N-Substituted 2,6-dialkylanilides

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Dedicated to Professor P. Kristian, DrSc., in honour of his 60th birthday

By reactions of 2,6-dialkylanilines or *N*-substituted 2,6-dialkylanilines with 3-(2-furyl)propenoyl chloride, 3-(5-nitro-2-furyl)propenoyl chloride and with other acyl chlorides the new 2,6-dialkylanilides or their *N*-substituted derivatives were prepared and their fungicidal and herbicidal properties were studied.

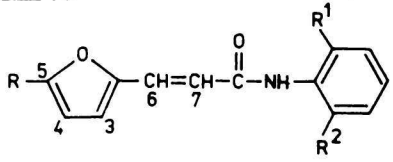
С помощью реакции 2,6-диалкиланилинов или *N*-замещенных 2,6-диалкиланилинов с 3-(2-фурил)пропеноилхлоридом, 3-(5-нитро-2-фурил)пропеноилхлоридом и другими ацилхлоридами были получены новые 2,6-диалкиланилиды или их *N*-замещенные производные, а также исследованы их фунгицидные и гербицидные свойства.

Many *N*-substituted 2,6-dialkylanilides are biologically active compounds [1—4]. One of them, 2-ethyl-6-methyl-*N*-(1-methoxy-2-propyl)chloroacetanilide (Metolachlor), is an active part of the antigrass herbicide Dual [1]. Metolachlor is a mixture of four stereoisomers, which were made and their absolute configuration was fixed by X-ray analysis [5].

The aim of this work was the synthesis of new type 2,6-disubstituted anilides and their *N*-substituted derivatives and the study of their fungicidal and herbicidal properties. The above-mentioned compounds were prepared by reactions of 2,6-dialkylanilines with 3-(2-furyl)propenoyl chloride or 3-(5-nitro-2-furyl)propenoyl chloride (compounds *I*—*VI*, Table 1). By treatment of the mentioned chlorides with *N*-(2-furyl)-2,6-dialkylanilines the compounds *VII*—*XII* (Table 2) were obtained. 2-Ethyl-6-methyl-*N*-[5-(3,4-dichlorophenyl)-2-furfuryl]aniline with the introduced chlorides, chloroacetyl as well as benzoyl chloride gave again the compounds *XIII*—*XVI* (Table 3). Analogously the above-mentioned chlorides with 2,6-dialkyl-*N*-(1-hydroxy or 1-methoxy)-2-propylanilines gave compounds *XVII*—*XXIV* (Table 4). The compounds *XXV*—*XXIX* were prepared by the reaction of 3-(2-furyl)propenoyl chloride and 3-(5-nitro-2-furyl)propenoyl chloride with 2,6-dialkyl-*N*-(1-methoxycarbonyl-1-ethyl)anilines (Table 5). The studied reactions were realized in benzene in the presence of water-free sodium carbonate (Scheme 1).

Table 1

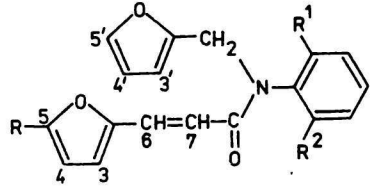
2′,6′-Dialkyl-3-(2-furyl)- and -3-(5-nitro-2-furyl)propenanilides *I*—*VI*



Compound	R	R^1	R^2	Formula	M_r	w_i(calc.)/% / w_i(found)/% C	H	N	Yield %	M.p. °C
I	CH_3	CH_3	CH_3	$C_{15}H_{15}NO_2$	241.3	74.66	6.26	5.80	78	184—187
						75.01	6.21	5.98		
II	H	CH_3	C_2H_5	$C_{16}H_{17}NO_2$	255.3	75.27	6.71	5.49	82	201—202
						75.39	6.60	5.78		
III	H	C_2H_5	C_2H_5	$C_{17}H_{19}NO_2$	269.3	75.82	7.11	5.20	93	187—190
						75.42	7.18	5.27		
IV	NO_2	CH_3	CH_3	$C_{15}H_{14}N_2O_4$	286.3	62.93	4.92	9.78	97	201—202
						62.73	4.82	9.58		
V	NO_2	CH_3	C_2H_5	$C_{16}H_{16}N_2O_4$	300.3	63.99	5.37	9.32	97	192—195
						63.90	5.27	9.22		
VI	NO_2	C_2H_5	C_2H_5	$C_{17}H_{18}N_2O_4$	314.3	64.97	5.77	9.13	76	190—193
						64.77	5.67	9.10		

Table 2

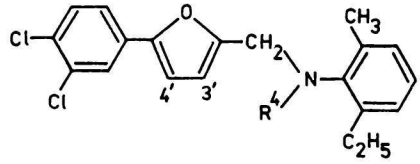
2′,6′-Dialkyl-*N*-(2-furfuryl)-3-(5-R-2-furyl)propenanilides *VII*—*XII*



Compound	R	R^1	R^2	Formula	M_r	w_i(calc.)/% w_i(found)/%			Yield	M.p.
						C	H	N	%	°C
VII	H	CH_3	CH_3	$C_{20}H_{19}NO_3$	321.4	74.74 74.26	5.96 5.86	4.35 4.32	80	94—95
VIII	H	CH_3	C_2H_5	$C_{21}H_{21}NO_3$	335.4	75.20 74.94	6.31 6.18	4.18 4.56	90	100—102
IX	H	C_2H_5	C_2H_5	$C_{22}H_{23}NO_3$	349.4	76.63 75.64	6.63 6.81	4.00 4.11	78	104—106
X	NO_2	CH_3	CH_3	$C_{20}H_{18}N_2O_5$	366.4	65.56 65.86	4.95 4.97	7.64 7.64	94	151—154
XI	NO_2	CH_3	C_2H_5	$C_{21}H_{20}N_2O_5$	380.4	66.31 66.39	5.30 5.27	7.36 7.30	96	92—96
XII	NO_2	C_2H_5	C_2H_5	$C_{22}H_{22}N_2O_5$	394.4	67.00 66.82	5.62 5.48	7.10 7.00	94	100—105

Table 3

2′-Ethyl-6′-methyl-*N*-[5-(3,4-dichlorophenyl)-2-furfuryl]-R^4-anilides *XIII*—*XVI*



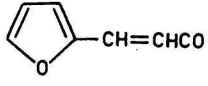
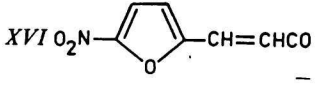
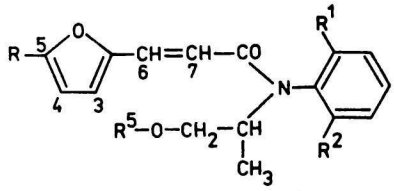
Compound	R^4	Formula	M_r	w_i(calc.)/% / w_i(found)/%				Yield	M.p.
				C	H	Cl	N	%	°C
XIII	$ClCH_2CO$	$C_{22}H_{20}Cl_3NO_2$	436.7	60.51 60.12	4.62 4.42	24.35 25.82	3.20 3.12	81	Yellow oil
XIV	vz. 2 do tab. 3	$C_{27}H_{23}Cl_2NO_2$	464.4	69.83 69.63	4.99 4.79	15.27 15.07	3.07 3.18	76	122—123
XV		$C_{27}H_{23}Cl_2NO_3$	480.4	67.50 67.36	4.83 4.75	14.75 14.62	2.91 2.73	74	133—135
XVI		$C_{27}H_{22}Cl_2N_2O_5$	525.4	61.72 61.52	4.12 4.12	13.49 13.33	5.33 5.11	88	164—167

Table 4

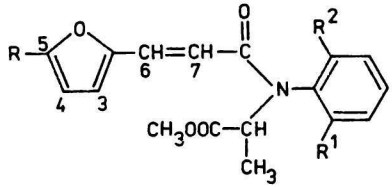
2′,6′-Dialkyl-*N*-(1-hydroxy or 1-methoxy-2-propyl)-3-(2-furyl)- and -3-(5-nitro-2-furyl)propenanilides *XVII*—*XXIV*



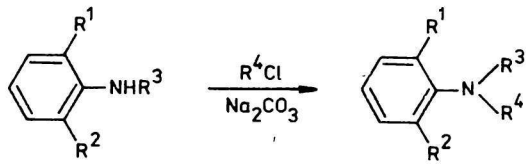
Compound	R	R^1	R^2	R^5	Formula	M_r	w_i(calc.)/% w_i(found)/%			Yield	M.p.
							C	H	N	%	°C
XVII	H	CH_3	CH_3	H	$C_{18}H_{21}NO_3$	299.3	72.23	7.07	4.68	62	77—79
							72.03	7.12	4.82		
XVIII	H	CH_3	C_2H_5	H	$C_{19}H_{23}NO_3$	313.4	72.82	7.40	4.59	72	82—83
							72.88	7.21	4.02		
XIX	NO_2	CH_3	CH_3	H	$C_{18}H_{20}N_2O_5$	340.3	63.53	5.92	8.23	76	125—126
							63.56	5.90	7.88		
XX	H	CH_3	CH_3	CH_3	$C_{19}H_{23}NO_3$	313.4	72.82	7.40	4.59	78	68—71
							72.48	7.26	4.22		
XXI	H	C_2H_5	CH_3	CH_3	$C_{20}H_{25}NO_3$	327.4	73.37	7.70	4.29	69	Yellow
							73.15	7.62	4.21		oil
XXII	NO_2	CH_3	CH_3	CH_3	$C_{19}H_{22}N_2O_5$	358.4	63.67	6.19	7.82	96	126—128
							63.82	6.10	7.78		
XXIII	NO_2	CH_3	C_2H_5	CH_3	$C_{20}H_{24}N_2O_5$	372.4	64.50	6.50	7.52	93	92—94
							64.32	6.40	7.42		
XXIV	NO_2	C_2H_5	C_2H_5	CH_3	$C_{21}H_{26}N_2O_5$	386.4	65.28	6.78	7.25	93	77—82
							65.08	6.60	7.05		

Table 5

2′,6′-Dialkyl-*N*-(1-methoxycarbonyl-1-ethyl)-3-(2-furyl or 5-nitro-2-furyl)propenanilides *XXV*—*XXIX*



Compound	R	R^1	R^2	Formula	M_r	w_i(calc.)/% / w_i(found)/%			Yield	M.p.
						C	H	N	%	°C
XXV	H	CH_3	CH_3	$C_{19}H_{21}NO_4$	327.4	69.70	6.46	4.27	76	Yellow
						69.20	6.06	4.68		oil
XXVI	H	CH_3	C_2H_5	$C_{20}H_{23}NO_4$	341.4	70.36	6.79	4.10	72	Yellow
						70.06	7.02	4.04		oil
XXVII	NO_2	CH_3	CH_3	$C_{19}H_{20}N_2O_6$	372.4	61.28	5.41	7.52	95	174—175
						61.36	5.48	7.70		
XXVIII	NO_2	CH_3	C_2H_5	$C_{20}H_{22}N_2O_6$	386.4	62.17	5.74	7.25	84	119—122
						62.60	5.54	7.17		
XXIX	NO_2	C_2H_5	C_2H_5	$C_{21}H_{24}N_2O_6$	400.4	63.00	6.04	6.99	90	132—134
						63.20	6.40	7.15		



R^1, R^2 = methyl, ethyl
R^3 = H, 2-furfuryl, 5-(3,4-dichlorophenyl)-2-furfuryl, 1-hydroxy-2-propyl, 1-methoxy-2-propyl, 1-methoxycarbonyl-1-ethyl
R^4 = chloroacetyl, 3-(2-furyl)propenoyl, 3-(5-nitro-2-furyl)propenoyl, benzoyl

Scheme 1

The prepared compounds are yellow or orange coloured substances. Some of them, namely 2′-ethyl-6′-methyl-substituted products were relatively difficult to crystallize, which can be explained by the presence of four stereoisomers in the reaction products.

The structure of the synthesized compounds was proved by ^{1}H NMR spectra (Tables 6—10). The data showed that the rotation around *N*-phenyl bond is braked down. ^{1}H NMR data confirmed an atropisomerism in case the substituents are different.

Table 6

^{1}H NMR data[a] (δ/ppm; J/Hz) of the compounds *I*—*VI*

Proton $J_{H,H}$	Compound					
	I	*II*	*III*	*IV*	*V*	*VI*
H-3	6.75 dd	6.72 dd	6.70 dd	7.08 d	7.06 d	7.04 d
H-4	6.59 dd	6.54 dd	6.55 dd	7.58 d	7.57 d	7.56 d
H-5	7.69 dd	7.64 dd	7.69 dd	—	—	—
H-6	7.49 d	7.44 d	7.44 d	7.53 d	7.52 d	7.52 d
H-7	6.81 d	6.76 d	6.78 d	7.08 d	7.08 d	7.09 d
H_{arom}	7.05 bs	7.08 bs	7.12 bs	7.09 bs	7.18 bs	7.15 bs
R^1	2.22 s	2.18 s	2.60 q 1.12 t	2.22 s	2.22 s	2.62 q 1.12 t
R^2	2.22 s	2.60 q 1.10 t	2.60 q 1.12 t	2.22 s	2.62 q 1.12 t	2.62 q 1.12 t
NH	8.81 bs	8.72 bs	8.75 bs	9.00 bs	9.00 bs	9.00 bs
$J_{3,4}$	3.2	3.2	3.2	3.9	3.9	3.9
$J_{6,7}$	15.5	15.5	15.5	15.6	15.6	15.6

a) Measured in hexadeuteroacetone.

Table 7

^{1}H NMR data[a] (δ/ppm; J/Hz) of the compounds *VII*—*XII*

Proton $J_{H,H}$	Compound					
	VII	*VIII*	*IX*	*X*	*XI*	*XII*
H-3	6.63 dd	6.61 dd	6.65 dd	7.02 d	7.00 d	7.00 d
H-4	6.47 dd	6.43 dd	6.45 dd	7.49 d	7.45 d	7.47 d
H-5	7.45 dd	7.41 dd	7.45 dd	—	—	—
H-6	7.49 d	7.50 d	7.48 d	7.56 d	7.54 d	7.55 d
H-7	6.00 d	6.01 d	6.01 d	6.28 d	6.28 d	6.30 d
H-3′	6.22 dd	6.20 dd	6.20 dd	6.23 dd	6.20 d	6.22 dd
H-4′	6.33 dd	6.30 dd	6.30 dd	6.34 dd	6.30 dd	6.32 dd
H-5′	7.40 dd	7.37 dd	7.40 dd	7.42 dd	7.44 dd	7.40 dd
H_{arom}	7.12 bs	*b*	*b*	7.19 bs	*b*	*c*
CH_2	4.85 s	4.72 d[d]	4.85 s	4.87 s	4.81 d[d]	4.87 s
		4.82 d			4.96 d	
R^1	1.93 s	1.90 s	2.32 q	1.95 s	1.95 s	2.32 q
			1.03 t			1.05 t
R^2	1.93 s	2.35 q	2.32 q	1.95 s	2.37 q	2.32 q
		1.03 t	1.03 t		1.10 t	1.05 t
$J_{3,4}$	3.2	3.2	3.2	3.9	3.9	3.9
$J_{6,7}$	15.2	15.2	15.2	15.4	15.5	15.5

a) Measured in hexadeuteroacetone; *b*) 7.0—7.4 m; *c*) 7.2—7.3 m; *d*) ^2J = 15.0 Hz.

The value of the vicinal coupling constant $J_{H\text{-}6,H\text{-}7}$ = 15.5—15.6 Hz for the derivatives *I*—*VI* (Table 6) and *VII*—*XII* (Table 7) confirmed *E*-configuration. The protons of CH_2 group at nitrogen atom of the compounds with the symmetrically substituted benzene ring (*VI*, *IX*, *X*, *XII*) display as a singlet, with unsymmetrically substituted benzene ring (*VIII*, *XI*) as two doublets of the AB spin system with a geminal coupling constant $^2J_{H\text{-}a,H\text{-}b}$ = 15.0 Hz. The nonequivalent proton signals of the methylene group of the unsymmetrically substituted compounds *XIII* and *XV* (Table 8) display the doublets of doublets. The chemical shift values of methylene protons of the compounds *XIV* and *XVI* are very close and they were observed as broadened signals (Table 9).

The compounds *XVII*—*XXIV* (Table 9) are *E*-isomers. The unequivalent methylene protons near the asymmetrical carbon atom of 1-methoxy-2-propyl group display the doublets of doublets due to the mutual geminal interaction and the interaction with the methine proton. The methylene protons of the compounds *XVIII*, *XIX* form a multiplet due to further interaction with the hydroxyl group proton. In the case of the compounds *XVIII*, *XXI*, *XXIII* (Table 9) with two different 2,6-substituents on the benzene ring two singlets of the

Table 8

^{1}H NMR data (δ/ppm; J/Hz) of the compounds *XIII*—*XVI*[a]

Proton $J_{H,H}$	Compound			
	XIII	*XIV*	*XV*[b]	*XVI*[c]
H-3′	6.45 d	6.47 d	6.40 d	6.73 d
H-4′	7.02 d	7.02 d	6.98 d	7.30 d
CH_2—N	4.93 d[d]	4.95 bs	4.92 d[d]	4.92 s
	4.79 d		4.82 d	
CH_3	1.96 s	2.00 s	1.92 s	1.95 s
CH_3—CH_2	2.37 q	2.45 q	2.35 q	2.35 q
CH_3—CH_2	1.00 t	0.95 t	0.98 t	1.00 t
H-6	—	—	7.47 d	6.41 d
H-7	—	—	5.90 d	4.92 d
H-3	—	—	6.78 dd	7.38 dd
H-4	—	—	6.50 dd	7.92 dd
H-5	—	—	7.61 dd	—
CH_2Cl	3.82 s	—	—	—
$J_{3',4'}$	3.2	3.4	3.2	3.5
$J_{6,7}$	—	—	15.2	15.2

a) Measured in hexadeuterodimethyl sulfoxide, H_{arom}: 7.10—7.80 m; *b*) R is 3-(2-furyl)-propenoyl; *c*) R is 3-(5-nitro-2-furyl)propenoyl, R is numbered as *XV* and *XVI* (see Table 7); *d*) $^2J = 15.0$ Hz.

Table 9

^{1}H NMR data[a] (δ/ppm; J/Hz) of the compounds *XVII*—*XXIV*

Proton $J_{H,H}$	Compound				
	XVII	*XVIII*	*XIX*	*XX*	*XXI*
H-3	6.65 dd	6.64 dd	6.98 d	6.61 dd	6.61 dd
H-4	6.44 dd	6.45 dd	7.46 d	6.43 dd	6.43 dd
H-5	7.43 dd	7.46 dd	—	7.42 dd	7.43 dd
H-6	7.45 d	7.42 d	7.50 d	7.43 d	7.40 d
H-7	5.92 d	5.92 d	6.20 d	5.91 d	5.91 d
H_{arom}	7.17 bs	*b*	7.21 bs	7.20 bs	*b*
CH_2—CH	3.80 m	3.80 m	3.90 m	3.47 dd	3.45 dd
				3.73 dd	3.76 dd
CH	4.10 m	4.08 m	4.10 m	4.25 m	4.25 m
OH	4.50 t	4.40 t	4.27 t	—	—

Table 9 (Continued)

Proton $J_{H,H}$	Compound				
	XVII	*XVIII*	*XIX*	*XX*	*XXI*
OCH_3	—	—	—	3.20 s	3.22 s
CH_3—CH	1.17 d	1.19 d	1.18 d	1.15 d	1.15 d
R^1	2.22 s	2.17	2.21	2.18 s	2.18
		2.32 s			2.15 s
R^2	2.16 s	2.63	2.26	2.22 s	2.58
		2.53 q			2.53 q
		1.24			1.16 t
$J_{3,4}$	3.3	3.3	3.8	3.3	3.3
$J_{6,7}$	15.1	15.1	15.1	15.2	15.2

Table 9 (Continued)

Proton $J_{H,H}$	Compound		
	XXII	*XXIII*	*XXIV*
H-3	6.98 d	6.97 d	6.97 d
H-4	7.48 d	7.46 d	7.47 d
H-6	7.49 d	7.47 d	7.47 d
H-7	6.20 d	6.22 d	6.24 d
H_{arom}	7.22 bs	*b*	7.32 bs
$\underline{CH_2}$—CH	3.60 dd	3.46 dd	3.50 dd
	3.72 dd	3.74 dd	3.75 dd
CH	4.25 m	4.25 m	4.25 m
OCH_3	3.20 s	3.22 s	3.21 s
CH_3—CH	1.18 d	1.14 d	1.12 d
R^1	2.20 s	2.20 s	2.56 q
			1.18 t
R^2	2.22 s	2.75 q	2.61 q
		1.20 t	1.18 t
$J_{3,4}$	4.0	4.0	4.0
$J_{6,7}$	15.5	15.5	15.5

a) Measured in hexadeuteroacetone; *b*) 7.10—7.30 m.

methyl group and two quartets of ethyl methylene group are observed due to atropisomerism. The methyl protons of the ethyl group were not distinguished. At the compounds *XXVI* and *XXVIII* having unsymmetrically substituted benzene ring the atropisomerism was observed as well (Table 10). The NMR

Table 10

^{1}H NMR data[a] (δ/ppm; J/Hz) of the compounds *XXV*—*XXIX*

Proton $J_{H,H}$	Compound				
	XXV	*XXVI*	*XXVII*	*XXVIII*	*XXIX*
H-3	6.64 dd	6.65 dd	7.01 d	7.00 d	7.00 d
H-4	6.43 dd	6.45 dd	7.49 d	7.47 d	7.48 d
H-5	7.41 dd	7.46 dd	—	—	—
H-6	7.44 d	7.40 d	7.48 d	7.47 d	7.47 d
H-7	5.99 d	5.87 d	6.24 d	6.26 d	6.27 d
H_{arom}	7.22 bs	*b*	7.25 bs	*b*	*b*
$\underline{CH}$—CH_3	4.52 q	4.54 q	4.53 q	4.56 q	4.53 q
		4.18 q		4.50 q	
$COOCH_3$	3.70 s	3.71 s	3.78 s	3.72 s	3.72 s
$\underline{CH_3}$—CH	1.05 d	1.04 d	1.05 d	1.06 d	1.00 d
		1.00 d		1.03 d	
R^1	2.42 s	2.41 s	2.41 s	2.41 s	2.50 q
		2.12 s		2.13 s	1.17 t
R^2	2.15 s	2.52; 2.91	2.16 s	2.52; 2.92	2.91 q
		1.15; 1.19		1.17; 1.20	1.20 t
$J_{3,4}$	3.2	3.2	3.9	3.9	3.9
$J_{6,7}$	15.2	15.2	15.4	15.4	15.5

a) Measured in hexadeuteroacetone; *b*) 7.10—7.30 m.

spectra of these compounds display two quartets of methine proton and two doublets of the methyl group of 1-methoxycarbonyl-1-ethyl group attached at nitrogen atom.

Some of the prepared compounds exhibited the antifungal activity examined according to the standard method [6]. The compounds *IV*—*VI*, and *XIX* formed a sterile zone with tested *Phytoptora infestans*, the compounds *IV*—*VI*, *XVIII*, *XXII*—*XXIV* with *Botrytis cinerea* and the compounds *IV*—*VII*, *XVIII*, *XXII*—*XXIV* with *Fusarium nivale*.

None of the prepared compounds in standard test methods [7] on herbicidal activity reached the activity of the used standards.

Experimental

^{1}H NMR spectra were measured with Tesla BS 487 C apparatus operating at 80 MHz in hexadeuteroacetone and hexadeuterodimethyl sulfoxide at 25 °C. Tetramethylsilane was used as internal reference. The obtained data and the solvents used are presented in Tables 6—10. The starting compounds were prepared according to [8—11].

2′,6′-Dialkylanilides I—VI

To the suspension of 2,6-dialkylaniline (0.02 mol) and sodium carbonate (2.12 g; 0.02 mol) in benzene (10 cm^3) 3-(2-furyl)- resp. 3-(5-nitro-2-furyl)propenoyl chloride (0.02 mol) in benzene (15 cm^3) was added under stirring at 25 °C. The reaction mixture was stirred at room temperature for 1 h. The separated sodium chloride was filtered off, the solvent was distilled off and the residue was crystallized from ethanol.

The data of the compounds *I—VI* are given in Tables 1 and 6.

N-Substituted 2′,6′-dialkylanilides VII—XXIX

To the suspension of *N*-substituted 2,6-dialkylaniline (0.02 mol) and sodium carbonate (2.12 g; 0.02 mol) in benzene (15 cm^3) acyl chloride (0.02 mol) in benzene (15 cm^3) was added under stirring at 25 °C (Scheme 1). The reaction mixture was stirred for 4 h, then filtered, the solvent was evaporated *in vacuo* and the residue was crystallized from ethanol.

In the case of the liquid products (*XIII, XXI, XXV, XXVI*) the reaction mixture after filtration was diluted with ethyl acetate, washed with water, 10 % hydrogen chloride and with saturated solution of sodium chloride. The organic layer was dried with sodium sulfate. The solvent was distilled off *in vacuo* and the residue was kept for 4 h *in vacuo* (p = 66 Pa) at 60 °C. The data of the compounds *VII—XXIX* are given in Tables 2—5, 7—10.

References

1. Vogel, C. and Aebi, R., *Ger. Offen.* 2328340 (1974); *Chem. Abstr. 80*, 82440g (1974).
2. Owens, W. B., *Brit. UK Pat. Appl.* 2049427 (1980); *Chem. Abstr. 95*, 37106b (1981).
3. Degischer, G. and Angst, W., *Brit. UK Pat. Appl.* 2073173 (1981); *Chem. Abstr. 96*, 142432y (1982).
4. Degischer, G. and Angst, W., *U.S.* 4317916 (1982); *Chem. Abstr. 96*, 199268d (1982).
5. Moser, H., Rihs, G., Sauter, H. P., and Böhner, B., *IUPAC Conference Pesticide Chemistry*, p. 315. Pergamon Press, Tokyo, 1982.
6. Konečný, V., Kováč, Š., and Varkonda, Š., *Chem. Zvesti 38*, 239 (1984).
7. Furdík, M., Konečný, V., Šály, A., and Truchlik, Š., *Acta Fac. Rerum Natur. Univ. Comenianae (Chimia) 12*, 45 (1968).
8. Grieder, A. and Coers, K. J., *U.S.* 4266071 (1981); *Chem. Abstr. 95*, 98324t (1981).
9. Moser, H. and Vogel, C., *Eur. Pat. Appl.* EP 77775 (1983); *Chem. Abstr. 99*, 158039y (1983).
10. Kolka, A., Ecke, G. G., and Closson, R. D., *U.S.* 2814646 (1957); *Chem. Abstr. 52*, 5463i (1958).
11. Vogel, C. and Aebi, R., *Swiss* 581607 (1976); *Chem. Abstr. 86*, 72242d (1977).

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