3H, PhUH3)	IIIx	
Illy 7.45–7.27 (m, 5H, Ph), 7.16–7.00 (m, 4H, Ph), 6.72–6.49 (m, 3H, Ph), 1.66	Шу	
(s, 9H, $C(CH_{3})_3$)	iii y	

MATERIALS AND METHODS

Instruments. The title compounds were synthesized under a nitrogen atmosphere. ¹H NMR spectra were obtained at 300 MHz using a Bruker AV300 spectrometer or at 400 MHz using a Varian Mercury Plus400 spectrometer in CDCl₃ solution with tetramethylsilane as the internal standard. Chemical shift values (δ) are given in ppm. Elemental

composition was determined on a Yanaca CHN Corder MT-3 elemental analyzer. The melting points were determined on an X-4 binocular microscope melting point apparatus (Beijing Tech Instruments Co., Beijing, China) and were uncorrected. Yields were not optimized.

General Synthesis. All anhydrous solvents were dried and purified by standard techniques just before use. *N'-tert*-Butyl-*N*,*N'*-diacylhy-

 Table 3. Stomach Toxicities against Oriental Armyworm of Compounds

 Illa-y and Parent Compounds

	larvicidal activity (%) at a concentration of				
compd	50 mg kg^{-1}	25 mg kg^{-1}	10 mg kg^{-1}	5 mg kg^{-1}	2.5 mg kg^{-1}
compd IIIa IIIb IIIc IIId IIIf IIIg IIIh IIIi IIIn IIIn IIIn IIIn IIIn IIIn	50 mg kg ⁻¹ 100 100 100 100		, ,		
lllw lllx llly RH-5849	100	100 70	100 0	100 100 30 /	90 100 0 /
RH-5849 RH-5992 JS-118 RH-2485 RH-0345	100 / / 100	/0 /	100 /	95 100 100 70	55 90 100 10

Table 4. Stomach Toxicities against Tobacco Cutworm of Compounds IIIi and RH-5992

compd	y = a + bx	LC ₅₀ (mg/L)	toxic ratio
IIIi	y = 1.5640 + 3.6577x $y = 3.5588 + 1.2691x$	7.215	1.55
RH-5992		11.178	1

drazines (I) were synthesized by the literature method (3, 23). Sulfur dichloride was prepared by the reaction of sulfur monochloride with chlorine (30). Pyridine was distilled over sodium hydroxide pellets and kept dry by storing over the same reagent.

General Synthetic Procedure for II. To a magnetically stirred and cooled (-20 °C) solution of sulfur dichloride (0.83 g, 8 mmol) in dichloromethane (15 mL) was added dropwise a solution of pyridine (0.63 g, 8 mmol) in dichloromethane (5 mL). After addition was complete, the reaction mixture was stirred below -15 °C for 15 min. Then, a solution of *N'-tert*-butyl-*N,N'*-diacylhydrazines (I) (7 mmol) in dichloromethane (5 mL) was added, and the resulting mixture was stirred at room temperature for 4 h. The solvent was removed in vacuo to afford a viscous residue, and then petroleum ether (60-90 °C) (20 mL) was added. The mixture was stirred at -10 °C for 15 min and then filtered to remove the pyridinium chloride. The filtrate was directly used for the next step without further purification.

General Synthetic Procedure for the Target Compounds IIIa–y. To a suspension of sodium hydride (8 mmol) in anhydrous xylene (20 mL) was added substituted phenol (7 mmol) in small portions at room temperature. The reaction mixture was warmed to about 70 °C, and stirring was continued for 2 h and then cooled to -10 °C. The above filtrate of *N*-chlorosulfenyl diacylhydrazine (**II**) was added dropwise, the resulting mixture was stirred at room temperature for 4 h and filtered, and the filtrate was concentrated under reduced pressure. The residue was purified by column chromatography on a silica gel using a mixture of petroleum ether (60–90 °C) and ethyl acetate as the eluent to afford the title compounds **IIIa–y**.

Biological Assay. All bioassays were performed on representative test organisms reared in the laboratory. The bioassay was repeated at 25 ± 1 °C according to statistical requirements. Assessments were made on a dead/alive basis, and mortality rates were corrected using Abbott's formula (*31*). Evaluations are based on a percentage scale of 0–100 in which 0 = no activity and 100 = total kill.

Stomach Toxicity against Oriental Armyworm (*Mythimna sepa-rata*). The stomach toxicities of the title compounds IIIa—y and the parent compounds I against oriental armyworm were evaluated by foliar application using the reported procedure (*24, 28, 32, 33*). For the foliar armyworm tests, individual corn leaves were placed on moistened pieces of filter paper in Petri dishes. The leaves were then sprayed with the test solution and allowed to dry. The dishes were infested with 10 fourth-instar oriental armyworm larvae. Percentage mortalities were evaluated 4 days after treatment. Each treatment was performed three times. For comparative purposes, the parent compounds, **RH-5849**, **RH-5992**, **JS-118**, **RH-2485**, and **RH-0345**, were tested under the same conditions.

Stomach Toxicity against Tobacco Cutworm (Spodoptera litura). The stomach toxicities of the title compound III and the corresponding parent compound **RH-5992** against tobacco cutworm were tested by leaf-dip method using the reported procedure (28, 34, 35). Leaf discs (5 cm \times 3 cm) were cut from fresh cabbage leaves and then were dipped into the test solution for 3 s. After air-drying, the treated leaf discs were placed individually into boxes (80 cm³). Each dried treated leaf disk was infested with five third-instar tobacco cutworm larvae. Percentage mortalities were evaluated 3 days after treatment. Leaves treated with water and acetone were provided as controls. Each treatment was performed three times. For comparative purposes, the parent compound, **RH-5992**, was tested under the same conditions.

Contact Toxicity against Tobacco Cutworm (Spodoptera litura), Asian Corn Borer (Ostrinia furnacalis), and Cotton Bollworm (Helicoverpa armigera). The contact toxicities of the title compound III and the corresponding parent compound RH-5992 against Tobacco cutworm, Asian corn borer, and Cotton bollworm were tested by topical application using the reported procedure (35–37). The compounds were dissolved in acetone to prepare five to seven concentrations. For each fourth-instar larva, 1 µL of tested dilution was applied on the thoracic tergite with an automatic microapplicator (Robbins Scientific). Acetone alone served as a control, and RH-5992 was used as a positive control sample. Usually, 40 insects per dose were tested, and each treatment was replicated four times. After treatment, the insects were returned to their standard rearing conditions. Mortalities were calculated 48 h after treatment, and LD₅₀ values (the median lethal dose) were established.

RESULTS AND DISCUSSION

Synthesis. *N*-Substituted phenoxysulfenyl-*N'-tert*-butyl-N,N'-diacylhydrazines (**IIIa**-**y**) were synthesized as shown in **Scheme 1**. *N*-Chlorosulfenyl-*N'-tert*-butyl-N,N'-diacylhydrazines (**II**) were prepared by the reaction of sulfur dichloride with *N'-tert*-butyl-N,N'-diacylhydrazines (**I**) in the presence of pyridine according to our previous work (28).

Table 5. Contact Toxicities against Asian Corn Borer, Tobacco Cutworm, and Cotton Bollworm of Compounds IIIi and RH-5992

	IIIi	IIIi		RH-5992		
	y = a + bx	LD ₅₀ (µg/g)	y = a + bx	LD ₅₀ (µg/g)	toxic ratio	
Asian corn borer	y = 2.0735 + 1.9932x	29.393	y = 3.1305 + 1.0539x	59.414	2.0	
tobacco cutworm	y = 2.5178 + 1.7545x	25.986	y = 1.5124 + 1.2813x	527.12	20.3	
cotton bollworm	y = 2.1725 + 1.5087x	74.835	y = 0.2223 + 1.5321x	1311.9	17.5	

The key intermediates **II** without further purification were reacted with sodium substituted phenoxy to give the title compounds **IIIa**–**y**. We found that the title compounds **III** have better solubility than the parent compound **I** in organic solvents such as methylene dichloride, chloroform, toluene, xylene, petroleum ether, etc., which should make them easier to apply in the field. Moreover, compared to the parent compounds **I**, the hydrophobicities of the title compounds **III** were obviously improved. The physical properties and elemental analyses of the title compounds **IIIa**–**y** are listed in **Table 1**, and their ¹H NMR data are listed in **Table 2**.

Bioassay. Stomach Toxicity against Oriental Armyworm (Mythimna separata). Table 3 shows the stomach toxicities of N'-tert-butyl-N,N'-diacylhydrazines and their N-substituted phenoxysulfeny derivatives III against oriental armyworm. The results indicate that the title compounds III have excellent stomach toxicities against oriental armyworm, and some of the title compounds III exhibit higher larvicidal activities than the corresponding parent compounds. For example, the larvicidal activities of IIIa and IIIb were 100% at 25 mg kg⁻¹, whereas the corresponding parent compound RH-5849 caused 70% mortality at this concentration; the larvicidal activities of IIIg, IIIh, IIIi, IIIp, IIIr, IIIt, IIIu, and IIIv at 2.5 mg kg⁻¹ were 80%, 80%, 90%, 80%, 80%, 80%, 100%, and 90%, respectively, as compared with 55% mortality of the corresponding parent compound RH-5992 at the same concentration. In particular, **IIIi** was sent for advanced testing.

Stomach Toxicity against Tobacco Cutworm (Spodoptera litura). **Table 4** shows the stomach toxicities of the field testing candidate **IIIi** and the corresponding parent compound **RH-5992** against tobacco cutworm. The results indicated that the stomach toxicity of **IIIi** against tobacco cutworm was 1.55fold as high as that of **RH-5992** from the value of LC₅₀.

The results of the stomach toxicities of the title compounds **III** against oriental armyworm and tobacco cutworm implied that the introduction of the *N*-substituted phenoxysulfenate was essential for the larvacidal activity, and the changes in physical properties might account for the improvement of larvicidal activities.

Contact Toxicity against Tobacco Cutworm (Spodoptera litura), Asian Corn Borer (Ostrinia furnacalis), and Cotton Bollworm (Helicoverpa armigera). Table 5 shows the contact toxicities of the field testing candidate IIIi and the corresponding parent compound RH-5992 against Asian corn borer, tobacco cutworm, and cotton bollworm. The results indicated that IIIi has higher contact activities than RH-5992, especially toward tobacco cutworm and cotton bollworm, 20.3 times and 17.5 times, respectively. This could be explained by the marked changes of the physical properties, particularly the decrease of the polarity and the increase of the lipophilicity, both of which lead to the enhancement of cuticular penetration and body assimilation.

In summary, a series of novel *N*-substituted phenoxysulfenyl-*N'-tert*-butyl-*N*,*N'*-diacylhydrazines were designed and synthesized as insect growth regulators from the key intermediate *N*-chlorosulfenyl-*N'-tert*-butyl-*N*,*N'*-diacylhydrazines. Compared to *N'-tert*-butyl-*N*,*N'*-diacylhydrazines, these *N*-substituted phenoxysulfenyl derivatives displayed better solubility and improved hydrophobicities. The results of bioassays showed that the title compounds possessed a combination of strong stomach as well as contact poison properties higher than the corresponding parent compounds. In particular, *N*-(4-chlorophenoxysulfenyl)-*N'-tert*-butyl-*N*-4-ethylbenzoyl-*N'*-3,5-dimethylbenzoylhydrazide (**IIIi**), as a field testing candidate, has higher stomach toxicities against oriental armyworm and tobacco cutworm than the corresponding parent compound **RH-5992**. Furthermore, compound **IIIi** exhibits higher contact activities against Asian corn borer, tobacco cutworm, and cotton bollworm than that of **RH-5992**.

LITERATURE CITED

- Wing, K. D. RH5849, anonsteroidal ecdysone agonist: effects on a Drosophila cell line. <u>Science (Washington, DC)</u> 1988, 241, 467– 469.
- (2) Wing, K. D.; Slawecki, R. A.; Carlson, G. R. RH5849, a nonsteroidal ecdysone agonist effects on Lepidoptera. <u>Science</u> (<u>Washington, DC</u>) **1988**, 241, 470–472.
- (3) Hsu, A. C.-T. 1,2-Diacyl-1-alkylhydrazines, a new class of insect growth regulators. In *Synthesis and Chemistry of Agrochemicals II*; Baker, B. R., Fenyes, J. G., Moberg, W. K. Eds.; ACS Sympoisum Series 443; American Chemical Society: Washington, DC, 1991; pp 478–490.
- (4) Aller, H. E.; Ramsay, J. R. RH-5849: a novel insect growth regulator with a new mode of action. *Brighton Crop Prot. Conf. Pests Dis.* **1988**, 2, 511–518.
- (5) Dhadialla, T. S.; Carlson, G. R.; Le, D. P. New insecticides with ecdysteroidal and juvenile hormone activity. <u>Annu. Rev. Entomol.</u> 1998, 43, 545–569.
- (6) Qian, X. H. Molecular modeling study on the structure-activity relationship of substituted dibenzoyl-1-tert-butylhydrazines and their structural similarity to 20-hydroxyecdysone. *J. Agric. Food Chem.* **1996**, *44*, 1538–1542.
- (7) Cao, S.; Qian, X. H.; Song, G. H. N'-tert-Butyl-N'-aroyl-N-(alkoxycarbonylmethyl)-N-aroylhydrazines, a novel nonsteroidal ecdysone agonist: syntheses, insecticidal activity, conformational, and crystal structure analysis. *Can. J. Chem.* 2001, 79, 272–278.
- (8) Wang, Q. M.; Huang, R. Q.; Bi, F. C. Dithiobis(hydrazide) compounds and its application. CN1271727, 2000.
- (9) Mao, C. H.; Wang, Q. M.; Huang, R. Q.; Bi, F. C.; Wang, K. L. Preparation of diacylhydrazide derivatives as insect growth regulators. CN 1654464, 2005.
- (10) Zhao, P. L.; Li, J.; Yang, G. F. Synthesis and insecticidal activity of chromanone and chromone analogues of diacylhydrazines. *Bioorg. Med. Chem.* 2007, 15, 1888–1895.
- (11) Dhadialla, T. S.; Jansson, R. K. Non-steroidal ecdysone agonists: new tools for IPM and insect resistance management. <u>*Pestic. Sci.*</u> **1999**, 55, 357–359.
- (12) Heller, J. J.; Mattioda, H.; Klein, E.; Sagenmuller, A. Field evalution of RH-5992 on lepidopterous pests in Europe. *Brighton Crop Prot. Conf. Pests Dis.* **1992**, *1*, 59–66.
- (13) Cowles, R. S.; Villani, M. G. Susceptibility of Japanese beetle, Oriental beetle, and European chafer (Coleoptera: Scarabaeidae) to halofenozide, an insect growth regulator. *J. Econ. Entomol.* **1996**, 89, 1356–1365.
- (14) Le, D. P.; Thirugnanam, M.; Lidert, Z.; Carlson, G. R.; Ryan, J. B. RH-2485: a new selective insecticide for caterpillar control. *Brighton Crop Prot. Conf. Pests Dis.* **1996**, 481–486.
- (15) Carlson, G. R.; Dhadialla, T. S.; Hunter, R.; Jansson, R. K.; Jany, C. S.; Lidert, Z.; Slawecki, R. A. The chemical and biological properties of methoxyfenozide, a new insecticidal ecdysteroid agonist. *Pest Manage, Sci.* **2001**, *57*, 115–119.
- (16) Sawada, Y.; Yanai, T.; Nakagawa, H.; Tsukamoto, Y.; Yokoi, S.; Yanagi, M.; Toya, T.; Sugizaki, H.; Kato, Y.; Shirakura, H.; Watanabe, T.; Yajima, Y.; Kodama, S.; Masui, A. Synthesis and insecticidal activity of benzoheterocyclic analogues of N'-benzoyl-N-(tert-butyl)benzohydrazide: Part 1. Design of benzoheterocyclic analogues. *Pest Manage, Sci.* 2003, *59*, 25–35.
- (17) Sawada, Y.; Yanai, T.; Nakagawa, H.; Tsukamoto, Y.; Yokoi, S.; Yanagi, M.; Toya, T.; Sugizaki, H.; Kato, Y.; Shirakura, H.; Watanabe, T.; Yajima, Y.; Kodama, S.; Masui, A. Synthesis and insecticidal activity of benzoheterocyclic analogues of N'-benzoyl-N-(tert-butyl)benzohydrazide: Part 2. Introduction of substituents on the benzene rings of the benzoheterocycle moiety. <u>Pest</u> <u>Manage. Sci.</u> 2003, 59, 36–48.

- (18) Sawada, Y.; Yanai, T.; Nakagawa, H.; Tsukamoto, Y.; Tamagawa, Y.; Yokoi, S.; Yanagi, M.; Toya, T.; Sugizaki, H.; Kato, Y.; Shirakura, H.; Watanabe, T.; Yajima, Y.; Kodama, S.; Masui, A. Synthesis and insecticidal activity of benzoheterocyclic analogues of N'-benzoyl-N-(tert-butyl)benzohydrazide: Part 3. Modification of N-tert-butylhydrazine moiety. *Pest Manage. Sci.* 2003, *59*, 49–57.
- (19) Yanagi, M.; Sugizaki, H.; Toya, T.; Kato, Y.; Shirakura, H.; Watanabe, T.; Yajima, Y.; Kodama, S.; Masui, A.; Yanai, T.; Tsukamoto, Y.; Sawada, Y.; Yokoi, S. New hydrazine derivative and pesticidal composition comprising said derivative as an effective ingredient. EP 496342, 1992.
- (20) Yanagi, M.; Watanabe, T.; Masui, A. ANS-118: A novel insecticide. Brighton Crop Prot. Conf. Pests Dis. 2000, 2, 27– 32.
- (21) Zhang, X. N.; Li, Y. F.; Zhu, L. M.; Liu, L. Y.; Sha, X. Y.; Xu, H.; Ma, H. J.; Wang, F. Y.; Ni, Y. P.; Guo, L. P. Preparation of diacylhydrazines insecticides and their intermediates. CN 1313276, 2001.
- (22) Xu, N. F.; Zhang, Y.; Zhang, X. N.; Ni, J. P.; Xiong, J. M.; Shen, M. Manufacture of JS118 insecticide suspension agent. CN 1918986, 2007.
- (23) Wang, Q. M.; Cheng, J. R.; Huang, R. Q. Synthesis and insecticidal evaluation of novel N-(S-amino)sulfenylated derivatives of diacylhydrazines. *Pest Manage. Sci.* 2002, 58, 1250–1253.
- (24) Mao, C. H.; Wang, Q. H.; Huang, R. Q.; Bi, F. C.; Chen, L.; Liu, Y. X.; Shang, J. Synthesis and insecticidal evaluation of novel *N*-oxalyl derivatives of tebufenozide. *J. Agric. Food Chem.* 2004, 52, 6737–6741.
- (25) Fukuto, T. R. Propesticides. In *Pesticides Synthesis through Rational Approaches*; Magee, P. S. Eds.; American Chemical Society: Washington, DC, 1984; pp 87–101.
- (26) Kawata, M.; Umetsu, N.; Fukuto, T. R. N-Alkoxy sulfenylcarbamates. US 4394383, 1983.
- (27) Umetsu, N.; Nishioka, T.; Fukuto, T. R. Formation of Alkoxysulfenyl Derivatives of Carbofuran by Acid-Catalyzed Alcoholysis of Carbosulfan. <u>J. Agric. Food Chem.</u> 1984, 32, 765–768.

- (28) Zhao, Q. Q.; Shang, J.; Liu, Y. X.; Wang, K. Y.; Bi, F. C.; Huang, R. Q.; Wang, Q. M. Synthesis and Insecticidal Activities of Novel *N*-Sulfenyl-*N'*-tert-butyl-*N*,*N'*-diacylhydrazines. 1. <u>N-Alkoxvsulfenate Derivatives. J. Agric. Food Chem</u>. 2007, 55, 9614– 9619.
- (29) Zhu, Y. P.; Ishihara, K.; Masuyama, A.; Nakatsuji, Y.; Okahara, M. Preparation and properties of double-chain bis(quaternary ammonium) compounds. <u>*Yukagaku*</u> 1993, 42 (3), 161–167.
- (30) He, Z. R. Sulfur dichloride. *Inorganic Preparation Chemistry Handbook*; Fuel Chemical Industry Press: 1972; p 224 (Chinese).
- (31) Abbott, W. S. A method of computing the effectiveness of an insecticide. *J. Econ. Entomol.* **1925**, *18*, 265–267.
- (32) Hsu, A. C.; Murphy, R. A.; Aller, H. E.; Hamp, D. W.; Weinstein, B. Insecticidal N'-substituted-N,N'-disubstitutedhydrazines. US 5117057, 1992.
- (33) Luo, Y. P.; Yang, G. F. Discovery of a new insecticide lead by optimizing a target-diverse scaffold: Tetrazolinone derivatives. *Bioorg. Med. Chem.* 2007, 15, 1716–1724.
- (34) Ma, H.; Wang, K. Y.; Xia, X. M.; Zhang, Y.; Guo, Q. L. The toxity testing of five insecticides to different instar larvae of Spodoptera exigua. <u>Xiandai Nongvao</u> 2006, 5, 44–46.
- (35) Busvine, J. R. Recommended methods for measurement of pest resistance to pesticides. In FAO Plant Production and Protection Paper; Rome, Italy, 1980; No. 21, pp 3–13, 119–122.
- (36) Wang, K. Y.; Jiang, X. Y.; Yi, M. J.; Chen, B. K. Studies on resistance change and management strategy of Spodoptera exigua. *Nongyao* **2001**, *40* (6), 29–32.
- (37) Chen, B. K.; Wang, K. Y.; Jiang, X. Y.; Yi, M. J. Toxicity of insecticides to different generations or different instar of Spodoptera exigua. *Nongvaoxue Xuebao* 2000, 2 (3), 91–93.

Received for review March 10, 2008. Revised manuscript received April 8, 2008. Accepted April 9, 2008. This work was supported by the National Key Project for Basic Research (2003CB114400) and the National Natural Science Foundation of China (20672064).

JF800740Z