

(19)
(12)

(KR)
(B1)

(51) 。 Int. Cl. ⁶
C07D 239/04

(45)
(11)
(24)

2001 09 17
10 - 0291874
2001 03 16

(21) 10 - 1993 - 0029979
(22) 1993 12 27

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1994 - 0014353
1994 07 18

(30) 92 - 348535 1992 12 28 (JP)
93 - 14980 1993 02 01 (JP)

(73) 가 가

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(72) 가 833 - 181

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(74)

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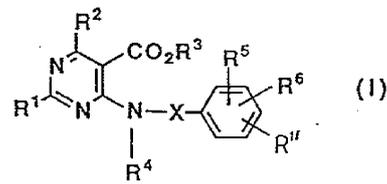
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(4 - 82 - 176967 , 88 - 225364 , 89 - 68362) .

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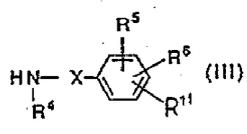
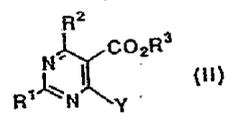
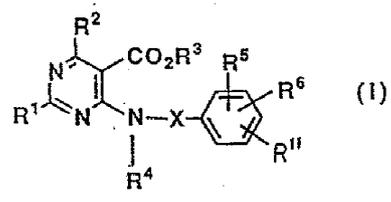


, R¹ ;

R² ;

R³ , , , ;
 R⁴ ;
 R⁵, R⁶ R¹¹ , , , , , ;
 X .

(2) () () ()



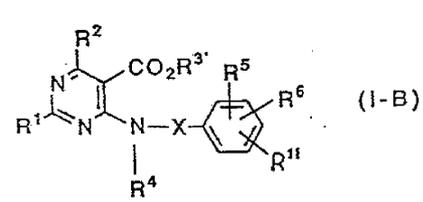
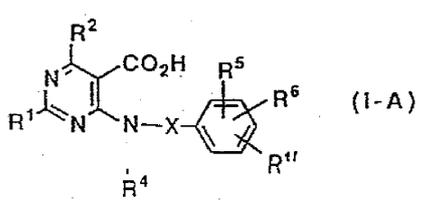
, Y , ;

(3) () ,

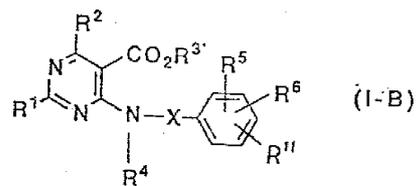
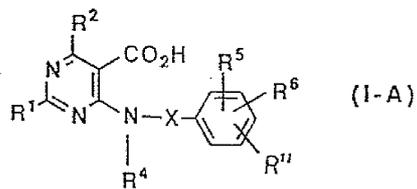
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(5) () ;

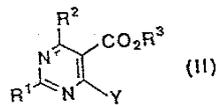
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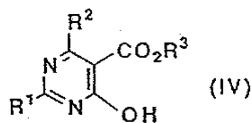
; R³ ; ()
 ;
 (7) (-A) , (-B)



; R³ ; ()
 ;
 (8) ()

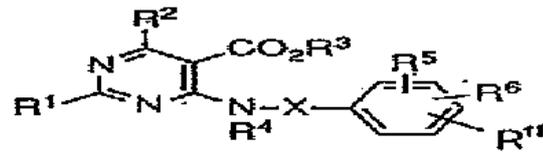


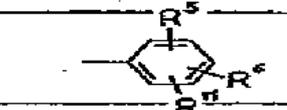
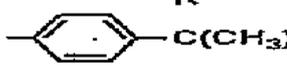
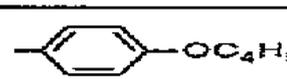
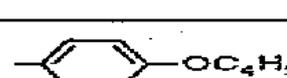
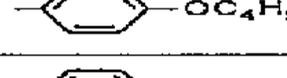
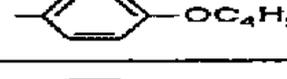
, Y ; () , R¹
 ;
 (9) () :



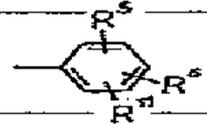
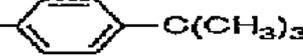
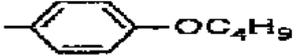
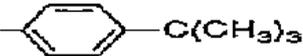
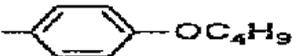
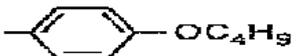
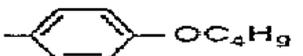
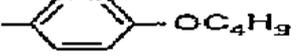
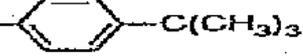
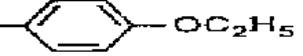
()
 R¹, R², R³, R⁴, R⁵, R⁶ R¹¹ C₁-C₆ , C₁-C₄ ,
 , 3 , R¹ , R² , R³

R¹ R¹

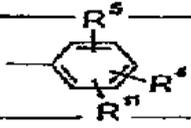
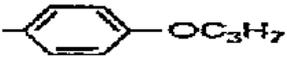
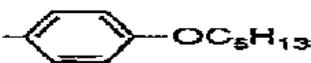
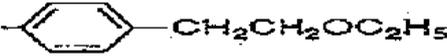
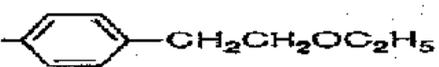
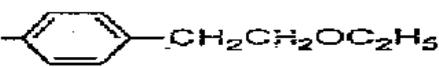
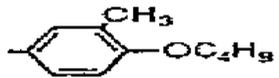
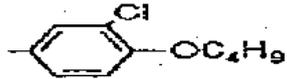
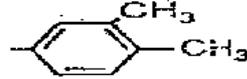


번호	R ¹	R ²	R ³	R ⁴	X	
1	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
2	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
3	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
4	H	C ₂ H ₅	C ₂ H ₅	CH ₃	-CH ₂ CH ₂ -	
5	H	C ₂ H ₅	C ₂ H ₅	H	$\begin{array}{c} -\text{CH}- \\ \\ \text{CH}_3 \end{array}$	
6	H	C ₂ H ₅	C ₂ H ₅	H	$\begin{array}{c} -\text{CH}- \\ \\ \text{C}_2\text{H}_5 \end{array}$	
7	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ -	
8	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	

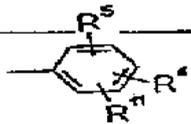
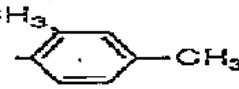
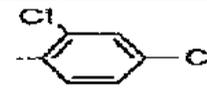
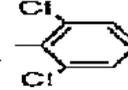
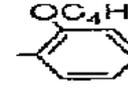
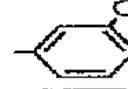
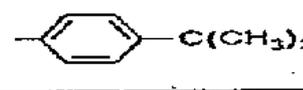
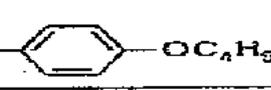
[2]

번호	R ¹	R ²	R ³	R ⁴	X	
9		C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
10	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
11	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
12	H	C ₂ H ₅	C ₃ H ₇	H	-CH ₂ CH ₂ -	
13	H	C ₂ H ₅	CH(CH ₃) ₂	H	-CH ₂ CH ₂ -	
14	H	C ₂ H ₅	C ₄ H ₉	H	-CH ₂ CH ₂ -	
15	H	C ₂ H ₅	CH ₂ - 	H	-CH ₂ CH ₂ -	
16	H	C ₂ H ₅	C ₄ H ₉	H	-CH ₂ CH ₂ -	
17	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

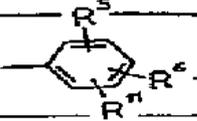
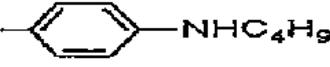
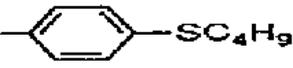
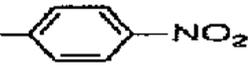
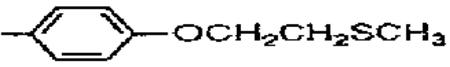
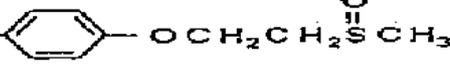
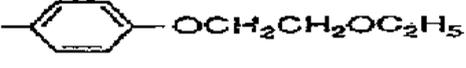
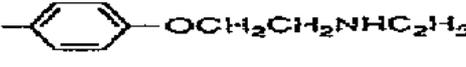
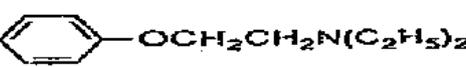
[3]

번호	R ¹	R ²	R ³	R ⁴	X	
18	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
19	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
20	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
21	H	C ₂ H ₅	C ₃ H ₇	H	-CH ₂ CH ₂ -	
22	H	C ₂ H ₅	CH(CH ₃) ₂	H	-CH ₂ CH ₂ -	
23	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
24	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
25	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
26	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

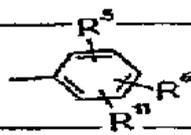
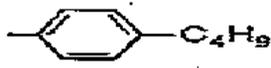
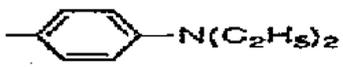
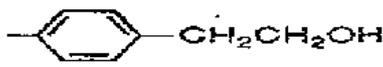
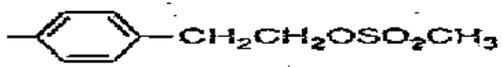
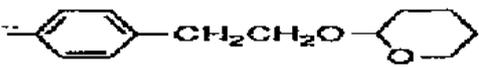
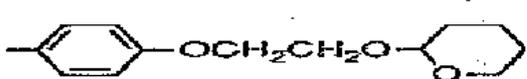
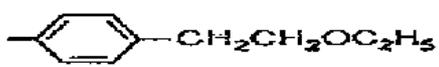
[4]

번호	R ¹	R ²	R ³	R ⁴	X	
27	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
28	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
29	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
30	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
31	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
32	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
33	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
34	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ O-	
35	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ O-	

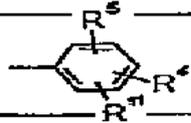
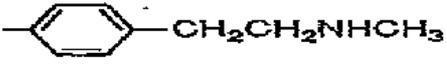
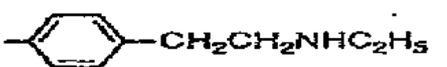
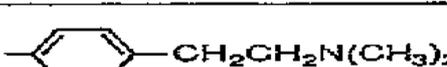
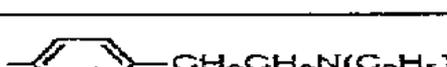
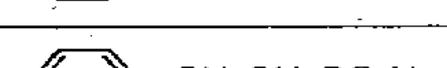
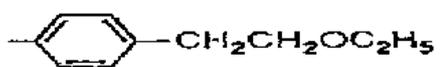
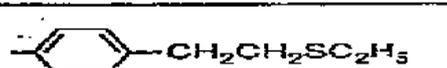
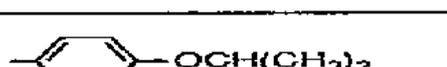
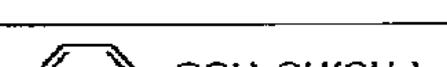
[5]

번호	R ¹	R ²	R ³	R ⁴	X	
36	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
37	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
38	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
39	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
40	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
41	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
42	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
43	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
44	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

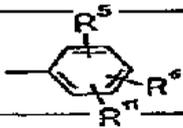
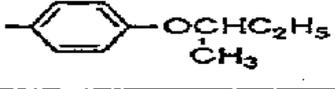
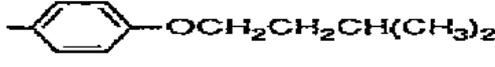
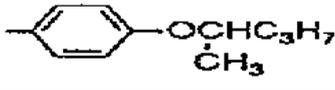
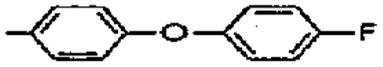
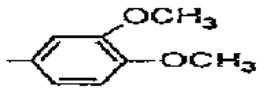
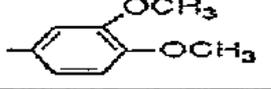
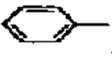
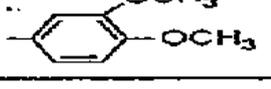
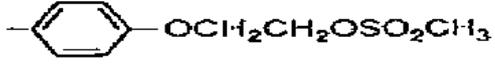
[6]

번호	R ¹	R ²	R ³	R ⁴	X	
45	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
46	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
47	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
48	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
49	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
50	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
51	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
52	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
53	H	C ₂ H ₅	C ₂ H ₅	H	-CH- C ₂ H ₅	

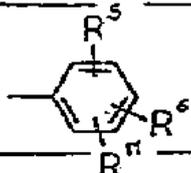
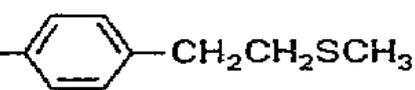
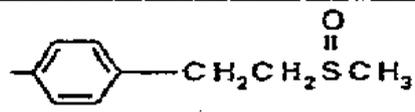
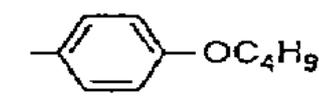
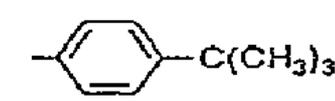
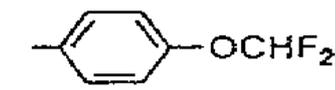
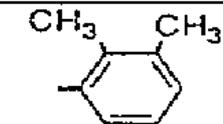
[7]

번호	R ¹	R ²	R ³	R ⁴	X	
54	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
55	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
56	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
57	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
58	H	C ₂ H ₅	C ₄ H ₉	H	-CH ₂ CH ₂ -	
59	H	C ₂ H ₅	CH ₂ - 	H	-CH ₂ CH ₂ -	
60	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
61	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
62	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

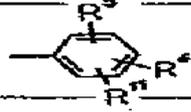
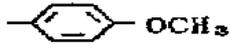
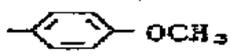
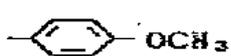
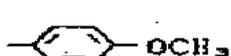
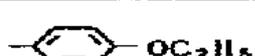
[8]

번호	R ¹	R ²	R ³	R ⁴	X	
63	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
64	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
65	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
66	H	C ₂ H ₅	C ₂ H ₅	H	-CH- C ₂ H ₅	
67	SCH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
68	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
69		C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
70	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
71	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

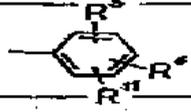
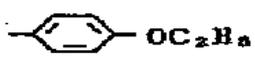
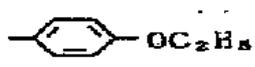
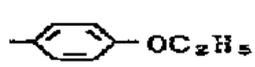
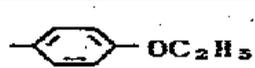
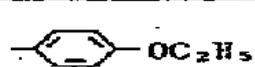
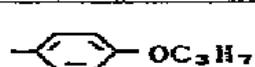
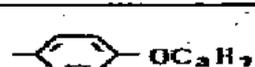
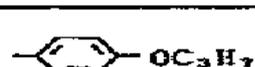
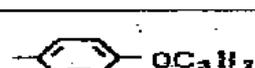
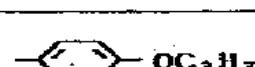
[9]

번호	R ¹	R ²	R ³	R ⁴	X	
72	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
73	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
74	H	C ₂ H ₅	H	H	-CH ₂ CH ₂ -	
75	H	C ₂ H ₅	H	H	-CH ₂ CH ₂ -	
76	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
77	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

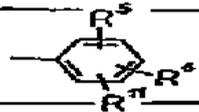
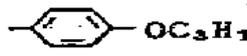
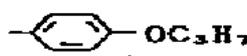
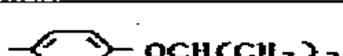
[10]

번호	R ¹	R ²	R ³	R ⁴	X	
78	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
79	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
80	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
81	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
82	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
83	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
84	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
85	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
86	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
87	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	

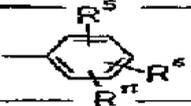
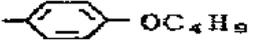
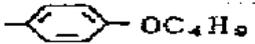
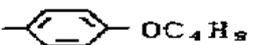
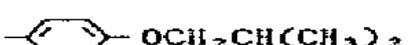
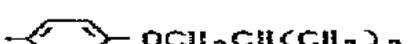
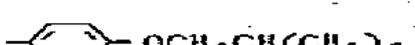
[11]

번호	R ¹	R ²	R ³	R ⁴	X	
88	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
89	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
90	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
91	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
92	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
93	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
94	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
95	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
96	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
97	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	

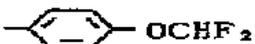
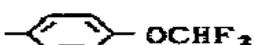
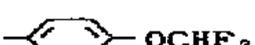
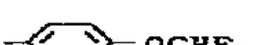
[12]

번호	R ¹	R ²	R ³	R ⁴	X	
98	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
99	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
100	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
101	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
102	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
103	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
104	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
105	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
106	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
107	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	

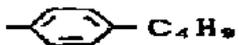
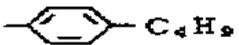
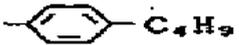
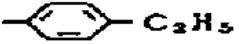
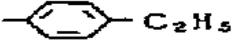
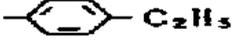
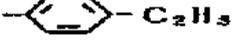
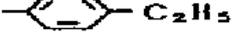
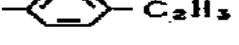
[13]

क्र.सं.	R ¹	R ²	R ³	R ⁴	X	
108	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
109	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
110	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
111	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
112	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
113	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
114	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
115	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
116	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
117	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	

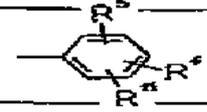
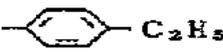
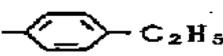
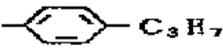
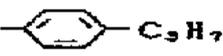
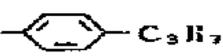
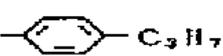
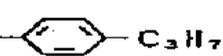
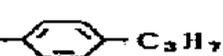
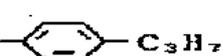
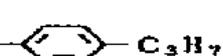
[14]

번호	R ¹	R ²	R ³	R ⁴	X	
118	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
119	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
120	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
121	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
122	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
123	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
124	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
125	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
126	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
127	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	

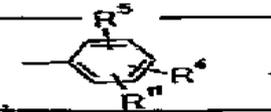
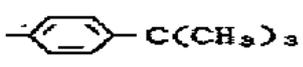
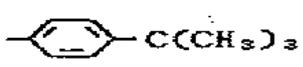
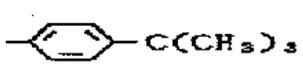
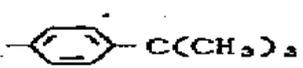
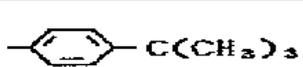
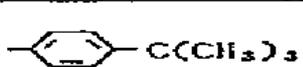
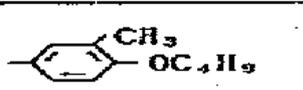
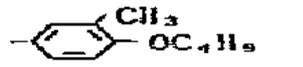
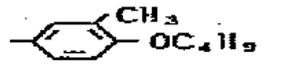
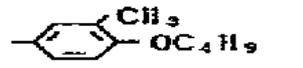
[15]

번호	R ¹	R ²	R ³	R ⁴	X	
128	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
129	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
130	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
131	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
132	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
133	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
134	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
135	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
136	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
137	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

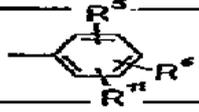
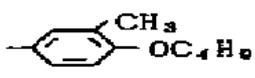
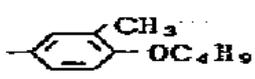
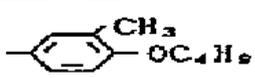
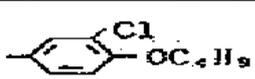
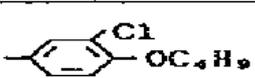
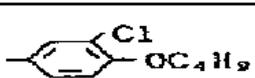
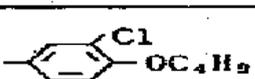
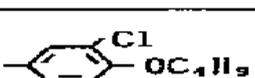
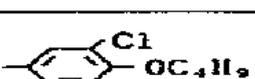
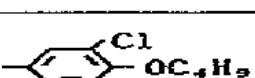
[16]

번호	R ¹	R ²	R ³	R ⁴	X	
138	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
139	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
140	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
141	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
142	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
143	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
144	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
145	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
146	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
147	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	

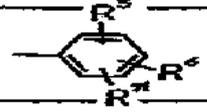
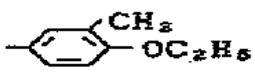
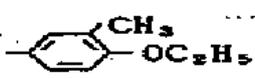
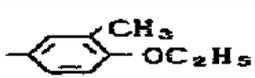
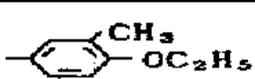
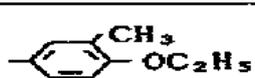
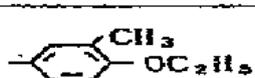
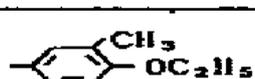
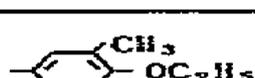
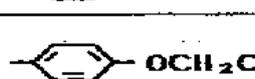
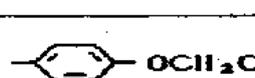
[17]

번호	R ¹	R ²	R ³	R ⁴	X	
148	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
149	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
150	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
151	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
152	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
153	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
154	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
155	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
156	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
157	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	

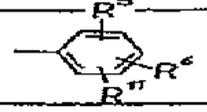
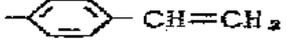
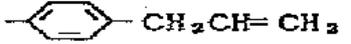
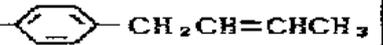
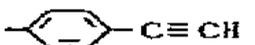
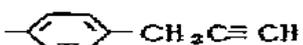
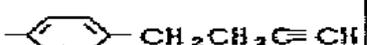
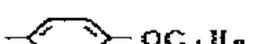
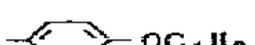
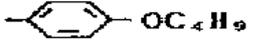
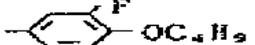
[18]

번호	R ¹	R ²	R ³	R ⁴	X	
158	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
159	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
160	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
161	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
162	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
163	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
164	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
165	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
166	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
167	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

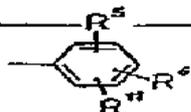
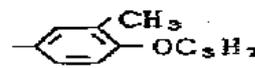
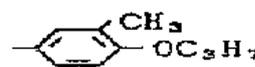
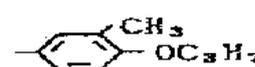
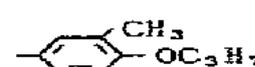
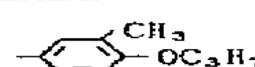
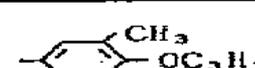
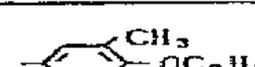
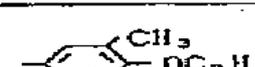
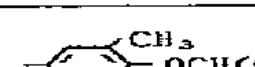
[19]

번호	R ¹	R ²	R ³	R ⁴	X	
168	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
169	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
170	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
171	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
172	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
173	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
174	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
175	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
176	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
177	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

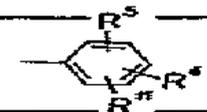
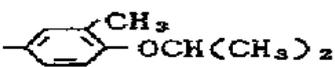
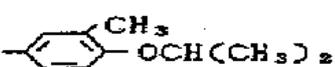
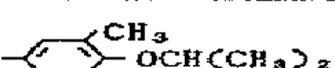
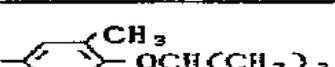
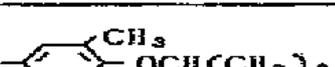
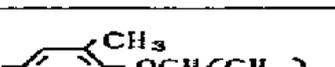
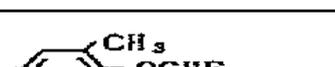
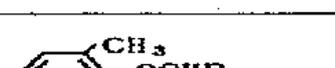
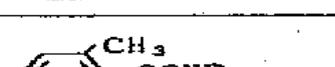
[20]

번호	R ¹	R ²	R ³	R ⁴	X	
178	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
179	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
180	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
181	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
182	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
183	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
184	H	C ₂ H ₅	CH ₂ CH=CH ₂	H	-CH ₂ CH ₂ -	
185	H	C ₂ H ₅	CH ₂ C≡CH	H	-CH ₂ CH ₂ -	
186	H	C ₂ H ₅	CH ₂ CH ₂ - 	H	-CH ₂ CH ₂ -	
187	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

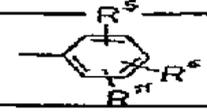
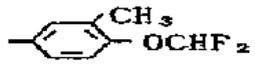
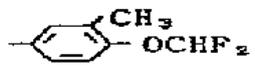
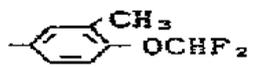
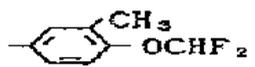
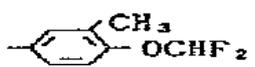
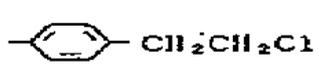
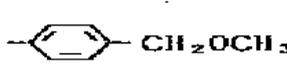
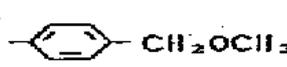
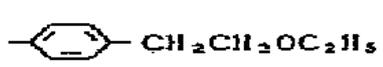
[21]

번호	R ¹	R ²	R ³	R ⁴	X	
188	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
189	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
190	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
191	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
192	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
193	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
194	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
195	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
196	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
197	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

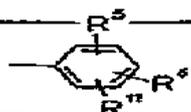
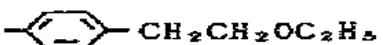
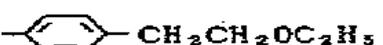
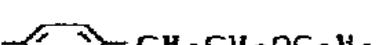
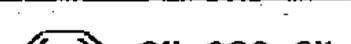
[22]

번호	R ¹	R ²	R ³	R ⁴	X	
198	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
199	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
200	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
201	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
202	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
203	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
204	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
205	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
206	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
207	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	

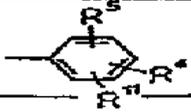
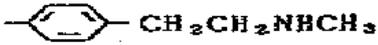
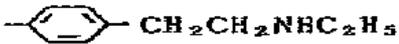
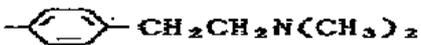
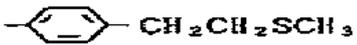
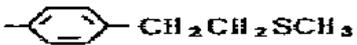
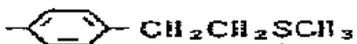
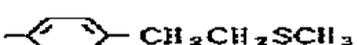
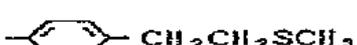
[23]

번호	R ¹	R ²	R ³	R ⁴	X	
208	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
209	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
210	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
211	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
212	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
213	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
214	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
215	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
216	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
217	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	

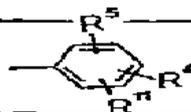
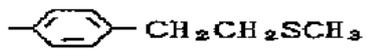
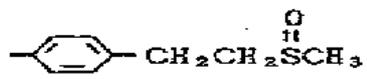
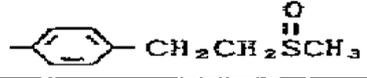
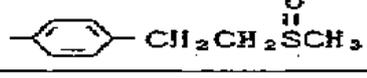
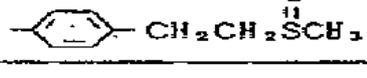
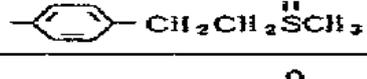
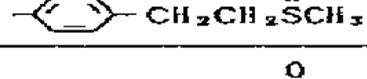
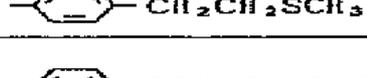
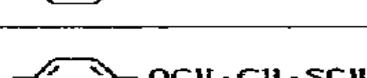
[24]

번호	R ¹	R ²	R ³	R ⁴	X	
218	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
219	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
220	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
221	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
222	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
223	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
224	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
225	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
226	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
227	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

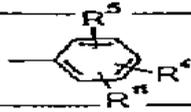
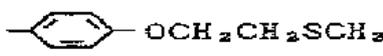
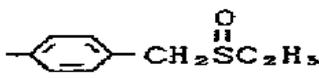
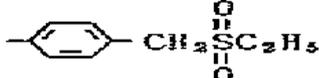
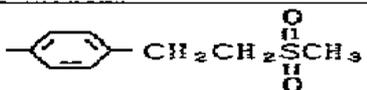
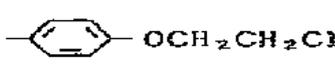
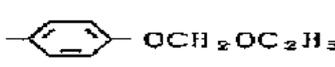
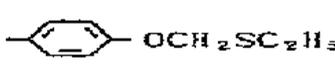
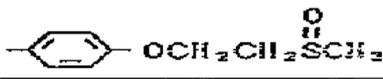
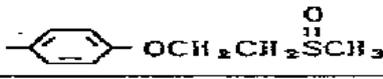
[25]

번호	R ¹	R ²	R ³	R ⁴	X	
228	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
229	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
230	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
231	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
232	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
233	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
234	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
235	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
236	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
237	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	

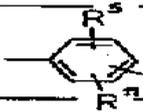
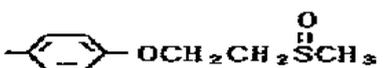
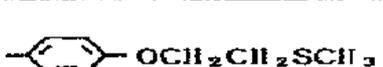
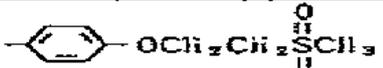
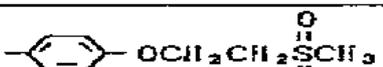
[26]

번호	R ¹	R ²	R ³	R ⁴	X	
238	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
239	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
240	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
241	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
242	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
243	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
244	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
245	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
246	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
247	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	

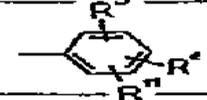
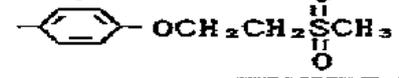
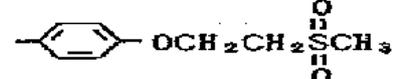
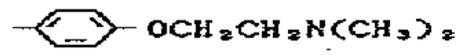
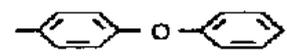
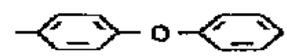
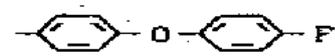
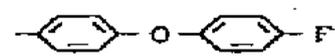
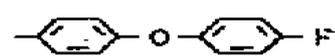
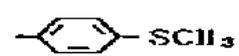
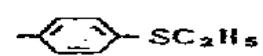
[27]

번호	R ¹	R ²	R ³	R ⁴	X	
248	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
249	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
250	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
251	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
252	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
253	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
254	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
255	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
256	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
257	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	

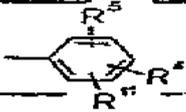
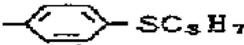
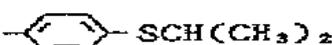
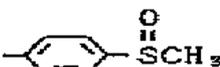
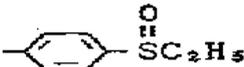
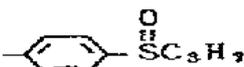
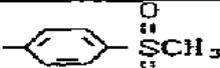
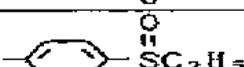
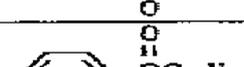
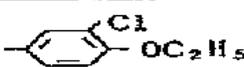
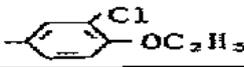
[28]

번호	R ¹	R ²	R ³	R ⁴	X	
258	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
259	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
260	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
261	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
262	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
263	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
264	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
265	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
266	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
267	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	

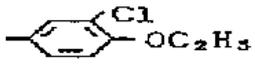
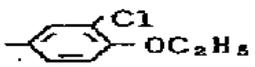
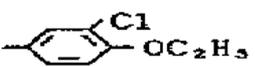
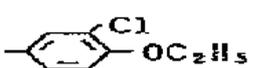
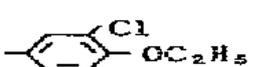
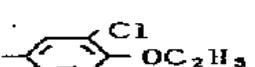
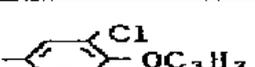
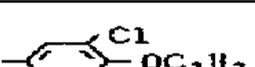
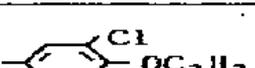
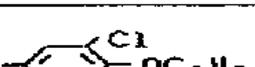
[29]

번호	R ¹	R ²	R ³	R ⁴	X	
268	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
269	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
270	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
271	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
272	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
273	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
274	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
275	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
276	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
277	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

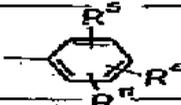
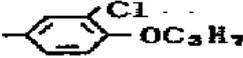
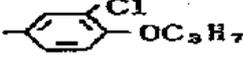
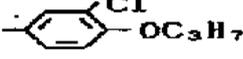
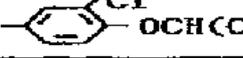
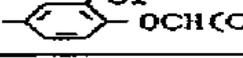
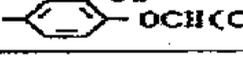
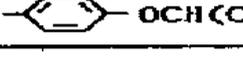
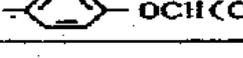
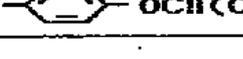
[30]

번호	R ¹	R ²	R ³	R ⁴	X	
278	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
279	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
280	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
281	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
282	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
283	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
284	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
285	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
286	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
287	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	

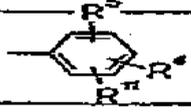
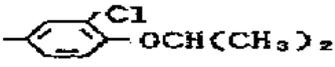
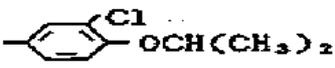
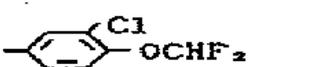
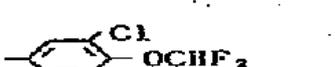
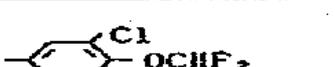
[31]

번호	R ¹	R ²	R ³	R ⁴	X	
288	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
289	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
290	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
291	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
292	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
293	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
294	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
295	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
296	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
297	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	

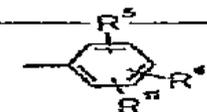
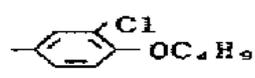
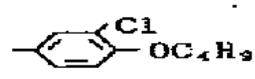
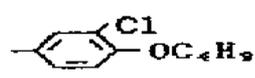
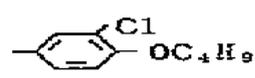
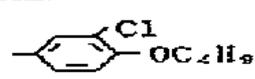
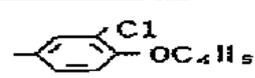
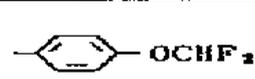
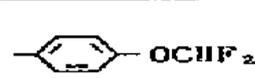
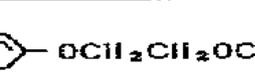
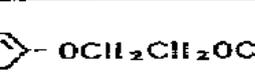
[32]

번호	R ¹	R ²	R ³	R ⁴	X	
298	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
299	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
300	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
301	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
302	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
303	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
304	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
305	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
306	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
307	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	

[33]

번호	R ¹	R ²	R ³	R ⁴	X	
308	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
309	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
310	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
311	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
312	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
313	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
314	H	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
315	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
316	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
317	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	

[34]

번호	R ¹	R ²	R ³	R ⁴	X	
318	H	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
319	H	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
320	CH ₃	CH ₃	CH ₃	H	-CH ₂ CH ₂ -	
321	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
322	CH ₃	C ₂ H ₅	C ₂ H ₅	H	-CH ₂ CH ₂ -	
323	CH ₃	C ₂ H ₅	CH ₃	H	-CH ₂ CH ₂ -	
324	H	C ₂ H ₅	C ₂ H ₅	H	$\begin{array}{c} -CH- \\ \\ CH_3 \end{array}$	
325	H	C ₂ H ₅	C ₂ H ₅	H	$\begin{array}{c} -CH- \\ \\ C_2H_5 \end{array}$	
326	H	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	
327	CH ₃	CH ₃	C ₂ H ₅	H	-CH ₂ CH ₂ -	

()

4-(2-(4-))-6- -5- (76),

4-(2-(4- -3-))-6- -5- (24),

4-(2-(4-))-6- -5- (18),

4-(2-(4-))-6- -5- (8),

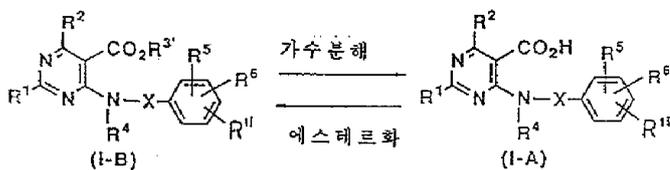
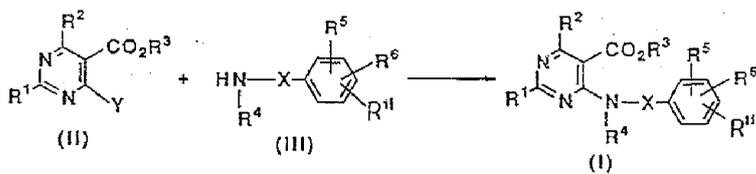
4-(2-(4-))-6- -5- (47),

4-(2-(4-))-6- -5- (3),

4-(2-(4-))-6- -5- (20)

() , , ()

()



, Y (, , ,) , R^{3'} , ,
 ()
 R^{3'} R³ .
 () () 1mol 1 2mol .
 (, N,N- , , , ,) , (, , , ,) ,
 (, , , ,) , (, , , ,) ,
 , N,N- , N,N- ; ,
) 1mol 1 3mol .
 1 24 .
 ()
 () -CO₂R³ 가 (-A)
 (-A) (-B) .
 (-B) 가 (-A)
 (, , , , , ,)
 (-B) 1mol 1 5mol .
 1 24 .
 (-A) .

(- A) 3가 (- B)

(1) (- A) :
 , , , .
 N,N- (, , ,), (, , ,),
 (- A) 1mol 1 2mol .

1 24 .

(2) (- A) :
 , .
 (, , ,), N,N- (, , ,), (, , ,)
 , ()

(- A) 1mol 1 3mol .
 1 24 .

(3) (- A) :
 , , , , , .
 ; p-
 (- A) 1mol 0.05 1mol .
 1 24 .

(- B) .
 () (J. Am. Chem. Soc., 76, 4180(1954) Angew. Chem., 80,

986(1968))

() , ()
 ()



, Y () .

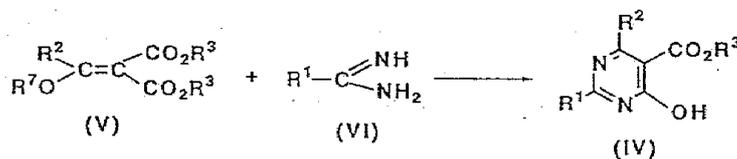
() 1mol 1, 5 5Ml 1 24 .

() , ()

() ()

()가 가 , () R' 가 , Y가

() () () , 1/2) 가



, R⁷ C₁-C₄ (, , ,), C₁-C₄ - (, , ,) , C₁-C₄ (, , ,) ()

() () 1mol 1 2mol .

(, , , , n- , 3) , (, , ,) , N,N-

(, , ,) , (, , ,) , (, , ,) ,

3

, N,N- , N,N- , , , ,

() 1mol 1 3mol .

-20 , 1 24 .

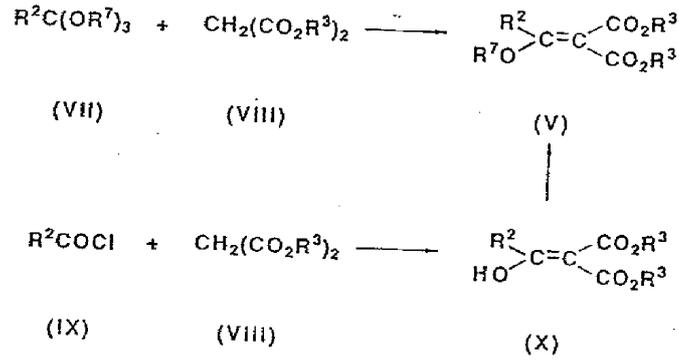
() , ()

() ()

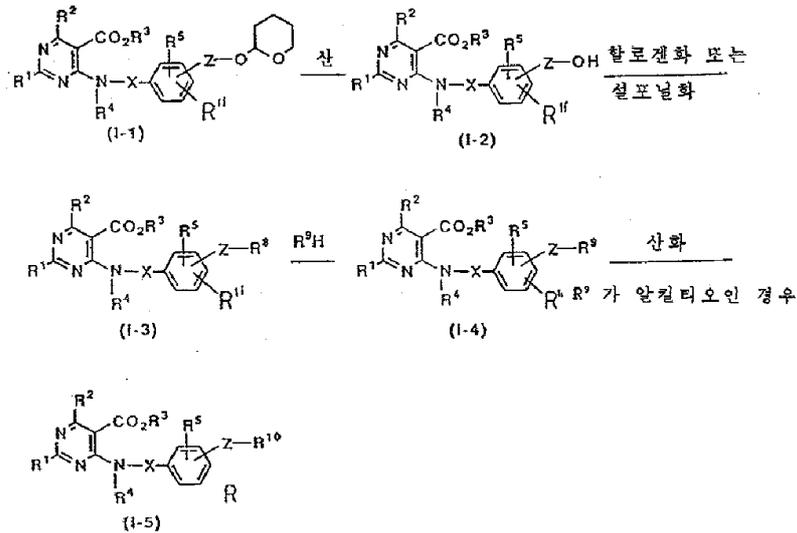
()가 ,

() [J. Org. Chem., 50, 2622(1985)]

91-109354



, R⁷ () , ()
 4- () R⁶
 (-1), (-2), (-3), (-4) (-5)



, Z X ;

R⁸ (, , , ,), (, , ,)
 (, p-) ;

R⁹ - - (, , ,) (, , ,)
) ;

R¹⁰ (, , ,) (, , ,)
 ; ()

(-1)(, R⁶ -2- -2- ()
 (, p- ,) (-2) .
 , 30 24 , (-2)
 (-2)

(- 2)
 (- 3) , N,N- , N,N- (- 2) 1mol
 1 3mol , 3
 (- 2) 1mol 1 2mol
 p- (- 2) 1mol 1 2mol
 0 30 24 (- 3)

(- 3)
 (- 4) (-
 3) 1mol 1 5mol , N,N-
 3mol 1mol 1 24
 (- 4)

(- 4) m- (- 5)
 m- (- 4) 1mol 1 3mol - 20
 30 24 (- 5)

(common millet),
 가) (Pyriculari
 a oryzae), (Rhizoctonia solani), (Erysiphe graminis),
 (Sphaerotheca fuliginea), (Erysiphe cichoracearum), (Phyto
 phthora infestans), (Pseudoperonospora cubensis), (Peronos
 pora manshurica), (Plasmopara viticola), (Botrytis cinerea);
 (Pythium aphanidermatum) (Sclerotinia scleroti
 orum); (Corticium rolfsi)

(Myzus persicae)],
 (plant - hopper), [(Nephotettix cincticeps)]
 (spider mite) [(Tetranychus ur
 ticae), (Tetranychus kanzawai), (Panonychus citri)]

. NMR 가 (J) Hz , .

[1]

6 - - 4 - - 5 - (- 5)
 (40Mℓ) 2 - - 3 - - 2 - (11.00g, 47.77mmol)
 6.94g(105.3mmol)/ 40Mℓ 가 . (5.96g, 57.25mmol) 가 , (85%
 16 , pH 7
 (=9/1)
 6 - - 4 - - 5 - (6.00g, 64%) .

m.p. : 84.5 - 86

NMR(ppm, TMS/CDCl₃): 1.27(3H, t, J=7), 1.38(3H, t, J=7), 2.62(2H, q, J=7), 4.41(2H, q, J=7), 8.18(1H, s).

[2]

1 , (- 1 - 4 - 6)
 35 .

[35]



No	R ¹	R ²	R ³	mp	¹ H-NMR (CDCl ₃) δ ppm
IV-1	H	CH ₃	CH ₃	124~ 127°C	2.43 (3 H, s), 3.94 (3 H, s), 8.16 (1 H, s)
IV-2	H	CH ₃	C ₂ H ₅	9~11	1.39 (3 H, t, J = 7), 2.42 (3 H, s), 4.40 (2 H, q, J = 7), 8.18 (1 H, s)
IV-3	CH ₃	CH ₃	C ₂ H ₅	165~ 166°C	1.38 (3 H, t, J = 7), 2.39 (3 H, s), 2.46 (3 H, s), 4.38 (2 H, q, J = 7)
IV-4	H	C ₂ H ₅	CH ₃	107~ 110°C	1.26 (3 H, t, J = 7), 2.64 (2 H, q, J = 7), 3.99 (3 H, s), 8.18 (1 H, s)
IV-5	H	C ₂ H ₅	C ₂ H ₅	84.5~ 86°C	1.27 (3 H, t, J = 7), 1.38 (3 H, t, J = 7), 2.62 (2 H, q, J = 7), 4.41 (2 H, q, J = 7), 8.18 (1 H, s)
IV-6	CH ₃	C ₂ H ₅	C ₂ H ₅	157~ 158°C	1.25 (3 H, t, J = 7), 1.37 (3 H, t, J = 7), 2.47 (3 H, s), 2.60 (2 H, q, J = 7), 4.39 (2 H, q, J = 7)

[3]

4- -6- -5- (-5)

6- -4- -5- (7.30g, 37.21mmol)

(11.41g, 74.41mmol) 가 , 90 3

pH 10

n- / (=

8/2) 4- -6- -

5- (3.50g, 44%)

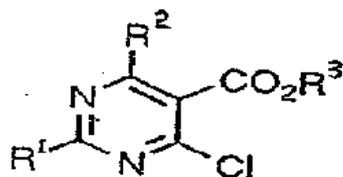
NMR(ppm, TMS/CDCl₃): 1.31(3H, t, J=7), 1.42(3H, t, J=7), 2.81(2H, q, J=7), 4.44(2H, q, J=7), 8.92(1H,s).

[4]

3 (-1 -4 -6)

36

[36]



No	R ¹	R ²	R ³	mp	¹ H-NMR (CDCl ₃) δ ppm
II'-1	H	CH ₃	CH ₃	오일	2.56 (3 H, s), 4.00 (3 H, s), 8.89 (1 H, s).
II'-2	H	CH ₃	C ₂ H ₅	오일	1.43 (3 H, t, J=7), 2.57 (3 H, s), 4.47 (2 H, q, J=7), 8.88 (1 H, s).
II'-3	CH ₃	CH ₃	C ₂ H ₅	오일	1.41 (3 H, t, J=7), 2.52 (3 H, s), 2.69 (3 H, s), 4.44 (2 H, q, J=7).
II'-4	H	C ₂ H ₅	CH ₃	오일	1.31 (3 H, t, J=7), 2.79 (2 H, q, J=7), 3.99 (3 H, s), 8.93 (1 H, s).
II'-5	H	C ₂ H ₅	C ₂ H ₅	오일	1.31 (3 H, t, J=7), 1.42 (3 H, t, J=7), 2.81 (2 H, q, J=7), 4.44 (2 H, q, J=7), 8.92 (1 H, s).
II'-6	CH ₃	C ₂ H ₅	C ₂ H ₅	오일	1.29 (3 H, t, J=7), 1.41 (3 H, t, J=7), 2.70 (3 H, s), 2.76 (2 H, q, J=7), 4.45 (2 H, q, J=7).

[5]

4-(2-(4-))-6- -5- (3)

(50ml) 4- -6- -5- (2.00g, 9.32mmol) (1.
 89g, 18.68mmol) 가 , 4- (2.16g, 11.18mmol)
 가 , 18 , (40ml) 가 ,
 , n- / (=8/2)
 4-(2-(4-))-6- -5-
 (2.00g, 58%)

NMR(ppm, TMS/CDCl₃): 0.94 (3H,t,J=7), 1.26 (3H,t,J=7), 1.37 (3H,t,J=7), 1.49 (2H,m), 1.74 (2H,m),
 2.85 (2H,t,J=7), 2.90 (2H,q,J=7), 3.71 (2H,q,J=7), 3.91(2H,t,J=6), 4.34 (2H,q,J=7), 6.83 (2H,d,J=9),
 7.14 (2H,d,J=9), 8.01 (1H,brt), 8.51 (1H,s).

[6]

4-(1-(4-)-1-)-6- -5- (6)

(10Mℓ) 4 - - 6 - - 5 - (0.40g, 1.86mmol) (0.
 33g, 3.26mmol) 가 , 80 3 , (40Mℓ) 가 , (0.46g, 2.
 22mmol) 가 , 80 3 , (40Mℓ) 가 , n - / (=8/2)
 4 - (1 - (4 -) - 1 -) -
 6 - - 5 - (0.32g, 44%) .

NMR (ppm, TMS/CDCl₃): 0.91 (3H,t,J=7), 0.95 (3H,t,J=7), 1.25 (3H,t,J=7), 1.41 (3H,t,J=7), 1.47 (2H,m), 1.73 (2H,m), 1.87 (2H,m), 2.92 (2H,q,J=7), 3.93 (2H,t,J=7), 4.38(2H,t,J=7), 5.16 (1H,q,J=7), 6.84 (2H,d,J=8), 7.24 (2H,d,J=8), 8.45 (1H,s), 8.50 (1H,d,J=7).

[7]

4 - (2 - (4 -)) - 6 - - 5 - (37)

(4Mℓ) 4 - - 6 - - 5 - (0.20g, 0.93mmol) (0.
 19g, 1.88mmol) 가 , 3 , (20Mℓ) 가 , 4 - (0.20g, 0.96mmol) 가
 , 3 , (20Mℓ) 가 , n - / (=8/2)
 4 - (2 - (4 -)) - 6 - - 5 -
 (0.20g, 55%) .

NMR (ppm, TMS/CDCl₃): 0.91 (3H,t,J=7), 1.26 (3H,t,J=7), 1.34 (3H,t,J=7), 1.46 (2H,m), 1.72 (2H,m), 2.91 (6H,m), 3.74 (2H,q,J=7), 4.34 (2H,q,J=7), 7.14 (2H,d,J=8), 7.27 (2H,d,J=8), 8.04 (1H,brt), 8.51 (1H,s).

[8]

4 - (2 - (4 -)) - 6 - - 5 - (36)

(10Mℓ) 4 - - 6 - - 5 - (0.30g, 1.40mmol) (0.
 28g, 2.77mmol) 가 , 3 , (20Mℓ) 가 , 4 - (0.40g, 2.08mmol)
 가 , 3 , (20Mℓ) 가 , n - / (=8/2)
 4 - (2 - (4 -)) - 6 - - 5 -
 (0.30g, 58%) .

mp: 65 - 66 .

NMR (ppm, TMS/CDCl₃): 0.95 (3H,t,J=7), 1.25 (3H,t,J=7), 1.36 (3H,t,J=7), 1.45 (2H,m), 1.70 (2H,m), 2.80 (2H,t,J=7), 2.89 (2H,q,J=7), 3.09 (2H,t,J=7), 3.69(2H,q,J=7), 4.34 (2H,q,J=7), 6.55 (2H,d,J=9), 7.04 (2H,d,J=9), 7.98 (1H,brt), 8.51 (1H,s).

[9]

4 - (2 - (4 - (2 - ()))) - 6 - () - 5 - ()

(10Mℓ) 4 - (2.26g, 22.33mmol) 가 (2.80g, 11.23mmol) 가 , 16 (2.41g, 11.23mmol) , 4 - (2 - (40Mℓ) 가 , n - / (4.20g, 87%)

NMR (ppm, TMS/CDCl₃): 1.26 (3H,t,J=7), 1.37 (3H,t,J=7), 1.40 - 1.80 (6H,m), 2.90 (4H,m), 3.50 - 4.20 (8H,m), 4.34 (2H,q,J=7), 4.70 (1H,m), 6.87 (2H,d,J=9), 7.14 (2H,d,J=9), 8.02 (1H,brt), 8.51 (1H,s).

[10]

4 - (2 - (4 - (2 - ()))) - 6 - () - 5 - () (49)

(40Mℓ) 4 - (2 - (4 - (2 - ()))) - 6 - () (4.20g, 9.82mmol) p - (0.10g) 가 4 가 , (40Mℓ) 가 , n - / (=1/1) (2.60g, 77%)

mp: 68 - 71 .

NMR (ppm, TMS/CDCl₃): 1.26 (3H,t,J=7), 1.37 (3H,t,J=7), 2.90 (6H,m), 3.73 (2H,q,J=7), 3.85 (2H,t,J=6), 4.33 (2H,q,J=7), 7.18 (4H,s), 8.01 (1H,brt), 8.50 (1H,s).

[11]

4 - (2 - (4 - (2 - ()))) - 6 - () - 5 - () (50)

(40Mℓ) 4 - (2 - (4 - (2 - ()))) - 6 - () - 5 - () (1.50g, 4.37mmol) (0.88g 8.70mmol) 가 , (0.60g, 5.24mmol) 가 , 10 (40Mℓ) 가 , n - / (=1/1) (1.80g, 98%)

mp: 84 - 86 .

NMR (ppm, TMS/CDCl₃): 1.26 (3H,t,J=7), 1.38 (3H,t,J=7), 2.84 (3H,s), 2.93 (4H,q,J=7), 3.03 (2H,t,J=7), 3.74 (2H,q,J=7), 4.34 (2H,q,J=7), 4.40 (2H,t,J=7), 7.19 (4H,s), 8.06 (1H,brt), 8.52 (1H,s).

[12]

4 - (2 - (4 - (2 -))) - 6 - - 5 - (55)

70% (2.14g, 33.23mmol) 4 - (2 - (4 - (2 -))) - 6 -
 - 5 - (0.70g, 1.66mmol) 가 , 100 2
 , (40Mℓ) 가 ,
 , / (=8/2)
 4 - (2 - (4 - (2 -))) - 6 -
 - 5 - (0.40g, 65%)

NMR (ppm, TMS/CDCl₃): 1.10 (3H,t,J=7), 1.26 (3H,t,J=7), 1.37 (3H,t,J=7), 2.67 (2H,q,J=7), 2.87 (8H,m), 3.74 (2H,t,J=7), 4.34 (2H,q,J=7), 7.16 (4H,s), 8.02 (1H,brt), 8.51 (1H,s).

[13]

4 - (2 - (4 - (2 -))) - 6 - - 5 - (72)

N,N - (10Mℓ) 4 - (2 - (4 - (2 -))) - 6 - -
 5 - (0.70g, 1.66mmol) , (0.13g, 1.85mmo
 l) 가 2 , (40Mℓ) 가 ,
 , n - / (=8/2)
 4 - (2 - (4 - (2 -)))
) - 6 - - 5 - (0.47g, 76%)

NMR (ppm, TMS/CDCl₃): 1.26 (3H,t,J=7), 1.37 (3H,t,J=7), 2.18 (3H,s), 2.73 (2H,m), 2.90 (6H,m), 3.74 (2H,q,J=7), 4.34 (2H,q,J=7), 7.16 (4H,s), 8.03 (1H,brt), 8.51 (1H,s).

[14]

4 - (2 - (4 - (2 -))) - 6 - - 5 - (73)

(20Mℓ) 4 - (2 - (4 - (2 -))) - 6 - - 5 -
 (0.25g, 0.67mmol) , 80% m - (0.16g, 0.74mmol) 가
 , 20 , 1N (20Mℓ) 가 ,
 , / (=8/2)
 4 - (2 - (4 - (2 -)))
) - 6 - - 5 - (0.20g, 77%)

NMR (ppm, TMS/CDCl₃): 1.26 (3H,t,J=7), 1.38 (3H,t,J=7), 2.58 (3H,s), 2.97 (6H,m), 3.07 (2H,m), 3.74 (2H,q,J=7), 4.34 (2H,q,J=7), 7.16 (4H,s), 8.07 (1H,brt), 8.51 (1H,s).

[15]

4 - (2 - (4 -)) - 6 - - 5 - (74)

(10Mℓ) 4 - (2 - (4 -)) - 6 - - 5 - (1.00g, 2.69mmol)
 , , 4 , 1N (0.53g(13.24mmol)/ 10Mℓ) 가
 , , , pH 4 .
 4 - (2 - (4 -)) - 6 - - 5 - (0.83g, 90%) .

m.p.: 208 - 211

NMR (ppm, TMS/CDCl₃): 0.95 (3H,t,J=7), 1.39 (3H,t,J=7), 1.41 (2H,m), 1.73 (2H,m), 2.91 (2H,t,J=7), 3.36 (2H,q,J=7), 3.82 (2H, q, J=7), 3.93 (2H,t,J=7). 6.48 (2H,d,J=9), 7.16 (2H,d,J=9), 8.70 (1H,s), 11.01 (1H,brs).

[16]

4 - (2 - (4 -)) - 6 - - 5 - (2)

(20Mℓ) (0.42g, 2.96mmol) 4 - (2 - (4 -)) - 6 -
 - 5 - (0.34g, 0.99mmol) (0.27g, 1.95mmol) 가 , 65 3
 , , n- /
 (=8/2) 4 - (2 - (4 -))
) - 6 - - 5 - (0.26g, 73%) .

NMR (ppm, TMS/CDCl₃): 0.94 (3H,t,J=7), 1.25 (3H,t,J=7), 1.49 (2H,m), 1.76 (2H,m), 2.86 (2H,t,J=7), 2.92 (2H,q,J=7), 3.73 (2H,q,J=7), 3.86 (3H,s), 3.94 (2H,t,J=7), 6.84 (2H,d,J=9), 7.13 (2H,d,J=9), 7.96 (1H,brt), 8.52 (1H,s).

[17]

4 - (2 - (3,4 -)) - 6 - - 2 - - 5 - (67)

(4Mℓ) 4 - - 6 - - 2 - - 5 - (0.21g, 0.81mmol)
 (0.17g, 1.68mmol) 가 , 3,4 - (0.18g, 0.99mmol) 가 ,
 14 , ,
 , n- / (=8/2)
 4 - (2 - (3,4 -)) - 6 - - 2 - - 5 - (0.16
 g, 49%) .

mp: 52 - 53 .

NMR (ppm, TMS/ CDCl_3): 1.22 (3H,t,J=7), 1.35 (3H,t,J=7), 2.54 (3H,s), 2.86 (2H,t,J=7), 2.89 (2H,q,J=7), 3.74 (2H,q,J=7), 3.87 (3H,s), 3.88 (3H,s), 4.30 (2H,q,J=7), 6.74 (1H,s), 6.77 (2H,m), 8.37 (1H,brt).

[18]

56 5 17 66, 68 71 75 327 1, 4, 5, 7 35, 38 48, 52 54, 37 59

[37]

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
1	36.5~ 38°C	1.26 (3 H, t, J = 7), 1.30 (9H, s), 1.35 (3 H, t, J = 7), 2.89 (2 H, t, J = 7), 2.93 (2H, q, J = 7), 3.75 (2H, q, J = 7), 4.33 (2 H, q, J = 7), 7.14 (2 H, d, J = 9), 7.33 (2H, d, J = 9), 7.98 (1H, brt), 8.51 (1 H, s).
2	오일	0.94 (3 H, t, J = 7), 1.25 (3 H, t, J = 7), 1.49 (2 H, m), 1.76 (2 H, m), 2.86 (2 H, t, J = 7), 2.92 (2 H, q, J = 7), 3.73 (2 H, q, J = 7), 3.86 (3 H, s), 3.94 (2 H, t, J = 7), 6.84 (2 H, d, J = 9), 7.13 (2 H, d, J = 9), 7.96 (1 H, brt), 8.52 (1 H, s).
3	오일	0.96 (3 H, t, J = 7), 1.26 (3H, t, J = 7), 1.37 (3H, t, J = 7), 1.49 (2 H, m), 1.74 (2 H, m), 2.85 (2H, t, J = 7), 2.90 (2H, q, J = 7), 3.71 (2H, q, J = 7), 3.91 (2 H, t, J = 6), 4.34 (2 H, q, J = 7), 6.83 (2 H, d, J = 9), 7.14 (2 H, d, J = 9), 8.01 (1 H, brt), 8.51 (1 H, s).
4	32~ 33°C	0.97 (3 H, t, J = 7), 1.26 (3 H, t, J = 7), 1.36 (3 H, t, J = 7), 1.49 (2 H, m), 1.74 (2 H, m), 2.64 (2 H, q, J = 7), 2.85 (2 H, t, J = 7), 2.92 (3 H, s), 3.76 (2 H, t, J = 7), 3.93 (2 H, t, J = 7), 4.33 (2 H, q, J = 7), 6.82 (2 H, d, J = 8), 7.13 (2H, d, J = 8), 8.53 (1 H, s).
5	오일	0.96 (3 H, t, J = 7), 1.26 (3 H, t, J = 7), 1.40 (3 H, t, J = 7), 1.47 (2H, m), 1.54 (3 H, d, J = 7), 1.74 (2 H, m), 2.93 (2 H, q, J = 7), 3.93 (2 H, t, J = 7), 4.36 (2 H, q, J = 7), 5.36 (1H, m), 6.85 (2 H, d, J = 9), 7.27 (2 H, d, J = 9), 8.41 (1H, d, J = 7), 8.48 (1 H, s).

[38]

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
6	오일	0.91 (3H, t, J), 0.95 (3H, t, J=7), 1.25 (3H, t, J=7), 1.41 (3H, t, J=7), 1.47 (2H, m), 1.73 (2H, m), 1.87 (2H, m), 2.92 (2H, q, J=7), 3.93 (2H, t, J=7), 4.38 (2H, t, J=7), 5.16 (1H, q, J=7), 6.84 (2H, d, J=8), 7.24 (2H, d, J=8), 8.45 (1H, s), 8.50 (1H, d, J=7).
7	오일	0.96 (3H, t, J=7), 1.27 (3H, t, J=7), 1.35 (3H, t, J=7), 1.47 (2H, m), 1.75 (2H, m), 2.95 (2H, q, J=7), 3.94 (2H, t, J=7), 4.35 (2H, q, J=7), 4.64 (2H, d, J=6), 6.86 (2H, d, J=9), 7.25 (2H, d, J=9), 8.28 (1H, t, J=6), 8.53 (1H, s).
8	오일	0.97 (3H, t, J=7), 1.37 (3H, t, J=7), 1.49 (2H, m), 1.76 (2H, m), 2.62 (3H, s), 2.86 (2H, t, J=7), 3.73 (2H, q, J=7), 3.93 (2H, t, J=7), 4.34 (2H, q, J=7), 6.84 (2H, d, J=9), 7.14 (2H, d, J=9), 8.23 (1H, brt), 8.47 (1H, s).
9	93.5~ 94°C	1.31 (9H, s), 1.33 (3H, t, J=7), 1.37 (3H, t, J=7), 2.97 (2H, t, J=7), 3.04 (2H, q, J=7), 3.89 (2H, q, J=7), 4.34 (2H, q, J=7), 7.22 (2H, d, J=9), 7.34 (2H, d, J=9), 7.47 (3H, d d, J=7,4), 8.13 (1H, brt), 8.50 (2H, d d, J=7,4).

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
10	오일	0.97 (3H, t, J=7), 1.24 (3H, t, J=7), 1.36 (3H, t, J=7), 1.48 (2H, m), 1.76 (2H, m), 2.50 (3H, s), 2.84 (2H, t, J=7), 2.89 (2H, q, J=7), 3.72 (2H, q, J=7), 3.94 (2H, q, J=7), 4.32 (2H, q, J=7), 6.84 (2H, d, J=9), 7.14 (2H, d, J=9), 8.05 (1H, brt).
11	61~62°C	1.25 (3H, t, J=7), 1.31 (9H, s), 2.89 (2H, t, J=7), 2.92 (2H, q, J=7), 3.75 (2H, q, J=7), 3.86 (3H, s), 7.17 (2H, d, J=8), 7.33 (2H, d, J=8), 7.98 (1H, brt), 8.52 (1H, s).
12	오일	0.97 (3H, t, J=7), 1.01 (3H, t, J=7), 1.26 (3H, t, J=7), 1.46 (2H, m), 1.74 (4H, m), 2.87 (2H, t, J=7), 2.93 (2H, q, J=7), 3.72 (2H, q, J=7), 3.93 (2H, t, J=7), 4.23 (2H, q, J=7), 6.84 (2H, d, J=9), 7.14 (2H, d, J=9), 8.01 (1H, brt), 8.52 (1H, s).
13	오일	0.97 (3H, t, J=7), 1.26 (3H, t, J=7), 1.35 (6H, d, J=6), 1.46 (2H, m), 1.76 (2H, m), 2.86 (2H, t, J=7), 2.91 (2H, q, J=7), 3.71 (2H, q, J=7), 3.93 (2H, t, J=7), 5.22 (1H, m), 6.83 (2H, d, J=9), 7.14 (2H, d, J=9), 8.01 (1H, brt), 8.51 (1H, s).
14	오일	0.97 (3H, t, J=7), 1.25 (3H, t, J=7), 1.33 (3H, t, J=7), 1.48 (4H, m), 1.74 (4H, m), 2.87 (2H, t, J=7), 2.93 (2H, q, J=7), 3.71 (2H, q, J=7), 3.93 (2H, t, J=7), 4.27 (2H, t, J=7), 6.83 (2H, d, J=9), 7.14 (2H, d, J=9), 8.02 (1H, brt), 8.52 (1H, s).

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
15	오일	0.97 (3 H, t, J=7), 1.15 (3 H, t, J=7), 1.47 (2 H, m), 1.76 (2 H, m), 2.84 (2 H, t, J=7), 2.86 (2 H, q, J=7), 3.70 (2 H, q, J=7), 3.93 (2 H, t, J=7), 5.30 (2 H, s), 6.83 (2 H, d, J=9), 7.12 (2 H, d, J=9), 7.38 (5 H, s), 7.98 (1 H, br), 8.51 (1 H, s).
16	오일	0.97 (3 H, t, J=7), 1.26 (3 H, t, J=7), 1.31 (9 H, s), 1.45 (2 H, m), 1.69 (2 H, m), 2.88 (2 H, t, J=7), 2.93 (2 H, q, J=7), 3.74 (2 H, q, J=7), 4.28 (2 H, q, J=7), 7.18 (2 H, d, J=8), 7.33 (2 H, d, J=8), 8.05 (1 H, br), 8.52 (1 H, s).
17	38~39°C	1.26 (3 H, t, J=7), 1.36 (3 H, t, J=7), 1.40 (3 H, t, J=7), 2.86 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.72 (2 H, q, J=7), 4.01 (2 H, q, J=7), 4.34 (2 H, q, J=7), 6.83 (2 H, d, J=9), 7.14 (2 H, d, J=9), 8.01 (1 H, br), 8.51 (1 H, s).
18	60~61°C	1.02 (3 H, t, J=7), 1.26 (3 H, t, J=7), 1.36 (3 H, t, J=7), 1.74 (2 H, m), 2.86 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.72 (2 H, t, J=7), 3.90 (2 H, t, J=7), 4.34 (2 H, q, J=7), 6.84 (2 H, d, J=9), 7.14 (2 H, d, J=9), 8.02 (1 H, br), 8.52 (1 H, s).

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
19	오일	0.90 (3 H, t, J = 7), 1.26 (3 H, t, J = 7), 1.20~1.40 (9 H, m), 1.74 (2 H, m), 2.86 (2 H, t, J = 7), 2.92 (2 H, q, J = 7), 3.72 (2 H, q, J = 7), 3.93 (2 H, t, J = 7), 4.34 (2 H, q, J = 7), 6.84 (2 H, d, J = 9), 7.14 (2 H, d, J = 9), 8.01 (1 H, br), 8.52 (1 H, s).
20	오일	1.20 (3 H, t, J = 7), 1.26 (3 H, t, J = 7), 1.36 (3 H, t, J = 7), 2.87 (4 H, t, J = 7), 2.91 (2 H, q, J = 7), 3.50 (2 H, q, J = 7), 3.61 (2 H, t, J = 7), 3.73 (2 H, q, J = 7), 4.33 (2 H, q, J = 7), 7.16 (4 H, s), 8.02 (1 H, br), 8.52 (1 H, s).
21	오일	1.01 (3 H, t, J = 7), 1.20 (3 H, t, J = 7), 1.26 (3 H, t, J = 7), 1.73 (2 H, m), 2.87 (4 H, t, J = 7), 2.93 (2 H, q, J = 7), 3.50 (2 H, q, J = 7), 3.61 (2 H, t, J = 7), 3.73 (2 H, q, J = 7), 4.24 (2 H, t, J = 7), 7.16 (4 H, s), 8.04 (1 H, br), 8.52 (1 H, s).
22	오일	1.20 (3 H, t, J = 7), 1.26 (3 H, t, J = 7), 1.34 (6 H, d, J = 7), 2.86 (4 H, t, J = 7), 2.91 (2 H, q, J = 7), 3.50 (2 H, q, J = 7), 3.61 (2 H, t, J = 7), 3.73 (2 H, q, J = 7), 5.22 (1 H, m), 7.16 (4 H, s), 8.01 (1 H, br), 8.51 (1 H, s).
23	73~74°C	1.26 (3 H, t, J = 7), 1.38 (3 H, t, J = 7), 2.33 (3 H, s), 2.89 (2 H, t, J = 7), 2.93 (2 H, q, J = 7), 3.70 (2 H, q, J = 7), 4.34 (2 H, q, J = 7), 7.10~7.15 (3 H, m), 8.09 (1 H, br), 8.52 (1 H, s).

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
24	42~44°C	0.97 (3 H, t, J=7), 1.26 (3 H, t, J=7), 1.36 (3 H, t, J=7), 1.47 (2 H, m), 1.76 (2 H, m), 2.20 (3 H, s), 2.82 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.70 (2 H, q, J=7), 3.94 (2 H, t, J=7), 4.34 (2 H, q, J=7), 6.74 (1 H, d, J=9), 6.99 (1 H, d, J=9), 7.01 (1 H, s), 8.00 (1 H, br), 8.52 (1 H, s).
25	49~51°C	0.98 (3 H, t, J=7), 1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 1.45 (2 H, m), 1.80 (2 H, m), 2.83 (2 H, t, J=7), 2.93 (2 H, q, J=7), 3.71 (2 H, q, J=7), 4.00 (2 H, t, J=7), 4.34 (2 H, q, J=7), 6.85 (1 H, d, J=9), 7.05 (1 H, d, J=9.2), 7.23 (1 H, d, J=2), 8.02 (1 H, br), 8.52 (1 H, s).
26	40~ 40.5°C	1.26 (3 H, t, J=7), 1.36 (3 H, t, J=7), 2.23 (3 H, s), 2.24 (3 H, s), 2.85 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.72 (2 H, q, J=7), 4.33 (2 H, q, J=7), 6.97 (1 H, d, J=8), 7.01 (1 H, s), 7.07 (1 H, d, J=8), 8.01 (1 H, br), 8.51 (1 H, s).
27	58~60°C	1.26 (3 H, t, J=7), 1.38 (3 H, t, J=7), 2.29 (3 H, s), 2.33 (3 H, s), 2.89 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.69 (2 H, q, J=7), 4.35 (2 H, q, J=7), 7.00 (3 H, m), 8.02 (1 H, br), 8.52 (1 H, s).

[43]

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
28	59.5~ 60 $^{\circ}\text{C}$	1.26 (3 H, t, J=7), 1.38 (3 H, t, J=7), 2.88 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.70 (2 H, q, J=7), 4.36 (2 H, q, J=7), 7.07 (1 H, d d, J=9.2), 7.31 (1 H, d, J=2), 7.37 (1 H, d, J=9), 8.08 (1 H, brt), 8.52 (1 H, s).
29	84~85 $^{\circ}\text{C}$	1.27 (3 H, t, J=7), 1.39 (3 H, t, J=7), 2.93 (2 H, q, J=7), 3.03 (2 H, t, J=7), 3.78 (2 H, q, J=7), 4.35 (2 H, q, J=7), 7.17 (2 H, s), 7.38 (1 H, s), 8.07 (1 H, brt), 8.53 (1 H, s).
30	70~72 $^{\circ}\text{C}$	1.26 (3 H, t, J=7), 1.36 (3 H, t, J=7), 2.93 (2 H, q, J=7), 3.27 (2 H, q, J=7), 3.80 (2 H, q, J=7), 4.36 (2 H, q, J=7), 7.09 (1 H, d, J=8), 7.28 (2 H, d, J=8), 8.04 (1 H, brt), 8.49 (1 H, s).
31	오일	1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 2.92 (2 H, q, J=7), 2.98 (2 H, t, J=7), 3.78 (2 H, q, J=7), 4.34 (2 H, q, J=7), 7.43 (4 H, m), 8.10 (1 H, brt), 8.52 (1 H, s).
32	오일	0.97 (3 H, t, J=7), 1.25 (3 H, t, J=7), 1.36 (3 H, t, J=7), 1.49 (2 H, m), 1.78 (2 H, m), 2.89 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.74 (2 H, q, J=7), 3.96 (2 H, t, J=7), 4.34 (2 H, q, J=7), 6.86 (1 H, d, J=8), 6.87 (1 H, t, J=8), 7.19 (1 H, d, J=8), 7.20 (1 H, t, J=8), 7.94 (1 H, brt), 8.50 (1 H, s).

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
33	오일	0.97 (3 H, t, J=7), 1.26 (3H, t, J=7), 1.37 (3H, t, J=7), 1.49 (2 H, m), 1.78 (2H, m), 2.89 (2H, t, J=7), 2.92 (2H, q, J=7), 3.74 (2H, q, J=7), 3.95 (2 H, t, J=7), 4.34 (2 H, q, J=7), 6.78 (3 H, m), 7.21 (1 H, t, J=8), 8.01 (1 H, brt), 8.51 (1 H, s).
34	47~48°C •	1.26 (3 H, t, J=7), 1.29 (9 H, s), 1.39 (3 H, t, J=7), 2.94 (2 H, q, J=7), 3.92 (2 H, q, J=6), 4.14 (2 H, t, J=6), 4.35 (2 H, q, J=7), 6.87 (2 H, d, J=9), 7.31 (2 H, d, J=9), 8.33 (1 H, brt), 8.51 (1 H, s).
35	42~43°C	0.93 (3 H, t, J=7), 1.26 (3 H, t, J=7), 1.39 (3 H, t, J=7), 1.46 (2 H, m), 1.76 (2 H, m), 2.94 (2 H, q, J=7), 3.88 (2 H, q, J=7), 3.90 (2 H, t, J=6), 4.10 (2 H, t, J=6), 4.34 (2 H, q, J=7), 6.86 (4 H, m), 8.32 (1 H, brt), 8.51 (1 H, s).
36	65~66°C	0.95 (3 H, t, J=7), 1.25 (3 H, t, J=7), 1.36 (3 H, t, J=7), 1.45 (2 H, m), 1.70 (2 H, m), 2.80 (2 H, t, J=7), 2.89 (2 H, q, J=7), 3.09 (2 H, t, J=7), 3.69 (2 H, q, J=7), 4.34 (2 H, q, J=7), 6.55 (2 H, d, J=9), 7.04 (2 H, d, J=9), 7.98 (1 H, brt), 8.51 (1 H, s).

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
37	오일	0.91 (3 H, t, J=7), 1.26 (3 H, t, J=7), 1.34 (3 H, t, J=7), 1.46 (2 H, m), 1.72 (2 H, m), 2.91 (6 H, m), 3.74 (2 H, q, J=7), 4.34 (2 H, q, J=7), 7.14 (2 H, d, J=8), 7.27 (2 H, d, J=8), 8.04 (1 H, brt), 8.51 (1 H, s).
38	110~111°C	1.27 (3 H, t, J=7), 1.39 (3 H, t, J=7), 2.94 (2 H, q, J=7), 3.05 (2 H, t, J=7), 3.78 (2 H, q, J=7), 4.34 (2 H, q, J=7), 7.39 (2 H, t, J=9), 8.18 (2 H, d, J=9), 8.17 (1 H, brt), 8.53 (1 H, s).
39	오일	1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 2.89 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.73 (2 H, q, J=7), 4.34 (2 H, q, J=7), 6.99 (2 H, t, J=9), 7.20 (2 H, d d, J=9,6), 8.05 (1 H, brt), 8.51 (1 H, s).
40	52.5~ 53.5°C	1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 2.21 (3 H, s), 2.90 (6 H, m), 3.72 (2 H, q, J=7), 4.14 (2 H, q, J=7), 4.34 (2 H, q, J=7), 6.85 (2 H, d, J=9), 7.14 (2 H, d, J=9), 8.04 (1 H, brt), 8.52 (1 H, s).
41	83~84°C	1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 2.70 (3 H, s), 2.87 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.14 (2 H, m), 3.74 (2 H, q, J=7), 4.34 (2 H, q, J=7), 4.41 (2 H, t, J=7), 6.86 (2 H, d, J=9), 7.16 (2 H, d, J=9), 8.05 (1 H, brt), 8.52 (1 H, s).

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번호	mp	$^1\text{H-NMR (CDCl}_3) \delta$ ppm
42	38.5~ 40°C	1.24 (3 H, t, J = 7), 1.26 (3 H, t, J = 7), 1.37 (3 H, t, J = 7), 2.86 (2 H, t, J = 7), 2.92 (2 H, q, J = 7), 3.60 (2 H, q, J = 7), 3.72 (2 H, q, J = 7), 3.78 (2 H, t, J = 5), 4.10 (2 H, t, J = 5), 4.34 (2 H, q, J = 7), 6.87 (2 H, d, J = 9), 7.14 (2 H, d, J = 9), 8.02 (1 H, brt), 8.52 (1 H, s).
43	49~50°C	1.16 (3 H, t, J = 7), 1.26 (3 H, t, J = 7), 1.37 (3 H, t, J = 7), 2.74 (2 H, q, J = 7), 2.86 (2 H, t, J = 7), 2.89 (2 H, q, J = 7), 3.02 (2 H, t, J = 5), 3.73 (2 H, q, J = 7), 4.07 (2 H, t, J = 5), 4.34 (2 H, q, J = 7), 6.86 (2 H, d, J = 9), 7.14 (2 H, d, J = 9), 8.02 (1 H, brt), 8.51 (1 H, s).
44	오일	1.06 (6 H, t, J = 7), 1.26 (3 H, t, J = 7), 1.37 (3 H, t, J = 7), 2.64 (4 H, q, J = 7), 2.92 (6 H, m), 3.71 (2 H, q, J = 7), 4.04 (2 H, t, J = 7), 4.34 (2 H, q, J = 7), 6.85 (2 H, d, J = 9), 7.13 (2 H, d, J = 9), 8.02 (1 H, brt), 8.51 (1 H, s).
45	58~59°C	1.26 (3 H, t, J = 7), 1.37 (3 H, t, J = 7), 2.89 (2 H, t, J = 7), 2.92 (2 H, q, J = 7), 3.74 (2 H, q, J = 7), 4.34 (2 H, q, J = 7), 7.15 (2 H, d, J = 9), 7.25 (2 H, d, J = 9), 8.06 (1 H, brt), 8.51 (1 H, s).

[47]

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
46	34~35°C	1.26 (3 H, t, J=7), 1.36 (3 H, t, J=7), 2.32 (3 H, s), 2.88 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.74 (2 H, q, J=7), 4.30 (2 H, q, J=7), 7.12 (4 H, s), 8.02 (1 H, brt), 8.52 (1 H, s).
47	오일	0.92 (3 H, t, J=7), 1.26 (3 H, t, J=7), 1.36 (3 H, t, J=7), 1.56 (4 H, m), 2.58 (2 H, t, J=7), 2.88 (2 H, t, J=7), 2.91 (2 H, q, J=7), 3.74 (2 H, q, J=7), 4.34 (2 H, q, J=7), 7.13 (4 H, s), 8.00 (1 H, brt), 8.51 (1 H, s).
48	40.5~ 41.5°C	1.14 (6 H, t, J=7), 1.26 (3 H, t, J=7), 1.36 (3 H, t, J=7), 2.81 (2 H, t, J=7), 2.91 (2 H, q, J=7), 3.30 (4 H, q, J=7), 3.70 (2 H, q, J=7), 4.34 (2 H, q, J=7), 6.64 (2 H, d, J=9), 7.09 (2 H, d, J=9), 7.98 (1 H, brt), 8.51 (1 H, s).
49	68~71°C	1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 2.90 (6 H, m), 3.73 (2 H, q, J=7), 3.85 (2 H, t, J=7), 4.33 (2 H, q, J=7), 7.18 (4 H, s), 8.01 (1 H, brt), 8.50 (1 H, s).
50	84~86°C	1.26 (3 H, t, J=7), 1.38 (3 H, t, J=7), 2.84 (3 H, s), 2.93 (4 H, q, J=7), 3.03 (2 H, t, J=7), 3.74 (2 H, q, J=7), 4.34 (2 H, q, J=7), 4.40 (2 H, t, J=7), 7.19 (4 H, s), 8.06 (1 H, brt), 8.52 (1 H, s).

[48]

번호	mp	$^1\text{H-NMR (CDCl}_3\text{)} \delta$ ppm
51	오일	1.26 (3 H, t, J=7), 1.38 (3 H, t, J=7), 1.40~1.80 (6H,m), 2.90 (6 H,m), 3.40~4.00 (6 H,m), 4.34 (2 H, q, J=7), 4.50 (1 H,m), 7.17 (4 H, s), 8.03 (1 H, brt), 8.51 (1 H, s).
52	오일	1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 1.40~1.80 (6H,m), 2.90 (4 H,m), 3.50~4.20 (8 H,m), 4.34 (2 H, q, J=7), 4.70 (1 H,m), 6.87 (2 H, d J=9), 7.14 (2 H, d, J=9), 8.02 (1 H, brt), 8.51 (1 H, s).
53	43.5~44°C	0.92 (3 H, t, J=7), 1.19 (3 H, t, J=7), 1.25 (3 H, t, J=7), 1.41 (3 H, t, J=7), 1.88 (2 H,m), 2.89 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.51 (2 H, q, J=7), 3.61 (2 H, t, J=7), 4.39 (2 H, q, J=7), 5.20 (1 H, q, J=7), 7.18 (2 H, d, J=8), 7.25 (2 H, d, J=8), 8.47 (1 H, s), 8.51 (1 H, d, J=7).
54	오일	1.26 (3 H, t; J=7), 1.37 (3 H, t, J=7), 2.43 (3 H, s), 2.80~2.96 (8 H,m), 3.74 (2 H, t, J=7), 4.34 (2 H, q, J=7), 7.16 (4 H, s), 8.02 (1 H, brt), 8.52 (1 H, s).

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
55	오일	1.10 (3 H, t, J=7), 1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 2.67 (2 H, q, J=7), 2.87 (8 H, m), 3.74 (2 H, t, J=7), 4.34 (2 H, q, J=7), 7.16 (4 H, s), 8.02 (1 H, brt), 8.51 (1 H, s).
56	오일	1.26 (3 H, t, J=7), 1.36 (3 H, t, J=7), 2.31 (6 H, s), 2.54 (2 H, m), 2.78 (2 H, m), 2.89 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.74 (2 H, t, J=7), 4.34 (2 H, q, J=7), 7.15 (4 H, s), 8.02 (1 H, brt), 8.52 (1 H, s).
57	32~33°C	1.09 (6 H, t, J=7), 1.26 (3 H, t, J=7), 1.36 (3 H, t, J=7), 2.65 (4 H, q, J=7), 2.74 (4 H, m), 2.90 (2 H, t, J=7), 2.91 (2 H, q, J=7), 3.74 (2 H, t, J=7), 4.34 (2 H, q, J=7), 7.15 (4 H, s), 8.02 (1 H, brt), 8.52 (1 H, s).
58	오일	0.97 (3 H, t, J=7), 1.20 (3 H, t, J=7), 1.26 (3 H, t, J=7), 1.44 (2 H, m), 1.74 (2 H, m), 2.88 (4 H, t, J=7), 2.93 (2 H, q, J=7), 3.51 (2 H, q, J=7), 3.61 (2 H, t, J=7), 3.74 (2 H, q, J=7), 4.28 (2 H, q, J=7), 7.16 (4 H, s), 8.04 (1 H, brt), 8.52 (1 H, s).
59	오일	1.15 (3 H, t, J=7), 1.20 (3 H, t, J=7), 2.86 (4 H, t, J=7), 2.87 (2 H, q, J=7), 3.50 (2 H, q, J=7), 3.61 (2 H, t, J=7), 3.72 (2 H, q, J=7), 5.30 (2 H, s), 7.15 (4 H, s), 7.38 (5 H, s), 8.00 (1 H, brt), 8.52 (1 H, s).

[50]

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
60	오일	1.25 (3 H, t, J=7), 1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 2.57 (2 H, q, J=7), 2.70~3.00 (8 H, m), 3.74 (2 H, q, J=7), 4.34 (2 H, q, J=7), 7.16 (4 H, s), 8.02 (1 H, brt), 8.52 (1 H, s).
61	44~ 44.5 $^{\circ}\text{C}$	1.26 (3 H, t, J=7), 1.32 (6 H, d, J=6), 1.36 (3 H, t, J=7), 2.85 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.73 (2 H, q, J=7), 4.36 (2 H, q, J=7), 4.50 (1 H, m), 6.83 (2 H, d, J=9), 7.13 (2 H, d, J=9), 8.02 (1 H, brt), 8.52 (1 H, s).
62	오일	1.01 (6 H, d, J=7), 1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 2.06 (1 H, m), 2.86 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.69 (2 H, d, J=7), 3.73 (2 H, q, J=7), 4.34 (2 H, q, J=7), 6.84 (2 H, d, J=9), 7.14 (2 H, d, J=9), 8.02 (1 H, brt), 8.52 (1 H, s).
63	오일	0.97 (3 H, d, J=7), 1.26 (3 H, t, J=7), 1.28 (3 H, d, J=6), 1.36 (3 H, t, J=7), 1.70 (2 H, m), 2.85 (2 H, t, J=7), 2.91 (2 H, q, J=7), 3.72 (2 H, q, J=7), 4.23 (1 H, m), 4.27 (2 H, q, J=7), 6.84 (2 H, d, J=9), 7.14 (2 H, d, J=9), 8.01 (1 H, brt), 8.52 (1 H, s).

[51]

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
64	오일	0.95 (6 H, d, J = 7), 1.26 (3 H, t, J = 7), 1.36 (3 H, t, J = 7), 1.66 (2 H, q, J = 7), 1.80 (1 H, m), 2.86 (2 H, t, J = 7), 2.92 (2 H, q, J = 7), 3.72 (2 H, q, J = 7), 3.96 (2 H, t, J = 7), 4.34 (2 H, q, J = 7), 6.84 (2 H, d, J = 9), 7.14 (2 H, d, J = 9), 8.01 (1 H, brt), 8.52 (1 H, s).
65	오일	0.94 (3 H, d, J = 7), 1.26 (3 H, t, J = 7), 1.28 (3 H, d, J = 7), 1.36 (3 H, t, J = 7), 1.47 (2 H, m), 1.70 (2 H, m), 2.85 (2 H, t, J = 7), 2.93 (2 H, q, J = 7), 3.72 (2 H, q, J = 7), 4.35 (2 H, q, J = 7), 4.35 (1 H, m), 6.83 (2 H, d, J = 9), 7.14 (2 H, d, J = 9), 8.01 (1 H, brt), 8.52 (1 H, s).
66	오일	0.93 (3 H, t, J = 7), 1.26 (3 H, t, J = 7), 1.42 (3 H, t, J = 7), 1.88 (2 H, m), 2.94 (2 H, q, J = 7), 4.39 (2 H, q, J = 7), 5.20 (1 H, q, J = 7), 6.80~7.05 (6 H, m), 7.29 (2 H, s'), 8.40 (1 H, s), 8.56 (1 H, d, J = 7).
67	52~53°C	1.22 (3 H, t, J = 7), 1.35 (3 H, t, J = 7), 2.54 (3 H, s), 2.86 (2 H, t, J = 7), 2.89 (2 H, q, J = 7), 3.74 (2 H, q, J = 7), 3.87 (3 H, s), 3.88 (3 H, s), 4.30 (2 H, q, J = 7), 6.74 (1 H, s), 6.77 (2 H, m), 8.37 (1 H, brt).
68	오일	1.26 (3 H, t, J = 7), 1.34 (3 H, t, J = 7), 2.87 (2 H, t, J = 7), 2.90 (2 H, q, J = 7), 3.74 (2 H, q, J = 7), 3.86 (3 H, s), 3.88 (3 H, s), 4.33 (2 H, q, J = 7), 6.75 (3 H, m), 8.06 (1 H, brt), 8.52 (1 H, s).

[52]

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
69	99~100°C	1.32 (3 H, t, J=7), 1.38 (3 H, t, J=7), 2.91 (2 H, t, J=7), 3.04 (2 H, q, J=7), 3.86 (2 H, q, J=7), 3.86 (3 H, s), 3.88 (3 H, s), 4.34 (2 H, q, J=7), 6.84 (3 H, m), 7.46 (5 H, m), 8.02 (1 H, br).
70	91~92°C	1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 2.87 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.74 (2 H, q, J=7), 3.95 (2 H, t, J=5), 4.04 (2 H, t, J=5), 4.37 (2 H, q, J=7), 6.86 (2 H, d, J=9), 7.15 (2 H, d, J=9), 8.04 (1 H, br), 8.52 (1 H, s).
71	44~ 45.5°C	1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 2.87 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.09 (3 H, s), 3.72 (2 H, q, J=7), 4.22 (2 H, t, J=5), 4.34 (2 H, q, J=7), 4.56 (2 H, t, J=5), 6.84 (2 H, d, J=9), 7.16 (2 H, d, J=9), 8.02 (1 H, br), 8.52 (1 H, s).
72	37~41°C	1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 2.18 (3 H, s), 2.73 (2 H, m), 2.90 (6 H, m), 3.74 (2 H, q, J=7), 4.34 (2 H, q, J=7), 7.16 (4 H, s), 8.03 (1 H, br), 8.51 (1 H, s).

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
73	76~78°C	1.26 (3 H, t, J=7), 1.38 (3 H, t, J=7), 2.58 (3 H, s), 2.97 (6 H, m), 3.07 (2 H, m), 3.74 (2 H, q, J=7), 4.34 (2 H, q, J=7), 7.16 (4 H, s), 8.07 (1 H, brt), 8.51 (1 H, s).
74	208~211°C	0.95 (3 H, t, J=7), 1.39 (3 H, t, J=7), 1.41 (2 H, m), 1.73 (2 H, m), 2.91 (2 H, t, J=7), 3.36 (2 H, q, J=7), 3.82 (2 H, q, J=7), 3.93 (2 H, t, J=7), 6.48 (2 H, d, J=9), 7.16 (2 H, d, J=9), 8.70 (1 H, s), 11.01 (1 H, brs).
75	214~216°C	1.29 (9 H, s), 1.39 (3 H, t, J=7), 2.92 (2 H, q, J=7), 3.34 (2 H, q, J=7), 3.85 (2 H, q, J=7), 7.17 (2 H, d, J=8), 7.33 (2 H, d, J=8), 8.53 (1 H, s), 10.68 (1 H, brs).
76	51.5~ 52.5°C	1.27 (3 H, t, J=7), 1.38 (3 H, t, J=7), 2.92 (2 H, t, J=7), 2.93 (2 H, q, J=7), 3.75 (2 H, q, J=7), 4.35 (2 H, q, J=7), 6.48 (1 H, d, J=7.4), 7.06 (2 H, d, J=8), 7.23 (2 H, d, J=8), 8.06 (1 H, brt), 8.52 (1 H, s).
77	66~68°C	1.26 (3 H, t, J=7), 1.38 (3 H, t, J=7), 2.27 (3 H, s), 2.28 (3 H, s), 2.86 (2 H, t, J=7), 2.94 (2 H, q, J=7), 3.69 (2 H, q, J=7), 4.34 (2 H, q, J=7), 7.04 (3 H, s), 8.01 (1 H, brt), 8.51 (1 H, s).

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
87	49~51 $^{\circ}\text{C}$	1.37 (3 H, t, J=7), 1.40 (3 H, t, J=7), 2.62 (3 H, s), 2.86 (2 H, t, J=7), 3.73 (2 H, q, J=7), 4.01 (2 H, q, J=7), 4.34 (2 H, q, J=7), 6.84 (2 H, d, J=9), 7.14 (2 H, d, J=9), 8.23 (1 H, brt), 8.47 (1 H, s).
88	72~73 $^{\circ}\text{C}$	1.25 (3 H, t, J=7), 1.41 (3 H, t, J=7), 2.86 (2 H, t, J=7), 2.91 (2 H, q, J=7), 3.72 (2 H, q, J=7), 3.87 (3 H, s), 4.01 (2 H, q, J=7), 6.84 (2 H, d, J=9), 7.15 (2 H, d, J=9), 7.97 (1 H, brt), 8.52 (1 H, s).
91	41.5~ 42.5 $^{\circ}\text{C}$	1.36 (3 H, t, J=7), 1.40 (3 H, t, J=7), 2.48 (3 H, s), 2.58 (3 H, s), 2.84 (2 H, t, J=7), 3.74 (2 H, q, J=7), 4.01 (2 H, q, J=7), 4.31 (2 H, q, J=7), 6.84 (2 H, d, J=8), 7.14 (2 H, d, J=8), 8.22 (1 H, brt).
93	34~36 $^{\circ}\text{C}$	1.03 (3 H, t, J=7), 1.37 (3 H, t, J=7), 1.80 (2 H, m), 2.62 (3 H, s), 2.86 (2 H, t, J=7), 3.73 (2 H, q, J=7), 3.90 (2 H, t, J=7), 4.34 (2 H, q, J=7), 6.84 (2 H, d, J=9), 7.14 (2 H, d, J=9), 8.22 (1 H, brt), 8.47 (1 H, s).
98	48~49 $^{\circ}\text{C}$	1.03 (3 H, t, J=7), 1.36 (3 H, t, J=7), 1.80 (2 H, m), 2.48 (3 H, s), 2.59 (3 H, s), 2.85 (2 H, t, J=7), 3.72 (2 H, q, J=7), 3.90 (2 H, t, J=7), 4.32 (2 H, q, J=7), 6.84 (2 H, d, J=8), 7.13 (2 H, d, J=8), 8.14 (1 H, brt).
100	오일	1.32 (6 H, d, J=7), 1.37 (3 H, t, J=7), 2.62 (3 H, s), 2.86 (2 H, t, J=7), 3.73 (2 H, q, J=7), 4.34 (2 H, q, J=7), 4.51 (1 H, m), 6.83 (2 H, d, J=9), 7.13 (2 H, d, J=9), 8.23 (1 H, brt), 8.47 (1 H, s).

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
102	36~38°C	1.25 (3 H, t, J=7), 1.32 (6 H, d, J=7), 2.86 (2 H, t, J=7), 2.91 (2 H, q, J=7), 3.72 (2 H, q, J=7), 3.86 (3 H, s), 4.52 (1 H, m), 6.84 (2 H, d, J=9), 7.14 (2 H, d, J=9), 7.96 (1 H, brt), 8.52 (1 H, s).
105	45.5~ 48.5°C	1.32 (6 H, d, J=6), 1.36 (3 H, t, J=7), 2.48 (3 H, s), 2.58 (3 H, s), 2.84 (2 H, t, J=7), 3.72 (2 H, q, J=7), 4.31 (2 H, q, J=7), 4.51 (1 H, m), 6.83 (2 H, d, J=8), 7.14 (2 H, d, J=8), 8.21 (1 H, brt).
107	오일	0.97 (3 H, t, J=7), 1.49 (2 H, q, J=7), 1.76 (2 H, t, J=7), 2.60 (3 H, s), 2.86 (2 H, t, J=7), 3.73 (2 H, q, J=7), 3.86 (3 H, s), 3.94 (2 H, t, J=7), 6.84 (2 H, d, J=9), 7.14 (2 H, d, J=9), 8.18 (1 H, brt), 8.48 (1 H, s).
109	62~63°C	0.97 (3 H, t, J=7), 1.36 (3 H, t, J=7), 1.48 (2 H, m), 1.73 (2 H, m), 2.48 (3 H, s), 2.58 (3 H, s), 2.84 (2 H, t, J=7), 3.73 (2 H, q, J=7), 3.94 (2 H, t, J=7), 4.31 (2 H, q, J=7), 6.83 (2 H, d, J=8), 7.14 (2 H, d, J=8), 8.20 (1 H, brt).
111	45.5~ 46.5°C	1.02 (6 H, d, J=7), 1.25 (3 H, t, J=7), 2.07 (1 H, m), 2.86 (2 H, t, J=7), 2.91 (2 H, q, J=7), 3.70 (2 H, d, J=7), 3.72 (2 H, q, J=7), 3.87 (3 H, s), 6.85 (2 H, d, J=9), 7.14 (2 H, d, J=9), 7.97 (1 H, brt), 8.53 (1 H, s).

[56]

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
113	42~45°C	1.01 (6 H, d, J=7), 1.37 (3 H, t, J=7), 2.07 (1 H, m), 2.62 (3 H, s), 2.88 (2 H, t, J=7), 3.70 (2 H, d, J=7), 3.72 (2 H, q, J=7), 4.34 (2 H, q, J=7), 6.84 (2 H, d, J=9), 7.14 (2 H, d, J=9), 8.23 (1 H, brt), 8.48 (1 H, s).
114	58~61°C	1.01 (6 H, d, J=6), 1.36 (3 H, t, J=7), 2.08 (1 H, m), 2.48 (3 H, s), 2.59 (3 H, s), 2.85 (2 H, t, J=7), 3.70 (2 H, d, J=6), 3.71 (2 H, q, J=7), 4.32 (2 H, q, J=7), 6.83 (2 H, d, J=8), 7.14 (2 H, d, J=8), 8.21 (1 H, brt).
118	51~52°C	1.26 (3 H, t, J=7), 2.92 (2 H, q, J=7), 2.93 (2 H, t, J=7), 3.75 (2 H, q, J=7), 3.88 (3 H, s), 6.49 (1 H, t, J=7.4), 7.07 (2 H, d, J=9), 7.23 (2 H, d, J=9), 8.04 (1 H, brt), 8.53 (1 H, s).
120	50~52°C	1.38 (3 H, t, J=7), 2.63 (3 H, s), 2.92 (2 H, t, J=7), 3.75 (2 H, q, J=7), 4.34 (2 H, q, J=7), 6.49 (1 H, t, J=7.5), 7.06 (2 H, d, J=9), 7.23 (2 H, d, J=9), 8.28 (1 H, brt), 8.48 (1 H, s).

[57]

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
121	61~62°C	1.36 (3 H, t, J=7), 2.48 (3 H, s), 2.58 (3 H, s), 2.90 (2 H, t, J=7), 3.74 (2 H, q, J=7), 4.34 (2 H, q, J=7), 6.47 (1 H, t, J=7.4), 7.05 (2 H, d, J=8), 7.24 (2 H, d, J=8), 8.25 (1 H, brt).
125	31~33°C	0.92 (3 H, t, J=7), 1.36 (3 H, t, J=7), 1.31-1.64 (4 H, m), 2.58 (2 H, t, J=7), 2.62 (3 H, s), 2.89 (2 H, t, J=7), 3.74 (2 H, q, J=7), 4.33 (2 H, q, J=7), 7.13 (4 H, m), 8.21 (1 H, brt), 8.48 (1 H, s).
156	48~49°C	0.98 (3 H, t, J=7), 1.37 (3 H, t, J=7), 1.51 (2 H, m), 1.77 (2 H, m), 2.20 (3 H, s), 2.62 (3 H, s), 2.83 (2 H, t, J=7), 3.71 (2 H, q, J=7), 3.94 (2 H, t, J=7), 4.33 (2 H, q, J=7), 6.75 (1 H, d, J=9), 7.00 (1 H, d, J=9), 7.01 (1 H, s), 8.21 (1 H, brt), 8.48 (1 H, s).
163	50~51°C	0.98 (3 H, t, J=7), 1.38 (3 H, t, J=7), 1.52 (2 H, m), 1.81 (2 H, m), 2.63 (3 H, s), 2.84 (2 H, t, J=7), 3.72 (2 H, q, J=7), 4.01 (2 H, t, J=7), 4.35 (2 H, q, J=7), 6.85 (1 H, d, J=9), 7.05 (1 H, dd, J=9, 2), 7.23 (1 H, d, J=2), 8.25 (1 H, brt), 8.48 (1 H, s).
164	65.5~ 66.5°C	0.98 (3 H, t, J=7), 1.36 (3 H, t, J=7), 1.52 (2 H, m), 1.79 (2 H, m), 2.49 (3 H, s), 2.59 (3 H, s), 2.82 (2 H, t, J=7), 3.72 (2 H, q, J=7), 4.07 (2 H, t, J=7), 4.33 (2 H, q, J=7), 6.85 (1 H, d, J=8), 7.05 (1 H, dd, J=8, 2), 7.23 (1 H, d, J=2), 8.24 (1 H, brt).

[58]

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
176	오일	1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 2.86 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.72 (2 H, q, J=7), 4.34 (2 H, q, J=7), 4.51 (2 H, d, J=5), 5.28 (1 H, d, J=10), 5.40 (1 H, d, J=17), 6.04 (1 H, m), 6.86 (2 H, d, J=9), 7.15 (2 H, d, J=9), 8.02 (1 H, brt), 8.52 (1 H, s).
177	47~ 48.5°C	1.26 (3 H, t, J=7), 1.37 (3 H, t, J=7), 2.51 (1 H, t, J=2), 2.88 (2 H, t, J=7), 2.92 (2 H, q, J=7), 3.72 (2 H, q, J=7), 4.34 (2 H, q, J=7), 4.68 (2 H, d, J=2), 6.93 (2 H, d, J=9), 7.17 (2 H, d, J=9), 8.02 (1 H, brt), 8.52 (1 H, s).
184	오일	0.97 (3 H, t, J=7), 1.25 (3 H, t, J=7), 1.49 (2 H, m), 1.76 (2 H, m), 2.86 (2 H, t, J=7), 2.93 (2 H, q, J=7), 3.72 (2 H, q, J=7), 3.94 (2 H, t, J=7), 4.77 (2 H, d, J=6), 5.31 (1 H, d, J=11), 5.38 (1 H, d, J=19), 5.98 (1 H, m), 6.84 (2 H, d, J=9), 7.13 (2 H, d, J=9), 8.00 (1 H, brt), 8.53 (1 H, s).
185	59~ 60.5°C	0.97 (3 H, t, J=7), 1.28 (3 H, t, J=7), 1.48 (2 H, m), 1.76 (2 H, m), 2.54 (1 H, t, J=2), 2.86 (2 H, t, J=7), 2.97 (2 H, q, J=7), 3.73 (2 H, q, J=7), 3.94 (2 H, t, J=7), 4.88 (2 H, d, J=2), 6.84 (2 H, d, J=9), 7.13 (2 H, d, J=9), 8.01 (1 H, brt), 8.54 (1 H, s).

번호	mp	$^1\text{H-NMR}$ (CDCl_3) δ ppm
324	오일	1.26 (3 H, t, J = 7), 1.42 (3 H, t, J = 7), 1.56 (3 H, d, J = 7), 2.94 (2 H, q, J = 7), 4.39 (2 H, q, J = 7), 5.41 (1 H, quintet, J = 7), 6.48 (1 H, t, J = 7.5), 7.08 (2 H, d, J = 8), 7.36 (2 H, d, J = 8), 8.46 (1 H, d, J = 7), 8.47 (1 H, s).
325	오일	0.94 (3 H, t, J = 7), 1.26 (3 H, t, J = 7), 1.43 (3 H, t, J = 7), 1.89 (2 H, m), 2.94 (2 H, q, J = 7), 4.41 (2 H, q, J = 7), 5.20 (1 H, q, J = 7), 6.48 (1 H, t, J = 7.4 Hz), 7.07 (2 H, d, J = 8), 7.32 (2 H, d, J = 8), 8.44 (1 H, s), 8.57 (1 H, d, J = 7).
326	46.5~ 47.5°C	1.24 (3 H, t, J = 7), 1.37 (3 H, t, J = 7), 2.62 (3 H, s), 2.86 (2 H, t, J = 7), 3.60 (2 H, q, J = 7), 3.72 (2 H, q, J = 7), 3.78 (2 H, t, J = 5), 4.10 (2 H, t, J = 5), 4.33 (2 H, q, J = 7), 6.87 (2 H, d, J = 8), 7.14 (2 H, d, J = 8), 8.23 (1 H, br), 8.47 (1 H, s).
327	53.5~ 54.5°C	1.24 (3 H, t, J = 7), 1.36 (3 H, t, J = 7), 2.49 (3 H, s), 2.59 (3 H, s), 2.85 (3 H, t, J = 7), 3.60 (2 H, q, J = 7), 3.72 (2 H, q, J = 7), 3.79 (2 H, t, J = 5), 4.11 (2 H, t, J = 5), 4.31 (2 H, q, J = 7), 6.87 (2 H, d, J = 8), 7.14 (2 H, d, J = 8), 8.23 (1 H, br).

[1]

4 - (2 - (- 2 -))

(50ml) 4 - (9.50g, 47.24mmol) p - (0.30g) 가
 3,4 - (5.53g, 65.74mmol) 가 , 2
 0 (40ml) 가
) (13.40g, 99%) 4 - (2 - (- 2 -))

NMR (ppm, TMS/ CDCl_3): 1.52 - 1.80 (6H,m), 2.85 (2H,t,J=7), 3.43 - 3.96 (4H,m), 4.57 (1H,t,J=4), 7.12 (2H,d,J=8), 7.39 (2H,d,J=8).

[2]

4 - (2 - (- 2 -))

(20ml) 4 - (2 - (- 2 -)) (14.00g, 49.09mmol)
 (1.31g, 53.90mmol) 가 , (0.1ml) 가 ,

1
 09M ℓ , 98.18mmol) 가 , 2M - / (49.
 (40M ℓ) 가
 n - /
 (=8/2) 4 - (2 -
 - 2 -)) (6.00g, 42%) .

NMR (ppm, TMS/ CDCl_3): 1.40 - 1.78 (6H,m), 2.85 (2H,t,J=7), 2.89 (2H,t,J=7), 3.48 - 3.98 (6H,m), 4.57 (1H,t,J=4), 7.14 (2H,d,J=8), 7.20 (2H,d,J=8).

[3]

4 - (2 - (- 2 -))

(40M ℓ) 4 - (2 - (- 2 -)) (4.00g, 15.97mmol)
 (3.22g, 31.82mmol) 가 , (2.19g, 1
 9.11mmol) 가 . 가 10 , , (40M ℓ) 가 .
 4 - (2 -
 - 2 -)) (5.24g, 99%) .

NMR (ppm, TMS/ CDCl_3): 1.40 - 1.78 (6H,m), 2.84 (3H,s), 2.85 (2H,t,J=7), 3.02 (2H,t,J=7), 3.47 - 3.97 (4H,m), 4.38 (2H,t,J=7), 4.58 (1H,t,J=4), 7.15 (2H,d,J=9), 7.20 (2H,d,J=9).

[4]

4 - (2 - (- 2 -)) - 1 - (2 -)

N,N - (50M ℓ) 4 - (2 - (- 2 -)) (5.24g, 15.
 95mmol) (1.73g, 26.61mmol) 가 . 100 1 ,
 (40M ℓ) 가 ,
 n - / (=20/1)
 4 - (2 - - 2 -)) - 1 - (2 -) (4.30g, 98%) .

NMR (ppm, TMS/ CDCl_3): 1.53 - 1.80 (6H,m), 2.86 (2H,t,J=7), 2.88 (2H,t,J=7), 3.48 (2H,t,J=7), 3.48 - 3.90 (4H,m), 4.58 (1H,t,J=4), 7.13 (2H,d,J=8), 7.20 (2H,d,J=8).

[5]

4 - (2 - (- 2 -))

4 - (2 - (- 2 -)) - 1 - (2 -) (4.30g, 15.61mmol)
 10% - (0.10g) 가 . 16 , , 10%
 - , . / (=8/2)
 4 - (2 - - 2 -)) (2.80g, 72%) .

NMR (ppm, TMS/ CDCl_3): 1.53 - 1.80 (8H,m), 2.73 (2H,t,J=7), 2.89 (2H,t,J=7), 2.95 (2H,t,J=7), 3.47 - 3.90 (4H,m), 4.58 (1H,t,J=4), 7.11 (2H,d,J=8), 7.18 (2H,d,J=8).

[19]

2 2 98 .

[20]

3 40 , 10 50 .

[21]

8 10 , 20() 1 89 .

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12 5 , 90 , 5 , .

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18 25 , 8 , 2 65 .

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20 2 98 .

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20 40 , 10 50 .

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61 10 , 20() 1 89 .

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61 50 , 6 , 4 40 .

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62 5 , 90 , 5 ,

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61 25 , 8 , 2 65

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63 2 98

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N,N -

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(

2) :

$$\text{방제율(\%)} = \frac{\text{비처리 플트의 병변정도 또는 병변수} - \text{처리 플트의 병변정도 또는 병변수}}{\text{비처리 플트의 병변 정도 또는 병변수}} \times 100$$

방제지수	방제율
5	99% 이상
4	90% 이상 99% 미만
3	70% 이상 90% 미만
2	50% 이상 70% 미만
1	30% 이상 50% 미만
0	30% 미만

[1]

가 (Sphaerotheca fuliginea)

(; TSUKUBASHIROIBO; 1.3 1.8) (9cm) 2
 3 . 2.0ppm
 가 (Sphaerotheca fuliginea) 10 20
 60

[60]

오이 흰가루병 (*Sphaerotheca fuliginea*)에 대한 방제효과

화합물 번호	방제 지수	
	예방효과	치료효과
1	2	4
2	5	5
3	5	5
8	4	4
10	4	5
11	5	3
13	4	4
17	4	5
18	3	5
20	4	5
61	4	5
62	5	5
63	3	5
64	3	5
65	2	5
대조용 1	3	3
대조용 2	2	2

[2]

가 (*Erysiphe graminis*)

(: Norin No. 61; 2.0 2.5) (9cm) 10
 (125 31.3ppm) 가 (*Erysiphe g*
 raminis) 25 7
 61

[61]

밀 흰가루병 (*Erysiphe graminis*) 에 대한 방제효과

화합물 번호	방제 지수	
	예방효과 125ppm	치료효과 31.3ppm
1	5	2
2	5	4
3	5	3
8	5	3
10	5	2
11	4	2
12	5	3
13	4	1
17	5	5
18	5	5
19	4	4
20	5	5
21	4	2
61	5	5
62	5	5
63	5	3
64	5	4
65	5	3
대조용 1	3	0
대조용 2	0	0

[]

3 가
N,N-

[3]

(Myzus persicae)

3cm (Chinese cabbage) 0.3% 가
25 1 , .25 48 ,
(,) 가 62

[4]

(Nephotettix Concticeps)

6 7 (paddy seedling)
6cm
10 , .25 48 ,
, 10 가 62

[5]

(Tetranychus urticae)

(Tetranychus urticae)

()

. 12

가

63ppm

62

[62]

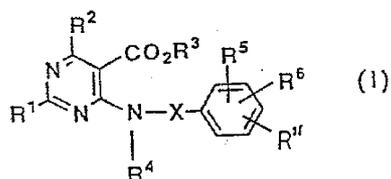
화합물번호	63ppm 에서 죽은 곤충의 비율		63ppm 에서의 방제율
	<u>Myzus persicae</u>	<u>Nephotettix cincticeps</u>	<u>Tetranychus urticae</u>
1	100	50	100
2	100	100	100
3	100	100	100
10	100		
11	100	77	100
14	100		
18	100		
19	100		
20	100		
61	100		
62	100		
63	100		
64	100		100
65	100		100

(57)

1.

(1) ()

가 :



R⁵가 , C₁ - C₆ ;

R⁶ C₁ - C₆ , C₁ - C₆ , - C₁ - C₆ C₁ - C₄ - - C₁ - C₄ ;

R¹¹ ;

X가 -CH₂CH₂- 가 .

4.

1 , 4 - (2 - (4 -)) - 6 - - 5 -
가 .

5.

1 , 4 - (2 - (4 - - 3 -)) - 6 - - 5 -
가 .

6.

1 , 4 - (2 - (4 -)) - 6 - - 5 -
가 .

7.

1 , 4 - (2 - (4 -)) - 6 - - 5 -
가 .

8.

1 , 4 - (2 - (4 -)) - 6 - - 5 -
가 .

9.

1 , 4 - (2 - (4 -)) - 6 - - 5 -
가 .

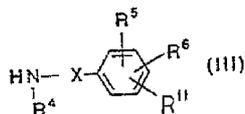
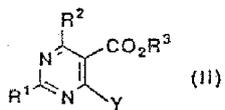
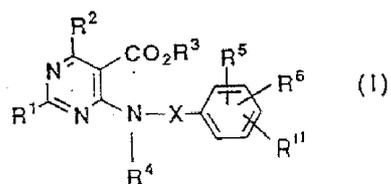
10.

1 , 4 - (2 - (4 -)) - 6 - - 5 -
가 .

11.

() () , ()

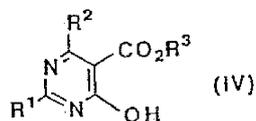
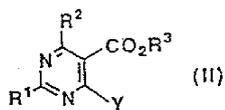
:



, Y , R¹, R², R³, R⁴, R⁵, R⁶ R¹¹ X 1 .

12.

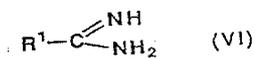
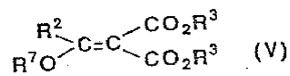
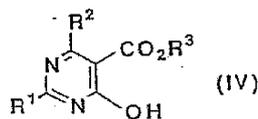
11 , () () :



, Y , R¹, R² R³ 1 .

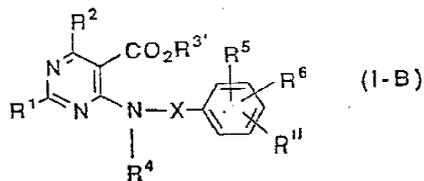
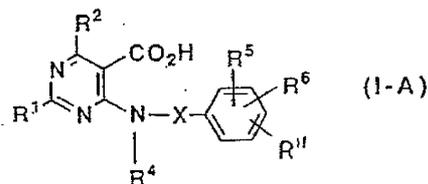
13.

12 , () () ()
가 :



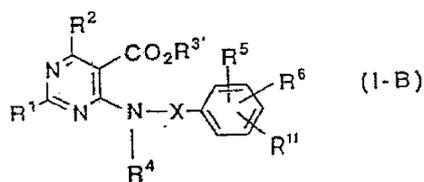
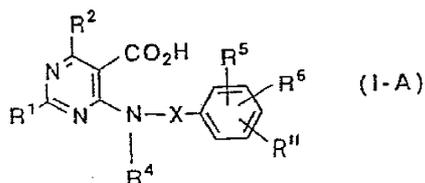
- , R⁷ C₁-C₆, C₁-C₆ C₁-C₆, R¹, R² R³ 1
14. 1 가
15. 1 가
16. 1 가
- 17.

(-B) 가 , (-A) :



R³ C₁-C₆, C₂-C₆, C₂-C₆ C₆-C₁₀ -C₁-C₄, R¹, R², R⁴, R⁵, R⁶ R¹¹
 X 1

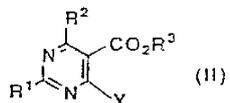
18. (-A) , (-B) :



R^6, R^{11} , R^3 , $C_1 - C_6$, $C_2 - C_6$, $C_2 - C_6$, $C_6 - C_{10}$, $C_1 - C_4$, R^1, R^2, R^4, R^5 ,
 X , 1 .

19.

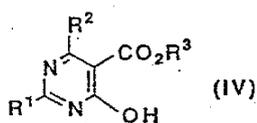
() :



Y , R^1, R^2, R^3 , 1 , R^1 ,
 $C_1 - C_4$, $C_1 - C_4$, $C_1 - C_4$.

20.

() :



R^1, R^2, R^3 , 1 .