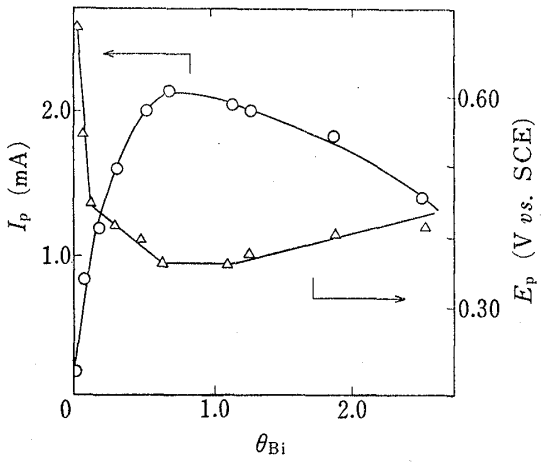

Fig. 3. Dependence of Peak Current (I_p) and Peak Potential (E_p) on Surface Coverage of Bi_{ad} (θ_{Bi})

I_p and E_p were obtained on i-E curves of 5.0×10^{-3}M I in the presence of various concn. of Bi^{3+}.

dation of I is attained at $\theta=0.5$—0.7, that is, the absorbed metals in submonolayer region exhibit the maximal catalytic effect.

The interpretation of such peculiar effects of M_{ad} formed on a platinum electrode can not be made in detail at this time. However, it can be considered that the presence of M_{ad} results in an increase of activated water species (like OH_{ad}) on platinum which behaves as an electron captor for I. This concept would be probable from the analogy to the behavior of adsorbed water in the anodic oxidation processes of some organic compounds on a platinum electrode.[7] Excessive coverage of M_{ad} may lead to lowering of its catalytic activity as a result of the decrease in the active sites on platinum for the adsorption of water and I itself.

7) B.B. Damaskin, O.A. Petrii and V.V. Batrakov, "Adsorption of Organic Compounds on Electrodes," Plenum Press, New York–London, 1971, pp. 465—467.

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Reaction of α,β-Unsaturated Ketones with Hydrazine Derivatives

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1,3-Diaryl-2-propen-1-one (I) reacted with aroyl- and acyl-hydrazines and ethyl hydrazinecarboxylate (II) in the presence of piperidine to give the corresponding α-[3-(1,3-diaryl-propan-1-one)]-β-acyl or-aroyl-hydrazines and ethyl β-[3-(1,3-diaryl-propan-1-one)]-hydrazine-carboxylate (IV), respectively. The structure and configuration of these compounds are based on chemical analysis and spectroscopic evidence.

Keywords——1,3-diaryl-2-propen-1-one; α-[3-(3-diaryl-propan-1-one)]-β-aroyl or acyl-hydrazines; ethyl β-[3-(1,3-diaryl-propan-1-one)]-hydrazinecarboxylate; synthesis; spectroscopy

The reaction of 1,3-diphenyl-and 3-aryl-1-methyl-2-propen-1-ones with alkyl hydrazinecarboxylate in the presence of acetic acid has been reported to give the corresponding hydrazonecarboxylic esters.[2] The present investigation was intended to study the reaction of 1,3-diaryl-2-propen-1-ones (I) with acyl- and aroyl-hydrazines and ethyl hydrazinecarboxylates in the presence of piperidine as a catalyst and to account for the manipulated methods

1) Location: *P.O. Box 24885 Safat, Kuwait*; *a*) To whom correspondence should be addressed.
2) S. Avramovici, I. Druia, and I. Zugravescu, *Rev. Roumaine Chim.*, **18**, 431 (1973).

and reasoning in establishing the mechanism of this reaction as well as the structure and the configuration of the products.

Experimental

Materials——1,3-Diaryl-2-propen-1-ones (Ia—f) were prepared according to the method previously reported by Barnes and Dodson.[3]

Apparatus——Melting points are uncorrected. Infrared (IR) spectra were measured on a Perkin Elmer 577 Grading Infrared Spectrophotometer (Nujol). Nuclear magnetic Resonance (NMR) spectra were measured on a JEOL-PMX 60 Spectrometer using TMS as internal standard. Electronic spectra were measured on a Beckman Spectrophotometer ACTA MVI (ethanol). The purity of the analytical samples was checked by thin-layer chromatography (TLC) (silica gel). Micro-analyses were determined by Alfred Bernhardt, West Germany. All evaporations were performed on rotary evaporators *in vacuo*.

Reaction of 1,3-Diaryl-2-propen-1-one (I) with Aroyl- and Acyl-hydrazines and Ethyl Hydrazine-carboxylate (II)——a) In the Presence of Piperidine. General Procedure: A solution of the ketone (I) (0.01 mol) and the hydrazine derivative (II) (0.01 mol) in benzene–ethanol mixture (15 : 1 v/v) (50 ml) was refluxed in the presence of piperidine (0.5 ml) for 3 hr. The reaction mixture was concentrated and extracted with chloroform. The organic layer was washed with dilute HCl solution (15%), water and dried (Na_2SO_4). Evaporation of the solvent, left a residual colourless solid which was crystallised from benzene–petroleum ether (30—60°) to give the corresponding hydrazine derivatives (IV). The results are reported in Table I.

Table I. α-[(3-(1,3-Diaryl-2-propan-1-one)]-hydrazine Derivatives (IVa—r)

Compound	Yield (%)	mp (°C)	Formula	Analysis (%) Calcd. C	Calcd. H	Calcd. N	Found. C	Found. H	Found. N
IVa	92	149—150	$C_{22}H_{20}N_2O_2$	76.72	5.85	8.13	76.81	5.82	8.33
IVb	87	110—111	$C_{23}H_{22}N_2O_2$	77.07	6.19	7.82	76.92	6.21	8.01
IVc	88	165—166	$C_{22}H_{18}BrClN_2O_2$	57.72	3.96	6.12	58.10	3.81	6.39
IVd	84	105—106	$C_{23}H_{20}N_2O_4$	71.12	5.19	7.21	70.98	5.21	7.51
IVe	89	125—126	$C_{23}H_{22}N_2O_3$	73.78	5.92	7.48	73.67	5.83	7.57
IVf	84	205—206	$C_{22}H_{19}BrN_2O_2$	62.41	4.52	6.62	62.67	4.61	6.82
IVg	73	116—117	$C_{23}H_{21}ClN_2O_2$	70.31	5.39	7.13	70.53	5.42	7.01
IVh	88	139—140	$C_{26}H_{22}N_2O_2$	79.17	5.62	7.10	79.34	5.67	7.41
IVi	88	150—151	$C_{27}H_{24}N_2O_2$	79.39	5.92	6.86	79.44	5.76	6.70
IVj	85	175—176	$C_{26}H_{20}BrClN_2O_2$	61.50	3.97	5.52	61.32	3.74	5.29
IVk	82	146—147	$C_{27}H_{22}N_2O_4$	73.96	5.06	6.39	74.13	5.13	6.62
IVl	85	161—162	$C_{26}H_{21}BrN_2O_2$	65.96	4.47	5.92	65.80	4.55	5.98
IVm	83	160—161	$C_{27}H_{24}N_2O_2$	79.39	5.92	6.86	79.60	5.97	6.97
IVn	78	126—127	$C_{28}H_{26}N_2O_2$	79.59	6.20	6.63	79.66	6.18	6.66
IVo	80	137—138	$C_{27}H_{23}ClN_2O_2$	73.21	5.23	6.32	73.08	5.32	6.40
IVp	83	130—131	$C_{27}H_{22}BrClN_2O_2$	62.14	4.25	5.37	62.35	4.30	5.55
IVq	81	163—164	$C_{27}H_{23}BrN_2O_2$	66.53	4.76	5.75	66.81	4.78	5.91
IVr	92	95— 96	$C_{18}H_{19}BrN_2O_3$	55.25	4.89	7.16	55.55	4.93	7.36

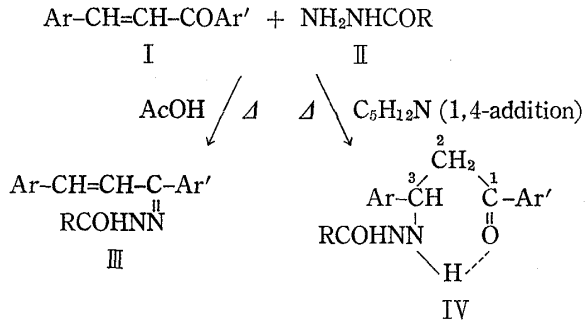
b) In the Presence of Acetic Acid. General Procedure: A solution of the ketone (I) (0.01 mol) and the hydrazine derivative (II) (0.015 mol) in a small quantity of ethanol (10 ml) was heated on a boiling water bath, in the presence of acetic acid (0.5 ml), for 2 hr. The reaction mixture was treated as previously reported by Avramovici *et al.*[2] to give the corresponding hydrazone derivative (III) as pale yellow crystals (benzene–petroleum ether 30—60°). (IIIa) mp 141—142°;[2] yield, 78%. *Anal.* Calcd. for $C_{18}H_{18}N_2O_2$: C, 73.45; H, 6.16; N, 9.52. Found: C, 73.51; H, 6.27; N, 9.73. IIIb mp 132—133°; yield, 81%. *Anal.* Calcd. for $C_{19}H_{20}N_2O_2$: C, 74.00; H, 6.54; N, 9.08. Found: C, 74.25; H, 6.61; N, 9.22.

3) R.P. Barnes and L.B. Dodson, *J. Am. Chem. Soc.*, **65**, 1585 (1943).

Results and Discussion

a) In the Presence of Piperidine

When 1,3-diaryl-2-propen-1-one (Ia—f) were refluxed, in the presence of piperidine as catalyst, with aroyl-(IIa, c)-and acyl-(IIb, d)-hydrazines and ethyl hydrazinecarboxylate (IIe)

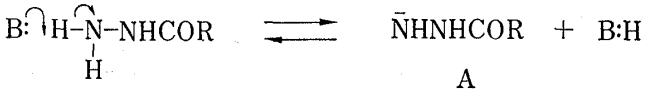


Compound I	Compound II	Compound III ($R=OC_2H_5$)
a: $Ar=C_6H_5$; $Ar'=C_6H_5$	a: $R=C_6H_5$	a: $Ar=Ar'=C_6H_5$
b: $Ar=p$-$CH_3C_6H_4$; $Ar'=C_6H_5$	b: $R=C_6H_5CH_2$	b: $Ar=p$-$CH_3C_6H_4$; $Ar'=C_6H_5$
c: $Ar=p$-$Cl\cdot C_6H_4$; $Ar'=p$-$Br\cdot C_6H_4$	c: $R=\alpha$-$C_{10}H_7$	
d: $Ar=3,4$-$OCH_2OC_6H_3$; $Ar'=C_6H_5$	d: $R=\alpha$-$C_{10}H_7CH_2$	
e: $Ar=m$-$CH_3OC_6H_4$; $Ar'=C_6H_5$	e: $R=OC_2H_5$	
f: $Ar=C_6H_5$; $Ar'=p$-$Br\cdot C_6H_4$		

Compound IV

No.	Ar	Ar′	R	No.	Ar	Ar′	R
a	C_6H_5	C_6H_5	C_6H_5	j	p-$Cl\cdot C_6H_4$	p-$Br\cdot C_6H_4$	α-$C_{10}H_7$
b	p-$CH_3C_6H_4$	C_6H_5	C_6H_5	k	$3,4$-$OCH_2OC_6H_3$	C_6H_5	α-$C_{10}H_7$
c	p-$Cl\cdot C_6H_4$	p-$Br\cdot C_6H_4$	C_6H_5	l	C_6H_5	p-$Br\cdot C_6H_4$	α-$C_{10}H_7$
d	$3,4$-$OCH_2OC_6H_3$	C_6H_5	C_6H_5	m	C_6H_5	C_6H_5	α-$C_{10}H_7CH_2$
e	m-$CH_3OC_6H_4$	C_6H_5	C_6H_5	n	p-$CH_3C_6H_4$	C_6H_5	α-$C_{10}H_7CH_2$
f	C_6H_5	p-$Br\cdot C_6H_4$	C_6H_5	o	p-$Cl\cdot C_6H_4$	C_6H_5	α-$C_{10}H_7CH_2$
g	p-$Cl\cdot C_6H_4$	C_6H_5	$C_6H_5CH_2$	p	p-$Cl\cdot C_6H_4$	p-$Br\cdot C_6H_4$	α-$C_{10}H_7CH_2$
h	C_6H_5	C_6H_5	α-$C_{10}H_7$	q	C_6H_5	p-$Br\cdot C_6H_4$	α-$C_{10}H_7CH_2$
i	p-$Cl\cdot C_6H_4$	p-$Br\cdot C_6H_4$	α-$C_{10}H_7$	r	C_6H_5	p-$Br\cdot C_6H_4$	OC_2H_5

Chart 1



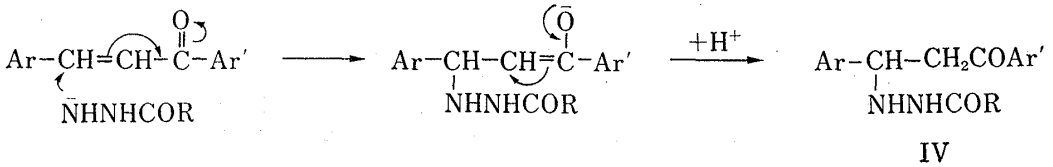


Chart 2

in benzene–ethanol mixture (15: 1 v/v), they gave the corresponding α-[3-(1,3-diaryl-propan-1-one)]-β-aroyl or acyl-hydrazines (IVa—q) and ethyl β-[3-(1-*p*-bromophenyl-3-phenyl-propan-1-one)]-hydrazinecarboxylate (IVr), respectively (*cf.* Chart 1). The reaction seems to proceed by Michael addition of the anion (A), derived from the hydrazine derivatives (II), to the double bond of α,β-unsaturated ketones (*cf.* Chart 2) leading ultimately to the product (IV). This mechanism appears to be similar to that reported for the reaction of active methylene compounds with α,β-unsaturated ketones.[4–7]

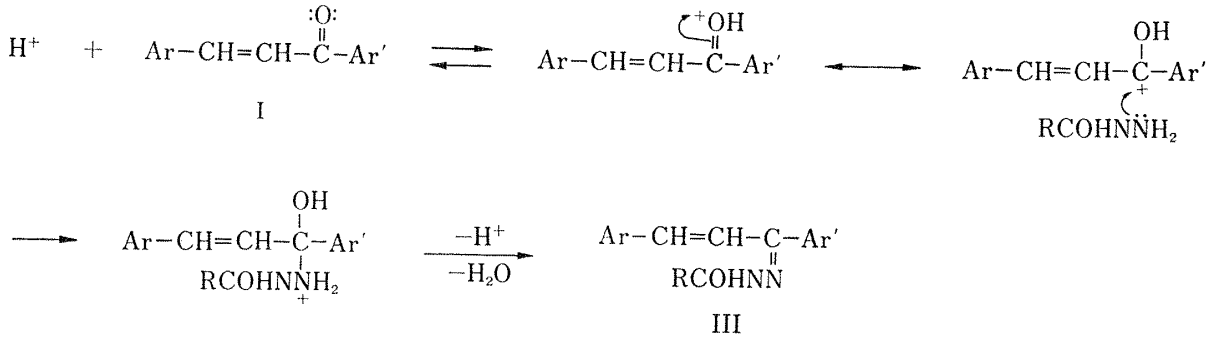


Chart 3

The structure and configuration of the reaction products (IV) were established by elemental analysis and spectral data.

The infrared spectra of these compounds (*cf.* Table II) show broad bands in the region 3420—3265 cm^{-1} (ν NH).[8] They also show strong bands in the regions 1695—1650 cm^{-1} and 1670—1635 cm^{-1} attributed to the carbonyl stretching frequencies of aroyl and amide groups, respectively.[9] The νC=O of the compounds (IVf—o) occur at 1685—1650 cm^{-1} indicating the presence of a weak hydrogen bonding between NH and C=O of the ketone (*cf.*

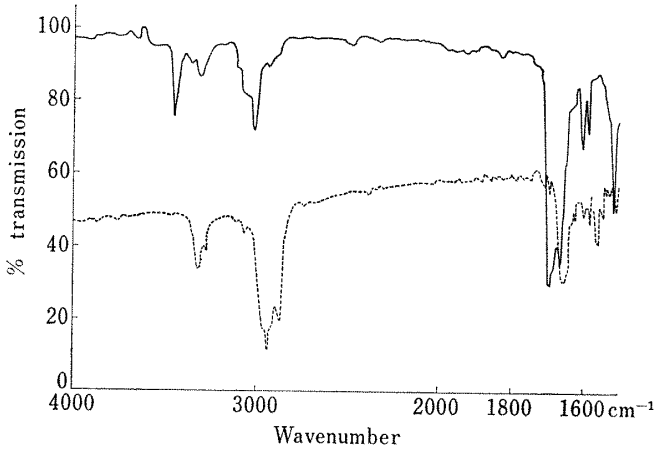


Fig. 1. IR Spectrum of IVn

----- in Nujol,
—— in $CHCl_3$.

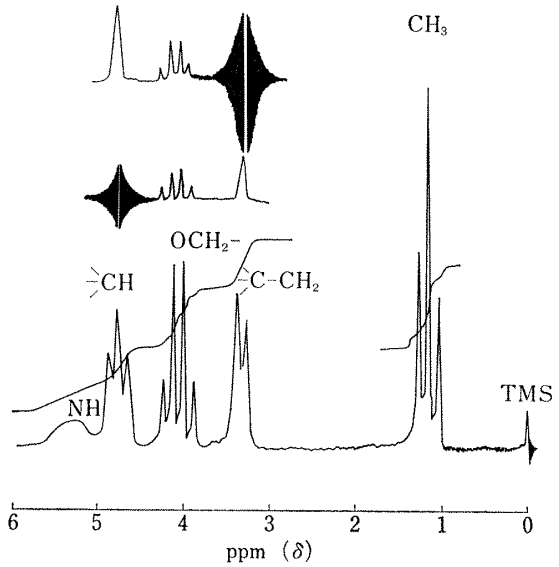


Fig. 2. NMR Spectrum of IVr in $CDCl_3$

4) A. Michael and J. Rose, *J. Am. Chem. Soc.*, **55**, 1632 (1933).
5) R. Conner and D. Andrews, *J. Am. Chem. Soc.*, **56**, 2713 (1934).
6) C.H. Weizmann, E. Bergmann and M. Sulzbacher, *J. Org. Chem.*, **15**, 918 (1950).
7) A. Sammour, M.I.B. Selim and M.S. Abd Elhalim, *Egypt J. Chem.*, **15**, 23 (1972).
8) F.G. Baddar, F.H. Al-Hajjar and N.R. El-Rayyes, *J. Heterocycl. Chem.*, **15**, 385 (1978).
9) L.J. Bellamy, "The Infrared Spectra of Complex Molecules," Methuen, London, 1966, p. 132, 205.

TABLE II. Infrared, Ultraviolet and Nuclear Magnetic Resonance Spectral Data of the Hydrazine Derivatives (IVa—r)

Compound	IR spectra (Nujol) cm⁻¹	ν	UV spectra (EtOH) λ	ε_{max}	NMR spectra ($CDCl_3$) δ		Assignments (No. of protons)
IVa	3340(m), 3320(m), 3260(s)	NH	243	17850	8.67—7.1(m)	(15)	ArH
					7.2(br)	(1)	NHCO
					5.33(br)	(1)	NH
					4.83(t) (J=7 Hz)	(1)	>CH-
	1685(s)	C=O			3.44(d) (J=7 Hz)	(2)	$-CH_2-$
	1645(s)	C=O					
IVb	3330(m), 3310(m), 3260(s)	NH	320	2590	8.22—6.97(m)	(14)	ArH
			240	16480	6.78(br)	(1)	NHCO
			223	14070	5.45(br)	(1)	NH
	1680(s)	C=O			4.78(t) (J=7 Hz)	(1)	>CH-
	1645(s)	C=O			3.45(d) (J=7 Hz)	(2)	$-CH_2-$
					2.32(s)	(3)	$Ar-CH_3$
IVc	3420(m), 3320(m)	NH	318	20880	8.0—7.77(m)	(13)	ArH
			253	28950	6.8(br)	(1)	NHCO
	1690(s)	C=O	225	34210	5.17(br)	(1)	NH
	1670(s)	C=O			4.95(t) (J=7 Hz)	(1)	>CH-
					3.35(d) (J=7 Hz)	(2)	$-CH_2-$
IVd	3300(m), 3240(s)	NH	282	9700	7.8—6.5(m)	(13)	ArH
			240	27880	6.37(br)	(1)	NHCO
	1690(s)	C=O	227	25450			
	1670(s)	C=O			5.90(s)	(2)	OCH_2O
					5.4(br)	(1)	NH
					4.50(t) (J=7 Hz)	(1)	>CH-
					3.26(d) (J=7 Hz)	(2)	$-CH_2-$
IVe	3400(br), 3360(s)	NH	282—276(sh)	7480	8.67—7.10(m)	(14)	ArH
					6.73(br)	(1)	NHCO
					5.67(br)	(1)	NH
	1695(s)	C=O	243	23750	4.83(t) (J=7 Hz)	(1)	>CH-
	1645(s)	C=O			3.80(s)	(3)	$ArOCH_3$
					3.42(d) (J=7 Hz)	(2)	$-CH_2-$
IVf	3340(m), 3310(m), 3280(m)	NH	253	26030	8.00—7.07(m)	(14)	ArH
			230	22025	6.77(br)	(1)	NHCO
					5.60(br)	(1)	NH
					4.82(t) (J=7 Hz)	(1)	>CH-
	1680(s)	C=O			3.40(d) (J=7 Hz)	(2)	$-CH_2-$
	1645(s)	C=O					
IVg	3340(m), 3300(m), 3260(m)	NH	243	20850	8.05—6.90(m)	(14)	ArH
			223	41720	6.70(br)	(1)	NHCO
					5.27(br)	(1)	NH
	1675(s)	C=O			4.68(t) (J=7 Hz)	(1)	>CH-
	1640(s)	C=O			3.40(s)	(2)	CH_2CO
					3.27(d) (J=7 Hz)	(2)	$-CH_2-$

Compound	IR spectra (Nujol)		UV spectra (EtOH)		NMR spectra ($CDCl_3$)		
	cm^{-1}	ν	λ	ε_{max}	δ		Assignments (No. of protons)
IVh	3360(s) 3320(s)	NH	288 280	7730 8641	8.20—7.13(m) 6.7(br)	(17) (1)	ArH NHCO
	1660(s)	C=O	252—238(sh)	15270	5.77(br)	(1)	NH
	1640(s)	C=O	222	70535	4.93(t) (J=7 Hz)	(1)	>CH-
					3.45(d) (J=7 Hz)	(2)	$-CH_2-$
IVi	3320(s) 3290(m)	NH	294—286(sh) 282	8930 9690	8.33—6.81(m) 5.73(br)	(17) (1)	ArH+CONH NH
	1660(s)	C=O	276—270	8420	4.88(t) (J=7 Hz)	(1)	>CH-
			252—238(sh) 223	16100 66940	3.44(d) (J=7 Hz)	(2)	$-CH_2-$
IVj	3360(br)	NH	292—284(sh)	7100	8.57—7.27(m) 5.83(br)	(16) (1)	ArH+CONH NH
	1660(s)	C=O					
	1645(s)	C=O	282—275(sh)	8125	4.90(t) (J=7 Hz)	(1)	>CH-
			260 222	19534 65830	3.53(d) (J=7 Hz)	(2)	$-CH_2-$
IVk	3315(m) 3285(m)	NH	292—284(sh) 280	7800 12320	8.13—6.73(m) 5.90(s)	(16) (2)	ArH+CONH OCH_2O
	1650(s)	C=O	274—268(sh)	9225	5.77(br)	(1)	NH
			252—238(sh)	17534	4.97(t) (J=7 Hz)	(1)	>CH-
			222	62720	3.42(d) (J=7 Hz)	(2)	$-CH_2-$
IVl	3310(br)	NH	294—284(sh)	15625	8.23—7.17(m)	(17)	ArH+CONH
	1675(s)	C=O	281	15750	5.83(br)	(1)	NH
	1650(s)	C=O	261	18210	4.97(t) (J=6 Hz)	(1)	>CH-
			222	64220	3.44(d) (J=6 Hz)	(2)	$-CH_2-$
IVm	3280(br)	NH	292 282	8930 13265	8.13—7.07(m)	(17)	ArH
	1680(s)	C=O	271	10970	6.63(br)	(1)	NHCO
	1640(s)	C=O	262	6870	5.33(br)	(1)	NH-CAr
			242		4.60(t) (J=6 Hz)	(1)	>CH-
			223	57700	3.95(s)	(2)	NCH_2CO
					3.23(d) (J=6 Hz)	(2)	$-CH_2-$
IVn	3280(br)	NH	293—286(sh)	6050	8.08—6.83(m)	(16)	ArH
	1685(s)	C=O	282	8420	6.53(br)	(1)	NHCO
	1640(s)	C=O	272	7370	5.30(br)	(1)	NHCAr
			242	13685	4.50(t) (J=7 Hz)	(1)	>CH-
			224	73515	3.87(s)	(2)	NCH_2CO
					3.18(d) (J=7 Hz)	(2)	$-CH_2-$
					2.27(s)	(3)	$Ar-CH_3$
IVo	3275(br)	NH	293—287(sh)	9470	7.92—6.93(m)	(16)	ArH
	1670(s)	C=O	282	9470	6.40(br)	(1)	NHCO
	1635(s)	C=O	273	8420	5.23(br)	(1)	NHCAr
			242	17370	4.53(t) (J=6 Hz)	(1)	>CH-
			224	67210	3.87(s)	(2)	$N-CH_2CO$
					3.12(d) (J=6 Hz)	(2)	$-CH_2-$

Compound	IR spectra (Nujol)		UV spectra (EtOH)		NMR spectra ($CDCl_3$)		
	cm^{-1}	ν	λ	ε_{max}	δ		Assignments (No. of protons)
IVp	3340(br) 3310(m)	NH	293—287(sh)	11070	8.03—6.90(m)	(15)	ArH
			282	15710	6.60(br)	(1)	NHCO
	1690(s)	C=O	272	17140	5.37(br)	(1)	NHCAr
	1660(s)	C=O	261	17500	4.53(t) (J=6 Hz)	(1)	>CH-
			224	69700	3.88(s)	(2)	NCH_2CO
					3.08(d) (J=6 Hz)	(2)	$-CH_2-$
IVq	3340(s) 3310(m)	NH	293—287(sh)	8530	8.13—6.07(m)	(16)	ArH
			282	12650	6.67(br)	(1)	NHCO
	1690(s)	C=O	272	11410	5.13(br)	(1)	NHCAr
	1665(s)	C=O	262	16900	4.57(t) (J=6 Hz)	(1)	>CH-
			224	73210	3.90(s)	(2)	NCH_2CO
					3.15(d) (J=6 Hz)	(1)	$-CH_2-$
IVr	3265(br)	NH	253	24830	7.83—7.00(m)	(9)	ArH
	1725(s)	C=O of ester	230	20010	6.60(br)	(1)	NHCO
					5.17(br)	(1)	NHC-Ar
	1690(s)	C=O			4.63(t) (J=6 Hz)	(1)	>CH-
					3.93(q) (J=7 Hz)	(2)	OCH_2-
					3.22(d) (J=6 Hz)	(2)	$-CH_2-$
					1.03(t) (J=7 Hz)	(3)	CH_3-

Chart 1). This conclusion was supported by running the IR spectrum of IVn in chloroform solution. It shows a strong absorption band at 1690 cm^{-1} and 1660 cm^{-1}, in addition to a sharp band at 3440 cm^{-1} (free νNH) (*cf.* Fig 1), which is in good agreement with the suggested weak hydrogen bonding system. Their NMR spectra (*cf.* Table II), however, show a triplet (1H) and a doublet (2H) (J=7 Hz) due to >CH-CH_2CO protons, indicating that they have structure (IV) and not (III). These assignments were confirmed by double irradiation experiments: *e.g.* on irradiation at the frequency of protons C_2, the proton C_3 triplet collapsed to a singlet (Chart 1, Fig. 2). Compound (IVr), however, shows in addition, a triplet and quartet (J=7 Hz) attributable to the ethyl group of the ester (*cf.* Table II). The NMR spectra of these compounds also show broad signals in the regions δ 7.20—6.37 (IH) and 5.38—5.31 (IH) attributed to the -NHCO- and C-NH-protons, respectively.These bands disappeared when the deuteriochloroform solution was shaken with D_2O.

The electronic spectra of these compounds (*cf.* Table II) reveal their identity and lend further support for the hydrazine derivatives. Thus, they show absorption maxima in the range 262—240 nm attributable to π—π^* transition bands of the acetophenone moieties.[10] In addition, compounds (VIh—l) and (IVm—q) show absorption maxima attributed to the naphthamide and naphthalene moieties,[8] respectively.

b) In the Presence of Acetic Acid

When the reaction between the α,β-unsaturated ketones (Ia, b) and ethyl hydrazinecarboxylate (IIe) was carried out in the presence of acetic acid, they gave the corresponding

10) G. Adembri, P. Sarti-Fantoni and E. Belgodere, *Tetrahedron*, **22**, 3149 (1966); E.A. Braude and F. Sondheimer, *J. Chem. Soc.*, **1955** 3754; R.A. Morton, Ali Hassan and T.C. Calloway, *ibid.*, 883 (1934).

hydrazones (III).[2] This reaction appears to proceed according to the mechamism reported in Chart 3.

The structure of the products (IIIa, b) was established spectroscopically. Thus, their IR spectra show strong bands at 1715—1710 cm^{-1} (νC=O) and 1610 cm^{-1} (νC=O).

Further evidence for the structure was obtained from their NMR spectra which show signals at δ 4.2—4.12 (q, 2H) and 1.20—1.03 (t, 3H) attributable to OCH_2CH_3 proton as well as a multiplet for the aromatic (δ 8.13—6.67) and NH (δ 8.67—7.60) protons.[2] The similarity of their electronic spectra reflect their structural identity. They show absorption maxima at 318—315 nm due to π—π^* transition in the conjugated system.

These results indicated that the type of the product separated from the reaction of α,β-unsaturated ketones with hydrazine derivatives depends mainly on the catalyst used. Thus, in the presence of a base (*i.e.* piperidine), the hydrazine derivatives will be separated in good yields (1,4-addition). However, by addition of acetic acid, the reaction mixture gave the corresponding hydrazone-carboxylate derivatives,[2] (1,2-addition).

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Effects of Vegetable Oils on the Biological Disposition of Ethchlorvynol. II. The Effects on the Brain Distribution of Ethchlorvynol in Rat

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The blood and tissue levels of unchanged ethchlorvynol (EC) were determined after intraperitoneal administration of EC suspended in 5% polyethylene glycol 400 aqueous solution (5% PEG). Pre-oral administration of 5% PEG did not show any effect on the levels of EC in blood and tissues, compared with the pre-treatment of normal saline as a control. However, pre-administered corn oil as well as peanut oil and soybean oil decreased the brain levels of EC. In order to exclude the effect of the vegetable oils, the thoracic fistula rats were used in the studies. When EC was administered orally in corn oil to the fistula rats, the brain levels of EC were fairly improved, and were higher than in the intact rats. As little as 0.06 and 0.05% ot total dose were recovered in the lymph as EC and EC-glucuronide (ECG), respectively after oral administration of EC in corn oil. While both EC and ECG were not detected in the lymph when EC was given in 5% PEG.

Keywords——ethchlorvynol; distribution; brain level; vegetable oils; corn oil; peanut oil; soybean oil; thoracic fistula rat

In the preceding paper of this series,[2] the distribution of ethchlorvynol (EC), a short acting hypnotic, to rat brain was found to be inhibited significantly by the co-administration with such vegetable oils as corn, peanut and soybean oil.

In order to confirm the inhibitory effect of the oils on the brain distribution of EC, the present studies were carried out.

Experimental

Animal——Female rats of Wistar strain weighing 200—250 g were fasted for 20—24 hr prior to use. Under ether anaesthesia, the thoracic duct of the rat was cannulated according to the method as reported

1) Location: *a) 2-2-1, Oshika, Shizuoka, Japan*; *b) 7-1, Katsuraoka-cho, Otaru, Japan.*
2) Y. Nitta, T. Aimoto, T. Murata and K. Ito, *Chem. Pharm. Bull.* (Tokyo), **26**, 1257 (1978).