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Reactions of Enols of Amides with Diazomethane

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Received June 4, 2002

The reaction of 10 carboxamides activated by two β-electron-withdrawing groups, which mostly exist completely or partially in their enol forms, with diazomethane was investigated. The main outcome is the diversity of reactions observed. With the most acidic enols **3**−**7**, activated by at least one trifluoroethoxycarbonyl group or a cyano group, O-methylation or O,N-dimethylation takes place. With β-dimethoxycarbonyl-activated systems **5** and **8**, the C-methylation product of the amide form was one of the products. With a Meldrum's acid anilide enol **2**, a cleavage took place leading to the C-alkylated imine having a $CH(CO_2Me)_2$ group. Exchange of one 2,2,2-trifluoroethoxycarbonyl by a methoxycarbonyl in the C,N-dimethylation product of $Me_2CHNHC(OH)=C(CO_2CH_2CF_3)_2$ **4** took place. The 2-anilido-1,3-cyclopentanedione **10** was methylated on a ring carbonyl while the enol of the 1,3-indanedione analogue **11** reacted with three diazomethane molecules and underwent a ring expansion and O-methylation to the 3-anilido-1,4-dimethoxynaphthalene. It is suggested that the reaction initiates by protonation of the diazomethane by the enol and an approximate qualitative relationship exists between the acidity of the enol and K_{enol} and the regioselectivity of the reaction.

The knowledge about enols of carboxylic acid derivatives[1] has increased in recent years, and experimental information about their equilibrium constants with their acid tautomers, K_{enol} = [enol of acid derivative]/[acid derivative], and the kinetics of the enol → keto transformation is slowly accumulating.[2−6] However, except for the ketonization reaction and the electrophilic addition to the double bond,[7] little is known about other reactions of this family of enols. In the present work we report the reaction of several such enols with diazomethane. The only such previous work known to us is the reaction of 2,2-ditipyl-1,1-ethenediol (**1**) with diazomethane.[8]

The systems investigated are **2**−**11** given in Chart 1. All of them are amides with the general structure $RNHC_\alpha OC_\beta HYY'$, where Y, Y′ are electron-withdrawing substituents or their enol tautomers, i.e., $RNHC_\alpha(OH)=C_\beta YY'$. The reasons why these systems should completely or partially exist as the enols of amides tautomers were discussed.[3−5,9,10] The previous work had shown that compounds **2**,[3a] **3**,[4] **7**,[10] and **11b**[11] exist in the solid state in the hydrogen bonded enol form shown, that solid **8**[3a] and **9**[10] exist in the amide form, and that solid **10** exists as an enol on the nonamido carbonyl group.[12] In low-polarity chlorinated solvents such as CCl_4 or $CDCl_3$, compounds **2**−**9** and **11** exist as pure enols of amides or as mixtures with the amide isomers.[3,4,10−12]

There are several aims of the investigation. (i) To find out if the enols are methylated by diazomethane in the absence of a catalyst. (ii) If so, to determine the regioselectivity of these ambident species, since O- and N-alkylations of the enol and C-alkylation of the amide are possible. (iii) To find out if other reactions beside alkylation also take place. (iv) To search for a qualitative relationship between the K_{enol} values and the acidity of the enols and the regioselectivity of the reaction. (v) To

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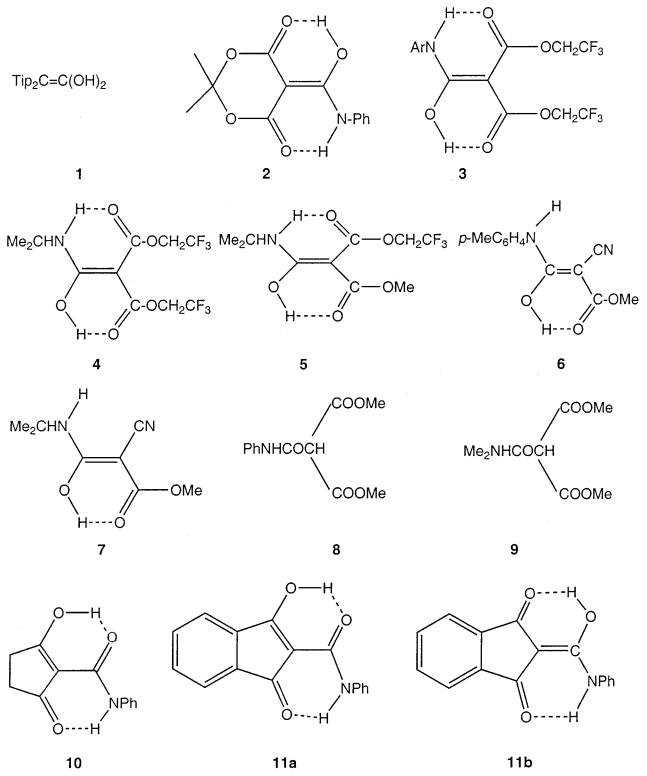
10.1021/jo0203802 CCC: $22.00
Published on Web 09/04/2002

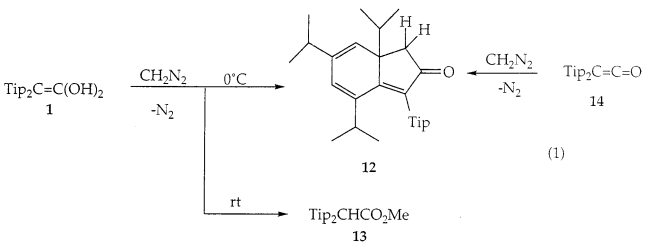
CHART 1



learn more about the importance of hydrogen bonding in stabilizing the enols since these bonds are expected to be partially and/or completely removed by the O- and/or *N*-methylation.

Results and Discussion

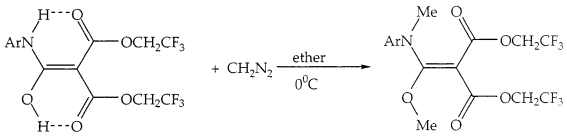
Hydroxy compounds are O-methylated by freshly distilled diazomethane,[13] but if their acidity is low as is the case with simple alcohols, a catalyst is required.[13a] Enols are related more to phenols which are alkylated without catalyst than to simple alcohols. However, the 1,1-enediol **1** which is only kinetically stable does not give the bis-O-methylation product, but gives compound **12** which is probably derived from the ester **13** or the ketene **14** (which exist in equilibrium with **1**) (eq 1). The latter can be formed either from the acid $Tip_2CHCOOH$ formed by ketonization of **1**, or by ketonization of a methyl hemiacetal of **1**, formed by methylation of one OH group of **1**.[8] Note that **1** has the lowest acidity of all the species shown in Chart 1.



(1)

The enols of amides **2**−**11** show several types of reactions under identical set of conditions, i.e., excess of freshly prepared and distilled diazomethane, no catalyst, and 12 h reaction time. The solvent is mostly dry ether except for **2**, **6**, **10**, and **11** which due to their low solubility in ether were reacted in THF.

O,N-Dimethylation. The bis(trifluoroethyl) esters **3a** and **3b** whose enol content is high ($K_{enol} \geq 50$ in CCl_4, and 6.7 (*p*-Me), 7.3 (*p*-OMe) in $CDCl_3$)[4] are only O,N-dimethylated in dry ether to products **15a** and **15b** with no evidence for formation of other products (eq 2). This



(2)

a: Ar = *p*-$MeOC_6H_4$
b: Ar = *p*-MeC_6H_4

is shown by the ^1H, ^{13}C, and ^{19}F NMR spectra of the crude product at the end of the reaction. A significant feature of these spectra is the presence of magnetically identical CH_2CF_3 groups at room temperature as shown by the single H, F, *C*H_2, and *C*F_3 signals. This is in contrast with the spectra of the parent enols **3a** and **3b** which show two separate CH_2CF_3 signals up to 360 K with no sign of coalescence.[4]

The observation of only one signal for the CH_2CF_3 groups is not due to accidental overlap of two different signals as shown by the one signal observed for each of Ar-*Me*, OMe, Ar-H, and CH_2CF_3 groups in the ^1H NMR of **15b** in $CDCl_3$, C_6D_6, and DMSO-d_6, despite the different δ values for each group in the three solvents. Moreover, the 12 ^{13}C signals, including those for the COO, CH_2, and CF_3 carbons did not split in the three solvents.

In a search for decoalescence the spectra were also determined at 270, 260, 250, and 240 K. As shown in the Experimental Section, the δ values in $CDCl_3$ are 0.04 ppm to a higher field at 270 K than at 240 K for the Me, NMe, OMe, CH_2CF_3, and Ar-H signals. However, the multiplicity and shape of few signals start to change at 240 K. The MeO singlet, the CH_2 quartet and one Ar-H doublet at 250−270 K but not the CF_3 signal broadened at 240 K, although no decoalescence was observed. Consequently, there is a fast rotation on the ^1H, ^{13}C, and ^{19}F NMR time scales around the C═C bond, which leads to a post-coalescence single signal. The different behavior of **3a** and **3b**[4] confirms the previous conclusion that OH···O═C and NH···O═C hydrogen bonding stabilize the enols significantly and contribute to the slow rotation around the C═C bond on the NMR time scales.

By reducing the temperature of a sample of **15a** in THF-d_8, we observed by a DNMR study a coalescence of the two CH_2 groups at 182.5 K, with k_{isom} (182.5 K) = 21.6 s^{-1} and $\Delta G^{\ddagger} = 9.4$ kcal/mol. The coalescence temperature of **15b** is 184.5 K (k_{isom} (184.5 K) = 6 s^{-1}; $\Delta G^{\ddagger} =$ 10 kcal/mol). These values should be compared with the $\Delta G^{\ddagger}$ value of 21.6 kcal/mol for the internal rotation in the enol **3a**, the "parent" of **15a**.[4] The $\Delta\Delta G^{\ddagger}$ difference of 12.2 kcal/mol can serve as a good approximation for the strength of the hydrogen bonds in enol **3a**.

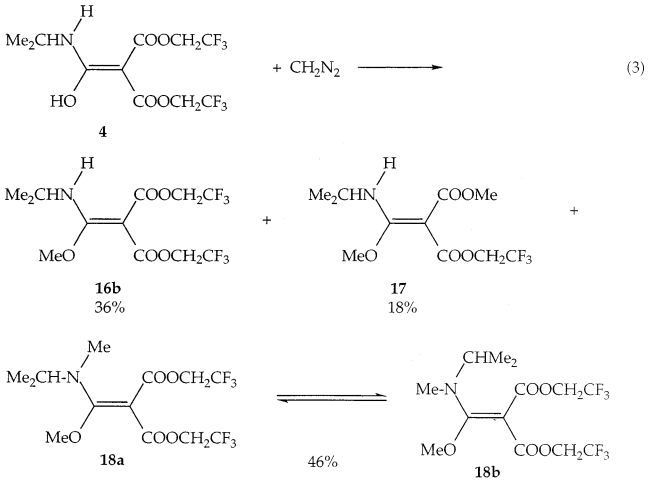
(13) (a) Sammakia, T. In *Encyclopedia of reagents for organic synthesis*; Paquette, L. A., Ed.; Wiley: New York, 1995; Vol. 2, p 1512. (b) Smith, B.; March, J. *Advanced Organic Chemistry, Reaction, Mechanisms and Structure*, 5th ed.; Wiley: New York, 2001; p 248.

The possibility that adventitious water in the solvent may affect the products[14] was investigated in the reaction of **3a** with diazomethane in ether saturated with added water. Three products were obtained: the main one (75%) was **15a**. The minor product was itself a mixture which we failed to separate, which according to the ^{1}H NMR is mainly the O-methylation product **16a** (17%). The additional small signals of the third product were not identified.

p-MeOC$_6$H$_4$NHC(OMe)=C(CO$_2$CH$_2$CF$_3$)$_2$

16a

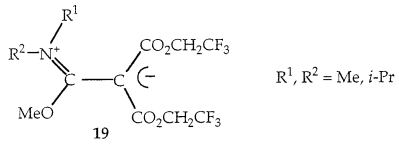
b. O,N-Dimethylation, O-Methylation, and Ester Exchange. The N-*i*-Pr analogue of the N-Ar enols **3** also exists in CCl_4 and $CDCl_3$ as the enol form **4**.[10] *N*-Isopropyl systems usually have somewhat higher K_{enol} values than the *N*-phenyl analogues.[10] **4** gives with diazomethane the O,N-dimethylation product **18** accompanied by the two products **16b** and **17** (eq 3). As is clear from the ^{1}H, ^{13}C



(3)

and ^{19}F NMR spectra, **18** exists in $CDCl_3$ as a mixture of two stereoisomers with a 1:0.4 ratio at 250 K. At room temperature, the ^{1}H NMR signals merge, the two ^{19}F NMR signals also give one broad signal, whereas the two isomers are still observed (at ca. 1:1 ratio) in the ^{13}C NMR spectrum. The coalescence temperature in the ^{1}H NMR spectrum for the C−N bond rotation is ca. 260 K, but the process was not investigated further.

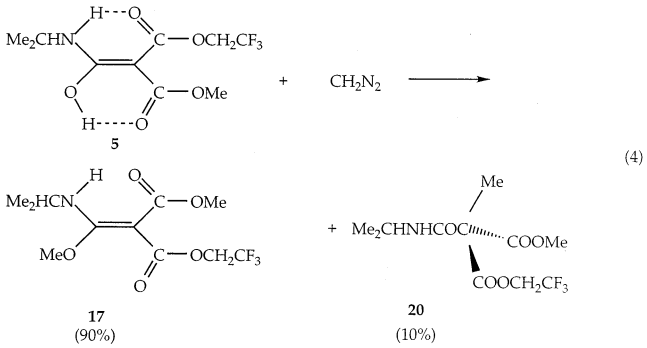
We ascribe the two isomers to the push−pull nature of **18**. The contribution of hybrid **19** is significant, as seen



by the rather long C=C bond and short C−N bond in enols **3**.[4] The partial double bond character of the C−N bond allows the formation of two rotamers: **18a** with the methyl group closer than the *i*-Pr to the *cis*-COOCH$_2$CF$_3$ group and **18b** with the *i*-Pr closer to the *cis*-COOCH$_2$CF$_3$. The population of the two forms should be generally different, and if the steric effect is dominant, **18a** should be slightly more stable than **18b**. The rate of rotation around the C=N bond is sufficiently high at room temperature that average signals for an apparent one species is observed on the ^{1}H and ^{19}F NMR time scale. Such hindered rotation is known for other push−pull enamines, especially when they carry another electron-donating substituent on the carbon attached to the nitrogen.[15] The same situation also exists in **15a** and **15b**. However, the barrier for C−N rotation may be sufficiently low (cf. the low barrier for C=C rotation), and the difference in bulk between Ar and Me may strongly favor one conformer over the other.

Compounds **16b** and **17** are both O-methylation products. In **16b**, the major isolated product, the enol skeleton is retained, but in **17** one of the trifluoroethyl groups is exchanged for a methyl group. The stronger NH···O=COCH$_3$ bond, compared to NH···O=COCH$_2$CF$_3$, may lead to the observation of only one geometrical isomer. **16b** seems to be the precursor to **18** which is formed by its *N*-methylation, and it can also be the precursor for **17**, although **17** can be formed by an initial ester exchange, followed by O-methylation. A precedent for a diazomethane-catalyzed exchange of an alkoxy group of an ester by an alcohol is not directly related to our case. Hydrolysis of an ester trifluoroethoxy group by an adventitious water, followed by methylation by the diazomethane, is a possibility,[14] but since **3a** in the presence of added water did not give such an exchange, the mechanism of the reaction is unknown.

c. O- and C-Methylations. The *N*-aryl monomethoxycarbonyl monotrifluoroethoxycarbonyl analogue of **3** has an amide structure in the solid state and exists as a mixture of an amide and of its *E*- and *Z*-enols in solution.[4] The *N*-isopropyl analogue **5** has a higher K_{enol} value in solution (K_{enol} ($CDCl_3$) = 1.0), which is however lower than that of **3** or **4**. The reaction with diazomethane led to a crude reaction mixture, which by GC/MS contained two isomeric monomethylation products with a molecular weight of 299. However, separation by a preparative TLC had failed, and only a 9:1 mixture of the isomers was obtained (eq 4) as a yellow liquid. The main compound



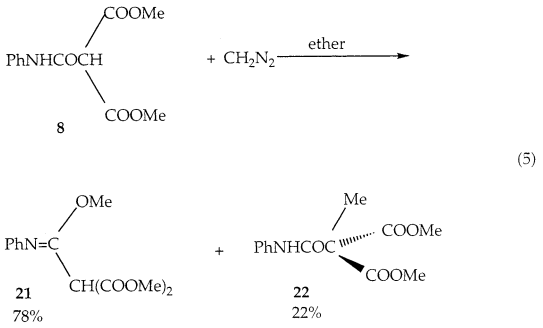
(4)

was identical with **17**, the minor product obtained from **4** by alkylation and exchange (eq 3). The minor product (10%) which did not display a C=C signal in the ^{13}C NMR or an enolic OH in the ^{1}H NMR was tentatively identified as **20**, the C-methylation product of the amide tautomer of **5**.

(14) Sammakia, T. Personal communication.

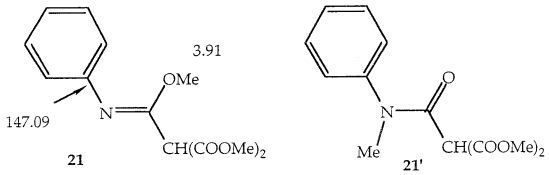
(15) For a review see Sandström, J. In *The Chemistry of Enamies*; Rappoport, Z., Ed.; Wiley: Chichester, 1994; Chapter 6, p 405.

d. C-Alkylation and Isomerization−Alkylation. Anilidodimethoxycarbonyl methane exists as the amide **8** in the solid state, and as a mixture of **8** (>93%) with its enol (ca. 5%) in $CDCl_3$.[3a] Hence, it is the least enolic of all the eight amido diesters studied (K_{enol} = ca. 0.05 in $CDCl_3$). Its reaction with diazomethane gave two isomeric products, which by GC/MS had molecular weights of 265 and were assigned structures **21** and **22**, which according to the ^{1}H NMR spectrum before workup were formed in a 3.5:1 ratio (eq 5). They were separated by preparative



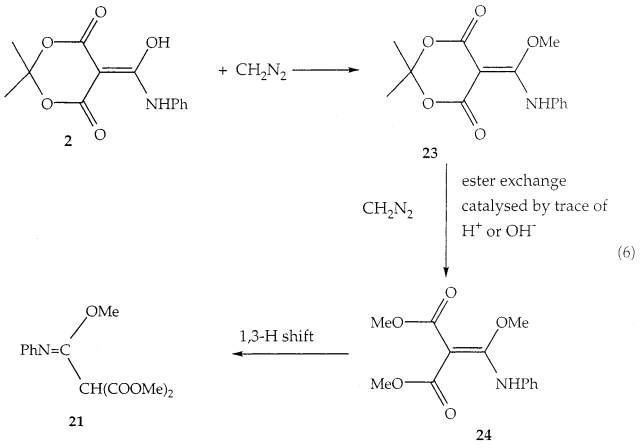
TLC and their assignments are based on microanalysis, GC/MS and NMR techniques.

The ^{1}H NMR spectrum of the major compound at room temperature in $CDCl_3$ showed signals for a Ph group, and CH, OMe, and COOMe (6H) signals at δ 4.47, 3.91, and 3.75, respectively. The spectrum at 210 K resembled that at room temperature. The ^{13}C NMR spectrum displayed signals for CH at δ 52.46, aromatic Ph signals and COOMe group(s), and a signal at δ 153.78. This does not allow an unequivocal assignment since both structures **21** and **21′** have Ph and $CH(CO_2Me)_2$ moieties, whereas the signal at δ 153.78 is consistent with both a N=*C*-(OMe) or a Me-N-*C*=O moiety and the Me group may be either an O-Me or N-Me. A C−H long distance correlation showed no cross signal between the C*H*$_3$ signal at δ 3.91 and the *ipso* signal at δ 147.09. Since there are four bonds between the atoms involved in **21** and only two in **21′** and a correlation is expected in the latter case, the data are consistent with structure **21**.



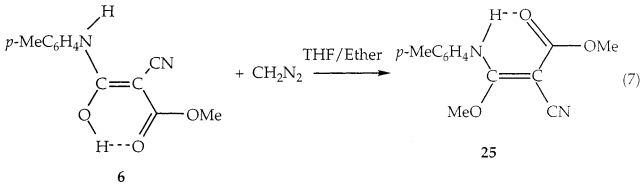
The minor product (22%) **22** showed ^{1}H NMR NH and C-Me signals at δ 9.74 and 1.83 and a *C*-Me quartet at δ 59.51 (J = 3.7 Hz) in the ^{13}C NMR.

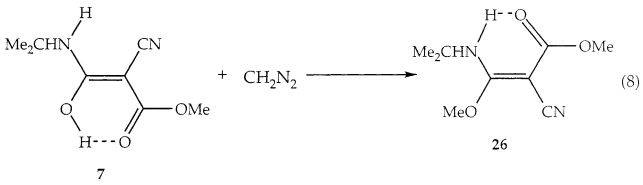
e. O-Alkylation with Cleavage. The Meldrum's acid derivative **2** is enolic in both the solid state and $CDCl_3$ and has the highest K_{enol} of all the anilido diester enols studied.[3a] With diazomethane it gave a single product, identified as **21** (eq 6), which was identical with the major product of the reaction of **8** with diazomethane. A tentative reaction mechanism involves a sequence of O-methylation to **23**, ring cleavage, and ester exchange to **24** of the type described for **4**, followed by 1,3-proton shift to give **21**. We have no evidence for the intermediacy



of **23** or **24**, but we note that Meldrum's acid reacts with CH_2N_2/ROH by cleavage to a malonyl diester.[17]

f. O-Alkylation. The cyano methoxycarbonyl activated enols of *N*-*p*-tolyl or *i*-Pr amides are enolic in the solid state[10] and have $K_{enol} \geq 50$ in $CDCl_3$. Each of them gives a single O-methylation product, **25** and **26**, respectively, with diazomethane (eqs 7 and 8).



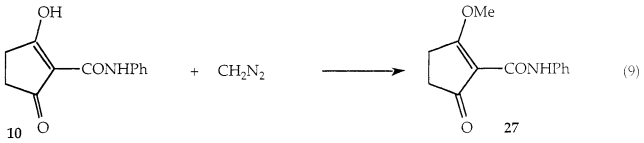


In the ^{1}H NMR spectra in both cases the OH signal is replaced by an OMe signal, whereas an NH signal is retained. The loss of the strong OHO hydrogen bond in **6** and **7**, which stabilizes the *Z*-configuration, reduces the barrier to the internal rotation around the C=C bond in the push−pull alkenes **25** and **26** and makes it fast at room temperature.[10] Stabilization is achieved by NHO hydrogen bond in the *E*-configuration of **25** and **26**.

g. No Reaction. Surprisingly, the isopropylamido-(dimethoxycarbonyl)methane **9** which is more enolic in $CDCl_3$ solution than **8** (K_{enol} = 0.1) and mostly enolic in CCl_4 (K_{enol} = 1.1)[10] did not react three times with diazomethane, and only **9** was recovered from the reaction mixture.

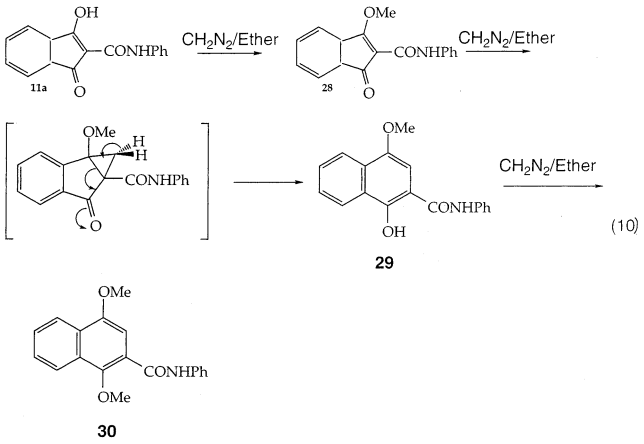
h. Methylation on a β-Carbonyl. 2-Anilido-1,3-cyclopentanedione is an enol, **10**, at a β-carbonyl rather than at the amido carbonyl site, as shown by the solid-state structure and the NMR data in solution.[12] With diazomethane almost a quantitative yield of a single product identified as **27**, the methyl ether of enol **10** was isolated (eq 9).

(16) Bredereck, H.; Sieber, R.; Kamphenkel, L. *Chem. Ber.* **1956**, *89*, 1169.
(17) Schreibner, S. L.; Kelly, S. E.; Porco, J. A., Jr.; Sammakia, T.; Suh, E. M. *J. Am. Chem. Soc.* **1988**, *110*, 6210.



(9)

i. O-Alkylation with Ring Enlargement. The 2-anilido-1,3-indanedione **11** exists in the solid state as the enol **11b**[11] despite its structural similarity to **10**. It reacted with three molecules of diazomethane to give 1,4-dimethoxy-2-anilidonaphthalene **30** as a single product formed by ring enlargement and double O-methylation (eq 10).



(10)

A tentative reaction sequence starts with the O-methylation of a β-carbonyl of the amide **11a**, present in equilibrium with **11b**, to give **28**. Cyclopropanation of the double bond of **28**, followed by ring enlargement give **29**, which is further methylated to **30**.

***K*$_{enol}$ Values in Ether.** To see if there is a relation between the amide/enol of amide K_{enol} value and the site/reactivity of the systems studied, we measured several K_{enol} values in ether, the methylation solvent. For the nonfluorinated species **8** and **9**, the K_{enol} values were determined in ether-d_{10} at 298 K. For **8** the integration of the enolic NH at δ 12.38 (or the enolic OH at δ 17.58) was 0.1 H compared with 1H for the amide NH or the CH at δ 9.43 and 4.71, respectively, giving $K_{enol} = 0.1$. The same value is obtained by the relative integration of (0.3H, 0.3H) for the two MeO groups of the enol and the 6H MeO for the amide.

For **9** the enols OH, NH, and two MeO and *i*-Pr-*Me* signals at δ 16.87, 10.23, 3.95, 3.83, and 1.44, respectively, are approximately half of those of the CH, NH, MeO, and *i*-Pr-*Me* signals of the amide at δ 4.48, 7.23, 3.92, and 1.33, giving K_{enol} value of 0.5.

The K_{enol} values for the fluorinated enols were determined by ^{19}F NMR. On the basis of previous experience and the δ's and K_{enol} values in the ^{1}H NMR in THF, the signal at more negative δ was ascribed to the enol (or the *E*/*Z* enols for **5**).[4,10] The K_{enol} values in ether are 5.9 (**3a**), 5.0 (**3b**), 5.3 (**4**), and 2.6 (**5**). This order qualitatively parallels the order of K_{enol} values in other solvents.

Mechanistic Considerations. The purpose of the present work was to study the scope and regioselectivity in the reaction of enols of carboxamides with diazomethane. Despite the moderate structural variations in the enols, the reactions were so variable that our mechanistic conclusions are only qualitative.

Species **2**−**9** exist in ether and THF solution as enols/amide mixtures which have at least five reaction sites where the diazomethane can react. These include the amino nitrogen, hydroxy oxygen and the double bond of the enol, the CH of the amide, and the enolizable carbonyl of the β-electron-withdrawing group. Reactions at all these sites and additional ones were observed.

For compound **10** the enol on the ring carbonyl is the only observable species in solution and the O-methylation to give **27** is the expected outcome.

Several mechanisms involving carbene intermediates were suggested for the etherification of alcohols with diazo compounds.[18] For acidic alcohols such as phenols it was suggested that protonation of the diazomethane gives the methyldiazonium ion which reacts with the nucleophile to give the ether.[19] When applied to our nonaqueous reaction system, the acidic enol (ROH) protonates CH_2N_2 to $CH_3N_2^+$ (eq 11, step a) which then reacts with the enolate ion nucleophile (eq 11, step b).

$$CH_2N_2 + ROH \overset{a}{\rightleftharpoons} CH_3N_2^+ + RO^-$$

$$RO^- + CH_3N_2^+ \overset{b}{\rightleftharpoons} ROCH_3 + N_2 \qquad (11)$$

This mechanism suggests a correlation between the acidity of the enol and the rate of the alkylation, as well as alkylation at the RO^- site since the negative oxygen is apparently more nucleophilic toward the hard $CH_3N_2^+$ cation than the NH nitrogen of the enolate C^-. Recent data[20] give the following order of gas-phase acidities: **3**, **6** > **7** > **4**, **2** > **10** > **8** > **5** > **9**, **11**. Another important parameter is K_{enol} which measures the percentage of the amide in solution and follows the order **2** > **3** ∼ **4** > **5** > **9** > **8**. Qualitatively we find a shift in the regioselectivity, from O,N-dimethylation via O-methylation to C-methylation which follows the acidity order and the K_{enol} values. Thus, **3** and **4** give O,N-dimethylation and **3a**−**7** give O-methylation. Hence, the first tentative step of the reaction of **2** assumes an initial O-methylation. A product of only *N*-methylation was not observed. Although the *N*-methylation of the initial *O*-methyl ether can be ascribed to initial protonation of CH_2N_2 by the acidic NH group, since **6** and **7** do not undergo further N-alkylation it is more likely that $CH_3N_2^+$ formed in step a of eq 11 reacts with the neutral NH of the enol.

When K_{enol} is further reduced, the percentage of the amide in solution increases. Consequently **5** and **8** undergo some C-alkylation. The derived enolate ions having zero or three fluorine atoms in the ester groups are softer then those derived from **3** and **4** that carry six fluorine atoms and increased percentage of C-alkylation is expected. In addition, in the low dielectric solvents, the enolate site from which the initial deprotonation took place should be ion paired with the $CH_3N_2^+$, and this could lead to more C-alkylation when K_{enol} decreases.

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TABLE 1. Summary of the Reactions with Diazomethane[a]

reactant	methylation product	other products
N-Ar enol, β-$(CO_2CH_2CF_3)_2$ (**3a**,**b**)	O,N-di- (**15a, b**)	
3a	O- (**16a**)[b]	
N-Ar enol, β-CN, CO_2Me (**6**)	O- (**25**)	
N-*i*-Pr enol, β-CN, CO_2Me (**7**)	O- (**26**)	
N-*i*-Pr enol, β-$(CO_2CH_2CF_3)_2$ (**4**)	O,N-di- (**18**), O- (**16b**), O- (**17**)	+ester exchange
N-Ph Meldrum's acid enol (**2**)	O- (**23**)[c]	cleavage; imine (**21**) formation
enol on ring (**10**)	O- (**27**)[d]	
N-Ph amide, β-$(CO_2Me)_2$ (**8**)	C- (**22**)	+ imine (**21**)
N-*i*-Pr amide, β-CO_2Me, $CO_2CH_2CF_3$ (**5**)	O,N-di- (**17**), C- (**20**)	
N-Ph indanedione enol (**11**)	O- (**28**)[c,d]	C=C addition + rearrangement
N-*i*-Pr amide, β-$(CO_2Me)_2$ (**9**)	no reaction	

[a] Compounds are arranged according to increased gas-phase acidity.[20] [b] In the presence of added water. [c] Assumed intermediate. [d] Enol on ring OH.

However, we do not have an explanation for the unexpected inertness of **9** in view of the reactivity of **8**.

Cyclopropanation of the double bond does not compete with any of the reactions mentioned above except in one stage in the reaction of **11**. Indeed, **11** is the least acidic system studied, so that a competing reaction to that of eq 11 take place. It is noteworthy that although **11** is substituted by two β-carbonyl groups, in contrast with **10** it enolizes in the solid on the amido rather than on a *C*-carbonyl group.

Finally, the $CO_2CH_2CF_3 \rightarrow CO_2CH_3$ ester exchange in the reaction of **4** to give **17** is unprecedented in the chemistry of diazomethane. Exchange of an ester alkyl group by another alkyl group of an alcohol in the presence of diazomethane was observed.[16] It could have been relevant to our case if methanol which is formed by the hydrolysis of diazomethane would further react with **4**. However, we did not find evidence for such an exchange in the reaction of **3a** with diazomethane in the presence of added water.

Conclusions. Enol of amides/amides mixtures are methylated by diazomethane in ether or in THF. The regioselectivity of the methylation depends on the acidity and K_{enol} of the enol studied and O, N-, and O- and C-methylation products are formed. Together with additional cleavage, ester exchange, and ring enlargement reactions, a rich array of products which are dependent on the structure of the system is formed. The results are summarized in Table 1.

Experimental Section

General Methods. Mps, ^{1}H, ^{13}C, and ^{19}F NMR spectra were measured as described previously.[4,21] GC/MS was conducted with a HP5989A/HP5890 equipment.

Solvents and Materials. The deuteriated solvents and Diazald for the generation of diazomethane were purchased from Aldrich.

General Procedure for Reaction with Diazomethane. The following procedure is representative for the reactions of the enols/amides with diazomethane. To a solution of **3a** (1 g, 2.4 mmol) in dry ether (10 mL) was added an ethereal solution of diazomethane (60 mL, ca. 12 mg CH_2N_2/mL, ca. 17 mmol was added freshly prepared and distilled from Diazald) at 0 °C. The mixture was kept for 12 h at 0 °C and for additional 12 h at room temperature. Acetic acid (3 mL) was then added. The mixture was washed thrice with a 5% $NaHCO_3$ and then twice with water. The organic layer was separated and dried ($MgSO_4$). After evaporation of the solvent, the crude product was analyzed by ^{1}H NMR spectrometry which revealed ≥90% of etherification product. Chromatography, using 3:1 EtOAc: petroleum ether eluent gave **15a** as a white solid (0.29 g, 27%), mp 77−80 °C. The analytical data of the products are given in Table S1.

Reaction of 1-Arylamino-2,2-bis(2′,2′,2′-trifluoroethylcarbonyl)ethenol (3a and 3b) with Diazomethane. The reaction of **3a** (Ar = *p*-$MeOC_6H_4$) and **3b** (Ar = *p*-MeC_6H_4) with excess diazomethane followed the general procedure and gave after chromatography the products **15a** and **15b** (mp 89−90 °C) with the following NMR spectra:

15a: ^{1}H NMR ($CDCl_3$, rt) δ: 3.46 (3H, s, NMe), 3.82 (3H, s, Ar-OMe), 3.98 (3H, s, OMe), 4.46 (4H, q, J = 8.7 Hz, $2CH_2$), 6.92, 7.14 (2 × 2H, 2d, J = 8.9 Hz, 4 Ar-H); ^{19}F NMR ($CDCl_3$, rt) δ: −74.43 (t, J = 8.7 Hz); ^{13}C NMR ($CDCl_3$, rt) δ: 42.68 (NMe), 55.45 (Ar-OMe), 59.38 (CH_2CF_3), 60.20 (OMe), 71.17 (=C_β), 114.70 (C_o), 123.56 (CF_3, qt, J_q = 277 Hz, J_t = 4.5 Hz), 125.88 (C_m), 135.02 (Ar-C_{ipso} (N)), 159.29 (C_p), 163.22 (COO), 178.64 (C_α). MS (80 eV), *m*/*z* (relative abundance %, assignment): 445 (7, M), 345 (4, M − CF_3CH_2OH), 230 (8), 140 (B, $CHCO_2CH_2CF_3$), 136 (15, $CH_3OC_6H_4NCH_3$), 83 (30, CH_2CF_3), 72 (79, MeNCOMe), 58 (20, MeNHCO).

15b: ^{1}H NMR ($CDCl_3$, rt) δ: 2.36 (3H, s, Me), 3.47 (3H, s, NMe), 3.97 (3H, s, OMe), 4.44 (4H, q, J = 8.7 Hz, CH_2CF_3), 7.10, 7.22 (2 × 2H, d, J = 8.2 Hz, Ar-H); ^{19}F NMR ($CDCl_3$, rt) δ: −74.48 (t, J = 9.0 Hz); ^{13}C NMR ($CDCl_3$, rt) δ: 20.97 (qt, J_q = 127 Hz, J_t = 4.4 Hz, Me), 42.48 (q, J = 142 Hz, NMe), 59.30 (tq, J_t = 150 Hz, J_q = 36 Hz, CH_2CF_3), 60.20 (q, J = 149 Hz, OMe), 71.51 (=C_β), 123.55 (tq, J_t = 150 Hz, J_q = 36 Hz, CF_3), 124.42 (dd, J_1 = 162 Hz, J_2 = 5.2 Hz, Ar-*C*-H), 130.15 (dm, J_d = 165 Hz, Ar-C-H), 138.54 (Ar-*C*-Me, q, J = 5.6 Hz), 139.77 (Ar-C_{ipso} (N)), 163.24 (COO), 178.47 (C_α). An 0.04H NH signal at δ 10.87 (rt) (11.67 at 170 K) and other small signals near or overlapping the main signals, with ca. 4% of their intensity indicate the presence of ca. 4% of a compound, probably the mono O-methylation product.

The multiplicity and numbers of the signals remained unchanged at 270−240 K except for broadening of several signals. In $CDCl_3$ at 270 and 240 K the signals of **15b** had the following δ and multiplicity: ^{1}H NMR (2.37 (s), 2.40 (s)), NMe (3.48 (s), 3.52 (s)), MeO (3.98 (s), 4.02 (br s)), CH_2CF_3 (4.46 (q), 4.50 (br)), Ar-H (7.10 (d), 7.13 (d)), Ar-H (7.23 (d), 7.27 (br d)); ^{19}F NMR ($CDCl_3$, rt) δ: CF_3 (−74.24 (260K), −74.08). In the ^{1}H NMR spectrum at 298 K the multiplicity and integration is the same in $CDCl_3$, C_6D_6, and DMSO-d_6, respectively: *p*-Tol-*Me* (2.36 (s), 1.95, 2.31), NMe (3.47 (s), 2.82, 3.40), OMe (3.97 (s), 3.43, 3.85), CH_2 (4.44 (q), 4.33, 4.60, 4H in each case), Ar-H (7.10(d), 6.77, 7.14), and (7.22, 6.82, 7.27). The ^{1}H NMR spectrum was also measured in the range of 170−298 K in THF-d_8. At 170−220 K a coalescence process of the CH_2 signals was followed. In the ^{13}C NMR spectra the δ values in $CDCl_3$, C_6D_6, and DMSO-d_6 were as follows: C_α (178.47, 178.10, 177.64), COO (163.24, 163.88, 162.31), Ar-C_{ipso} (N) (139.77, 140.79, 139.83), Ar-C_{ipso}-(Me) (138.54, 137.86, 137.71), Ar-*C*-(H) (130.15, 130.12, 130.00) and (124.42, 125.02, 124.29), CF_3

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(123.55, 124.35, 123.89, =C_β (71.51, 75.32, 71.73), OMe (60.20, 59.86, 60.11), CH_2 (59.30, 59.55, 58.35), NMe (42.48, 41.92, 42.14), *p*-Tol-Me (20.97, 20.73, 20.49).

Reaction of 3a with Diazomethane in the Presence of Water. To a solution of **3a** (1 g, 2.4 mmol) in ether (10 mL) was added H_2O (5 mL) followed by ethereal diazomethane (60 mL) with stirring at ice-bath temperature. After 1 h, the yellow color of the solution disappeared. The organic layer was separated and dried ($MgSO_4$), the solvent was evaporated, and TLC showed two spots. Separation by preparative TLC using 1:1 EtOAc:petroleum ether eluent gave 75% of **15a** (NMR as above) as the main product. The second single spot showed one main component (17%) accompanied by signals of 8% of another compound. ^{1}H NMR of the main component δ ($CDCl_3$, 298 K): 3.75 (3H, s, Ar-OMe), 3.82 (3H, s, =C(OMe)), 4.56 (4H, q, J = 9 Hz, CH_2CF_3), 6.90, 7.17 (2 × 2H, AB q, J = 9 Hz, Ar), 10.73 (0.74H, s, NH) suggested that the compound is **16a**. Attempted separation of an analytical sample from the smaller component had failed, and it was not identified.

Reaction of Dimethoxycarbonylanilidomethane (8) with Diazomethane. ^{1}H NMR spectroscopy of the crude reaction mixture of **8** with diazomethane showed the presence of two compounds in a 3.5:1 ratio. Three consecutive preparative TLC separations, two by using 1:3 EtOAc:petroleum ether eluent, followed by a 3:0.5:0.5 petroleum ether:EtOAc:THF eluent gave slightly red liquids which were identified by microanalysis, GC/MS, and NMR spectroscopy as **21** (with the larger R_f, 22%) and **22** (78%). GC/MS analysis showed that both products have molecular weight of 265. The main MS fragment is at *m*/*z* 119 which fits PhNCO. The analytical data are in Table S1.

21: ^{1}H NMR ($CDCl_3$, rt) δ: 3.75 (6H, s, 2Me), 3.91 (3H, s, =CO*Me*), 4.47 (1H, s, CH), 6.76 (2H, m, J = 7.3 Hz, Ph-H), 7.08 (1H, tt, J = 7.4 Hz, Ph-H), 7.30 (2H, t, J = 8.1 Hz, Ph-H). The spectrum is similar at 210 K. ^{13}C NMR ($CDCl_3$, 210 K) δ: 52.46 (d, J = 134 Hz, CH), 53.74 (q, J = 148 Hz, OMe), 54.87 (q, J = 147 Hz, =*C*OMe), 120.41 (dt, J_d = 151 Hz, J_t = 8.3 Hz, C, 123.93 (dt, J_d = 162 Hz, J_t = 6.8 Hz, C_p), 129.31 (dd, J_1 = 162 Hz, J_2 = 8.4 Hz, C_o), 146.28 (t, J = 9 Hz, C_{ipso}-(N), 153.78 (m, N=CO), 165.42 (q, J = 4.0 Hz, COO). MS (80 eV; *m*/*z*, relative abundance %, assignment): 265 (49, M), 234 (11, M − MeO), 233 (13, M − MeO − H), 201 (29, M − 2MeO − 2H), 134 (56, M − $CH(CO_2Me)_2$, 151 (20, PhNHCOOMe), 119 (B, $CH_2(CO_2Me)_2$ − Me), 104 (19, PhNCH), 91 (13, PhN), 77 (46, Ph), 59 (20, CO_2Me), 51 (19, C_4H_3).

These data are consistent with either the N-methylation or the O-methylation product. These were distinguished by a 2D long-range C−H correlation spectra. There was no correlation between the ^{1}H signal at δ 3.91 and the ^{13}C *ipso* signal at 147.09, indicating that the methyl group is on the oxygen.

22: ^{1}H NMR ($CDCl_3$, rt) δ: 1.83 (3H, s, Me), 3.83 (6H, s, OMe), 7.13 (1H, t, J = 7.4 Hz, Ph-H), 7.34 (2H, t, J = 8.3, Ph-H), 7.57 (2H, d, J = 8.3 Hz, Ph-H), 9.74 (s, 0.8H, NH). The spectrum at 210 K is similar. ^{13}C NMR ($CDCl_3$, 210 K) δ: 21.79 (q, J = 134 Hz, Me), 53.92 (q, J = 149 Hz, OMe), 59.51 (q, J = 3.7 Hz, *C*-Me), 119.61 (d, J = 163 Hz, C_m), 124.68 (dt, J_d = 161 Hz, J_t = 6.5 Hz, C_p), 128.96 (dd, J_1 = 162 Hz, J_2 = 8.6 Hz, C_o), 136.61 (t, J = 9 Hz, C_{ipso}), 164.96 (q, C=O), 170.07 (m, COOMe). Nearly the same spectrum was obtained at room temperature. MS (80 eV) *m*/*z* (relative abundance %, assignment): 265 (1, M), 234 (1, M − MeO), 146 (30, CHMe-$(CO_2Me)_2$), 119 (64, PhNCO), 114 (39), 91 (45, PhN), 73 (29, C_2CO_2Me), 64 (38, C_5H_4), 59 (B, CO_2Me), 51 (14, C_4H_3).

Reaction of 1-*p*-Tolylamino-2-cyano-2-methoxycarbonylethenol (6) with Diazomethane. The standard procedure gave according to ^{1}H NMR of the crude product only one product. Chromatography gave pure **25**, mp 84−6 °C.

^{1}H NMR ($CDCl_3$, rt) δ: 2.35 (3H, s, *p*-Tol-Me), 3.83 (3H, s, COOMe), 4.16 (3H, s, =C(OMe), 7.10, 7.18 (2 × 2H, 2d, J = 8.3 Hz, *p*-Tol-H), 11.05 (0.9H, br, NH). A similar spectrum was obtained at 210 K. ^{13}C NMR ($CDCl_3$, rt) δ: 20.94 (qt, J_q = 126 Hz, J_t = 4.5 Hz, Me), 52.10 (q, J = 147 Hz, COOMe), 61.38 (q, J = 149 Hz, MeO), 61.48 (s, =C_β), 117.52 (CN), 122.81 (d, J = 164 Hz, Ar-C), 129.92 (ddd, J_1 = 155 Hz, J_2 = 6.8 Hz, J_3 = 5.3 Hz, Ar-C), 132.85 (Ar-C_{ipso}), 136.29 (q, J = 6.0 Hz, Ph-C(Me), 169.82 (C_α), 170.49 (COO). At 210 K in the hydrogen coupled spectrum the COO carbon is a quartet at δ 169.72 (J = 3.8 Hz), C_α is a multiplet at 169.44 and the C_{ipso} is a triplet at δ 132.02 (J = 8.4 Hz). The other signals have the same pattern as at room temperature, except for slight shifts.

Reaction of the Meldrum's acid Anilide (2) with Diazomethane. Only one product was isolated from the reaction of **2** with diazomethane in THF. It was identified as the substituted imine **21** by the identity of its ^{1}H and ^{13}C NMR spectra with those of **21** obtained from the reaction of **8** with diazomethane.

Reaction of 1-Isopropylamino-2,2-bis(2′,2′,2′-trifluoroethoxycarbonyl)ethenol (4) with Diazomethane. The standard procedure gave a mixture with a complicated ^{1}H NMR spectrum, with an approximate composition of the three products **16b**:**17**:**18** of 36:18:46. GC/MS gave molecular weights of 367, 299, and 381. Preparative TLC (1:1 EtOAc: petroleum ether eluent) gave three products whose analytical data are in Table S1. The first (36%, molecular weight 367) was a solid, mp 61−3 °C, whose structure was assigned to the enol *O*-methyl ether (**16b**). MS (70 eV) *m*/*z* (relative abundance %, assignment): 367 (2, M), 366 (14, M − H), 351 (34, M − Me − H), 319 (4, M − MeOH − Me − H), 267 (21, M − $HOCH_2$-CF_3 or $CH(CO_2CH_2CF_3)_2$), 225 (14, M − CF_3CH_2OH-*i*-Pr), 194 (30), 168 (6, M − $2CF_3CH_2O$ − H), 167 (8, M − $2CF_3CH_2OH$), 152 (11, M − $2CF_3CH_2OH$ − Me), 140 (17, $CHCO_2CH_2CF_3$), 126 (23, MH−$CO_2CH_2CF_3$), 84 (B, CH_3CF_3), 83 (43, CH_2CF_3), 69 (18, CF_3), 58 (99, *i*-Pr−NH), 43 (41, *i*-Pr or MeCHNH). ^{1}H NMR ($CDCl_3$, rt) δ: 1.26 (6H, d, J = 6.5 Hz, *i*-Pr-*Me*), 3.95 (3H, s, OMe), 4.05 (1H, octet, J = 6.5 Hz, *i*-*Pr*-*H*), 4.51 (4H, q, J = 8.3 Hz, CH_2CF_3), 9.08 (0.9H, br, NH). The spectrum at 220 K is similar except for slight signals shifts, slight broadening of the CH_2 q, but the NH appears as a doublet at δ 9.22 (J = 7.3 Hz). ^{19}F NMR ($CDCl_3$, 298 K) δ: One signal at −74.58 (J = 8.6 Hz at 298 K), 74.19 (7.5 Hz at 220 K); ^{13}C NMR ($CDCl_3$, H-coupled, rt) δ: 23.02 (q, J = 127 Hz, *i*-Pr-*Me*), 44.36 (d, J = 143 Hz, *i*-Pr-*C*H), 60.03 (tq, J_t = 150 Hz, J_q = 36 Hz, CH_2CF_3), 61.38 (q, J = 149 Hz, OMe), 76.23 (narrow m, C_β), 123.28 (qt, J_q = 276 Hz, J_t = 4.3 Hz, CF_3), 166.03 (t, J = 3.2 Hz, COO), 172.86 (s, C_α). At 220 K δ 78.16 is a singlet.

The second compound (molecular weight 299, 18%) was identified as **17**, the O-methyl ether of the enol with one trifluoroethoxycarbonyl and one methoxycarbonyl group. MS (70 eV, *m*/*z*, relative abundance %, assignment): 299 (1.3, M), 283 (28, M − Me − H), 251 (13), 225 (9, M − CH_2CF_3OH − *i*-Pr), 194 (13), 152 (11, M − $2CF_3CH_2OH$ − Me), 140 (15, $CHCO_2CH_2CF_3$), 126 (57, MH − $CO_2CH_2CF_3$), 100 (12, M − CHO, CF_3CH_2OH), 84 (57, CF_3CH_3), 83 (20, CH_2CF_3), 69 (16, CF_3), 58 (B, *i*-PrNH), 43 (31, *i*-Pr). ^{1}H NMR ($CDCl_3$, rt) δ: 1.25 (6H, d, J = 6.5 Hz, *i*-Pr-*Me*), 3.74 (3H, s, COOMe), 3.92 (3H, s, =C(OMe)), 3.97 (1H, octet, J = 6.6 Hz, *i*-Pr-*H*), 4.50 (2H, q, J = 8.6 Hz, CH_2CF_3), 9.19 (0.82 H, s, NH). At 240 K the NH signal is a doublet at δ 9.30 (J = 7.6 Hz). ^{19}F NMR ($CDCl_3$) δ: −74.44 (rt, t, J = 6.4 Hz), −74.09 (240 K, t, J = 6.4 Hz); ^{13}C NMR ($CDCl_3$, 240 K) δ: 23.04 (q, J = 127 Hz, *i*-Pr-*Me*), 44.02 (d, J = 141 Hz, *i*-Pr-C*H*), 51.76 (q, J = 147 Hz, COO*Me*), 59.75 (tq, J_t = 150 Hz, J_q = 36 Hz, CH_2CF_3), 61.10 (q, J = 148 Hz, =CO*Me*), 77.41 (s, C_β), 123.20 (q, J = 277 Hz, CF_3), 165.69 ($COOCH_2CF_3$), 168.87 (C_α), 172.32 (*C*OOMe). The spectrum at room temperature is almost identical.

The third compound (molecular weight 381, 46%) was assigned structure **18**, the *N*,*O*-dimethyl derivative of the precursor enol by comparison with the *N*-aryl analogues **15**. The ^{1}H NMR spectrum at 250 K had shown the presence of two rotational isomers around the C−N bond in a 1:0.4 ratio (1:0.48 at 260 K). MS (80 eV, *m*/*z*, relative abundance %, assignment): 381 (1, M), 380 (7, M − H), 364 (21, M − Me − H), 307 (2, M − *i*-Pr − OMe), 281 (12, M − CF_3CH_2OH), 253 (8, M − $CO_2CH_2CF_3$ − H), 239 (2, M − CF_3CH_2O − *i*-Pr), 221

(3, M − $CO_2CH_2CF_3$ − MeOH − H), 207 (13, M − $CO_2CH_2CF_3$ − Me − OMe − H), 140 (9, $CHCOOCH_2CF_3$), 127 (5, CO_2CH_2-CF_3), 114 (6, $Me_2CN(Me)C(OMe)$), 113 (4), 98 (3, CF_3CHO), 83 (23, CF_3CH_2), 82 (4, CF_3CH), 72 (B, Me_2CHNMe), 71 (7, Me_2CNMe), 58 (3, *i*-PrNH), 56 (16, Me_2CN), 43 (8, *i*-Pr). ^{1}H NMR ($CDCl_3$, 250 K) δ: Major isomer: 1.29 (d, J = 6.8 Hz, *i*-Pr-Me), 3.10 (s, NMe), 4.07 (s, OMe), 4.50 (br, CH_2CF_3, overlaps the CH_2CF_3 of the minor isomer), 4.64 (m, *i*-Pr − H). Minor isomer: 1.26 (d, J = 7.0 Hz, 3.11 (s), 4.06 (s), 4.50 and 4.64 (overlap). At rt the signals for the two isomers merge and ^{1}H NMR ($CDCl_3$) δ: 1.27 (6H, d, J = 6.7 Hz, *i*-Pr-Me), 3.08 (3H, s, NMe), 4.04 (3H, s, OMe), 4.48 (4H, q, J = 8.8 Hz, CH_2CF_3), 4.61 (1H, heptet, J = 6.7 Hz, *i*-Pr-CH). ^{19}F NMR ($CDCl_3$, rt) δ: −74.63 (broad); at 250 K two triplets with a 1:0.35 ratio appear at −74.28 (J = 9.0 Hz) and −74.54 (br) are observed. In the ^{13}C NMR spectrum in $CDCl_3$ at 250 K the pairs of signals (for the two isomers) are at 19.09, 19.24 (q, J = 128 Hz, *i*-Pr-Me), 33.65, 29.76 (qd, J_q = 141 Hz, J_d = 3.1 Hz, N-Me), 50.37, 55.12 (d, J = 142 Hz, *i*-Pr-C), 58.86 (q, J = 35 Hz, CH_2CF_3), 59.66, 59.01 (q, J = 149 Hz, OMe), 68.76 (=C_β), 123.47 (q, J = 277 Hz, CF_3), 162.81 (COO), 176.53, 176.33 (C_α). At rt the ratio of the two isomers is nearly 1:1 judged by the identical intensities of the *i*-Pr-C signals at δ 51.06 and 53.17, and the C_β signals at 66.66 and 68.64. The other signals in the H-coupled spectrum are at 19.19 (q of quintets, J_q = 128 Hz, $J_{quintet}$ = 4.4 Hz, *i*-Pr-Me), 58.91 (tq, J_t = 150 Hz, J_q = 36 Hz, CH_2CF_3), 59.41 (q, J = 146 Hz, OMe), 123.67 (qt, J_q = 278 Hz, J_t = 5.3 Hz, CF_3), 162.68 (COO) and 177.18 (C_α). There are broad, barely seen, signals at ca. 33 (NMe) and 51 (OMe) ppm.

The C−H (HSQCSI) correlation at 250 K in $CDCl_3$ confirm the coexistence of the two conformers. There are cross-peaks for **18a** between 3.10 (^{1}H) and 33.65 (^{13}C) for NMe, between 4.07 (^{1}H) and 59.67 (^{13}C) for MeO and between 4.66 (^{1}H) and 50.37 (^{13}C) for *i*-Pr-CH; cross-peaks for **18b** are between 3.11 (^{1}H) and 29.6 (^{13}C) for NMe, between 4.05 (^{1}H) and 59.00 (^{13}C) for MeO and between 4.64 (^{1}H) and 55.12 (^{13}C) for *i*-Pr-H.

Reaction of 1-Isopropylamino-2-cyano-2-methoxycarbonyletheneol (7) and Diazomethane. A single product was observed in the spectrum of the crude reaction mixture. It was isolated by preparative TLC and identified as **26**, mp 30−31 °C. ^{1}H NMR ($CDCl_3$, rt) δ: 1.23 (6H, d, J = 6.5 Hz, *i*-Pr-Me), 3.76 (3H, s, COOMe), 3.97 (1H, octet, J = 6.6 Hz, *i*-Pr−H), 4.26 (3H, s, =COMe), 9.25 (1H, br, NH). At 210 K the spectrum was similar except that the NH signal at δ 9.28 was a doublet (J = 7.6 Hz). ^{13}C NMR ($CDCl_3$, H-coupled, rt) δ: 22.98 (q of heptets, J_q= 127 Hz, J_{heptet} = 4.5 Hz, *i*-Pr-Me), 43.82 (dm, J_d = 144 Hz, *i*-Pr-H), 51.57 (q, J = 147 Hz, COO*Me*), 58.11 (s, C_β), 61.26 (q, J = 149 Hz, =COMe), 118.36 (s, CN), 170.19 (q, C_α), 171.20 (m, COOMe). The spectrum is similar at 210 K.

Reaction of 1-Isopropylamino-2-methoxycarbonyl-2-(2′,2′,2′-trifluoroethoxycarbonyl)ethenol (5) with Diazomethane. The ^{1}H NMR of the crude reaction product showed the presence of two compounds which are two isomers with molecular weights of 299 with different mass spectra according to GC/MS. Attempted purification by preparative TLC gave a slightly yellow liquid which was a 9:1 mixture of the two isomers. The main product (90%) was assigned structure **17**, which has identical ^{1}H, ^{13}C, and ^{19}F NMR spectra with the product obtained from **4**. MS (70 eV) *m*/*z* (relative abundance %, assignment): 299 (1.5, M), 298 (11, M − H), 283 (30, M − Me − H), 251 (15, M − MeO − OH), 225 (9, M − CO_2Me − Me), 194 (13), 140 (16, $CHCO_2CH_2CF_3$), 126 (31, CO_2CHCF_3), 100 (13, CF_3CH_2OH), 84 (61, *i*-PrNCO), 58 (B, *i*-PrNH), 43 (25, *i*-Pr).

The other product was assigned as **20**, the C-Me alkylation product of the amide isomer of **5**, on the basis of the ^{1}H NMR spectra in its mixture with **17** and its MS.

20: (in the mixture with **17**) ^{1}H NMR ($CDCl_3$, 210 K) δ: 1.22 (0.9H some overlap, d, J = 6.5 Hz, *i*-Pr-Me), 1.79 (0.3H, s, C-Me), 3.83 (0.3H, s, OMe), 4.09 (*i*-Pr-H, overlap the *i*-Pr-H for **17**), 4.42 (0.2H, q, CH_2CF_3), 7.88 (0.1H, d, J = 7.7 Hz, NH). The spectrum at 298 K is similar. ^{13}C NMR ($CDCl_3$, 210 K) δ: 21.58 (C-Me), 22.17 (*i*-Pr-Me), 41.52 (*i*-Pr-H), 53.6 (OMe), 58.95 (C-Me), 165.09 ($CO_2CH_2CF_3$), 166.89 (C=O(N)), 170.48 (CO_2-Me). The CF_3 and CH_2CF_3 signals overlap signals of **17**. The spectrum at 298K is similar. ^{19}F NMR ($CDCl_3$, 298 or 210 K) δ: −74.70 (t).

20: MS (70 eV, *m*/*z*, relative abundance, %): 299 (2.5, M), 283 (46, M − Me − H), 257 (3, M − Me_2C), 240 (22, M − CO_2Me), 196 (64), 182 (56), 140 (14, $CHCO_2CH_2CF_3$), 115 (B, MH_2 − CO_2Me − $CO_2CH_2CF_3$), 114 (89, MH−CO_2Me − $CO_2CH_2CF_3$), 86 (46, $Me_2CHNHCO^+$), 70 (24, $MeCNHCO^+$), 55 (22, $NHCOC^+$), 43 (80, Me_2CH).

Reaction of *N*-Isopropylamido(dimethoxycarbonyl)-methane (9) with Diazomethane. The reaction was repeated three times under the standard conditions but only **9** was recovered.

Reaction of 2-Anilido-1,3-cyclopentanedione (10) with Diazomethane. The single product, mp 162−4 °C, which was obtained nearly quantitatively was identified as **27**, the enol methyl ether on the 1-carbonyl of **10**. ^{1}H NMR ($CDCl_3$, rt or 210 K) δ: 2.63 (2H, m, CH_2), 2.84 (2H, m, CH_2), 4.19 (3H, s, OMe), 7.05 (1H, t, J = 7.4 Hz, Ph-H_p), 7.31 (2H, t, J = 7.9 Hz, Ph-H), 7.68 (d, J = 7.8 Hz, Ph-H), 10.39 (1H, s, NH). ^{13}C NMR ($CDCl_3$, rt) δ: 25.37 (t, J = 132 Hz, CH_2), 33.18 (t, J = 133 Hz, CH_2), 58.49 (q, J = 148 Hz, CO*Me*), 112.61 (C=), 120.04 (d, J = 159 Hz, C_m), 123.76 (dt, J_d = 159 Hz, J_t = 7.0 Hz, C_p-N), 128.82 (ddd, J_1 = 159 Hz, J_2 = 6.2 Hz, J_3 = 1.9 Hz, C_o), 138.23 (t, C_{ipso}), 159.43 (C(=O)N), 195.06 (CO), 203.43 (=*C*OMe). A similar spectrum was observed at 210 K. The analysis is in Table 1.

Reaction of 2-[Hydroxy(anilido)methylene]-1,3-indanedione (11) with Diazomethane. The reaction gave almost quantitatively the single product 1,4-dimethoxy-2-anilidonaphthalene **30**, mp 150−2 °C. ^{1}H NMR ($CDCl_3$, rt) δ: 4.04, 4.07 (2 × 3H, 2s, 2MeO), 7.18 (1H, t, J = 7.2 Hz, Ar-H), 7.42 (2H, t, J = 8.4 Hz, Ar-H), 7.53 (1H, s, Ar-H), 7.62 (2H, m, Ar-H), 7.78 (2H, d, J = 7.5 Hz), 8.15 (1H, m, Ar-H), 8.30 (1H, m, Ar-H), 10.12 (1H, s, NH). ^{13}C NMR ($CDCl_3$, rt) δ: 55.84 (q, OMe), 63.39 (q, OMe), 103.37 (d), 120.02, 121.80, 122.60, 122.70, 124.28, 127.29, 127.52, 128.12, 128.63, 129.12, 138.48 (Ar-H), 148.84 (*C*OMe), 152.32 (*C*OMe), 163.56 (C(=O)N).

Acknowledgment. We are indebted to Professors T. Sammakia and S.E. Biali for discussions, to Drs. Ram Pal Chaudhary and Jayanta Mukhopadhyaya for samples of compounds **10** and **11**, to Dr. Roy Hoffman for assistance, and to the Israel Science Foundation for support.

Supporting Information Available: Table S1 with analytical data. This material is available free of charge via the Internet at http://pubs.acs.org.

JO0203802