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Original paper

Simple preparation of new *N*-aryl-*N*-(3-indolmethyl) acetamides and their spectroscopic analysis

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Abstract

Objectives. To prepare new indolic molecules and characterize them by spectroscopic methods. **Materials and methods:** All reagents were purchased from Aldrich, commercial grade. The purity of the products and the composition of the reaction mixtures were monitored by thin layer chromatography over Silufol UV_{254} 0.25 mm-thick chromatoplates. Product isolation and purification were performed by column chromatography (SiO_2), using ethyl acetate-petroleum ether mixtures as eluents. **Results.** The synthesis of new *N*-aryl-*N*-(3-indolmethyl) acetamides based on first step iminization reaction of indol-3-carbaldehyde is accomplished. The structures of the C-3 substituted indoles were confirmed by ^{1}H-NMR and ^{13}C-NMR studies supported by inverse-detected 2D NMR experiments and also through monocrystal X-ray diffraction. **Conclusions.** An efficient, economic, and fast synthetic route was designed to the construction of the *N*-aryl-*N*-(3-indolmethyl) acetamides, structural analogues of some alkaloids.

Key words: indole, acetamides, iminization

Resumen

Preparación sencilla de nuevas *N*-aril-*N*-(3-indolmetil) acetamidas y su análisis espectroscópico. Objetivos: Preparar nuevas moléculas indólicas y caracterizarlas por los métodos espectroscópicos. **Materiales y métodos.** Todos los reactivos fueron adquiridos de Aldrich, de grado comercial. La pureza de los productos y composición de las mezclas de reacción fueron monitoreadas por la cromatografía en capa delgada, Silufol UV_{254} 0.25 mm-grosor de cromatoplacas. El aislamiento y purificación de los productos fueron realizados por la cromatografía en columna (SiO_2), usando mezclas de acetato de etilo y éter de petróleo como eluentes. **Resultados.** Se ha realizado la síntesis de nuevas *N*-aril-*N*-(3-indolmetil) acetamidas, basada en la reacción de iminización del indol-3-carbaldehído. Las estructuras de los indoles C-3 sustituidos fueron confirmadas por estudios de ^{1}H, ^{13}C -RMN, experimentos de 2D RMN y también por difracción monocristal de Rayos X. **Conclusiones.** Se ha diseñado una nueva ruta de síntesis eficiente, económica y rápida para la construcción de las *N*-aril-*N*-(3-indolmetil) acetamidas, análogos estructurales de diversos alcaloides.

Palabras clave: indol, acetamidas, iminización

Resumo

Preparação simples de novas *N*-aril-*N*-(3-indolmetil)acetamidas e sua análise espectroscópica. Objetivos. Preparar novas moléculas indólicas e caracterizar-las através de métodos espectroscópicos. **Materiais e métodos.** Todos os reagentes foram obtidos de Aldrich, de tipo comercial. A pureza dos produtos e a composição das misturas de reação foram monitoradas por cromatografia em camada fina, Silufol UV_{254} 0,25 mm de espessura das cromatoplacas. O isolamento e a purificação dos produtos foram feitos através de cromatografia em coluna (SiO2), utilizando misturas de acetato de etila e éter de petróleo como eluente. **Resultados.** Realizou-se a síntese de novas *N*-aril-*N*-(3-indolmetil)acetamidas, baseada na reação de iminización do indol-3-carbaldeído. As estruturas dos indóis C-3 substituídos foram confirmadas por estudos de ^{1}H, ^{13}C -RMN, experimentos de 2D RMN e também por difração monocristal dos Rayos X. **Conclusões.** Desenhou-se una nova rota de síntese eficiente, econômica e rápida para a construção das *N*-aril-*N*-(3-indolmetil) acetamidas, análogos estruturais de vários alcalóides.

Palavras-chave: indol, acetamidas, iminização

Introduction

The research of the indol chemistry has been and still is one of the most active areas of heterocyclic chemistry. In recent years, much interest has been attracted to the preparation of substituted indoles due to their numerous biologically significant activities.[1] The 3-indolylmethanamine derivatives **1** were the important intermediates of the natural and natural-like products, such as hydro-γ-carboline and pyrido[4,3-*b*]indole derivatives.[2,3] This 3-indolyl methanamine motif is also embedded in numerous indole alkaloids from simple alkaloid gramine **2** to complex aspidospermine alkaloid **3**[4,5] (**Figure 1**).

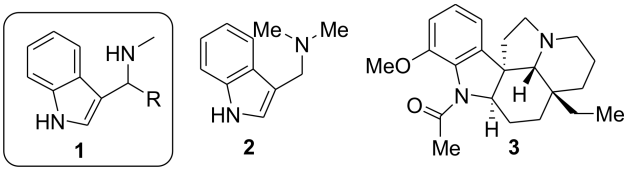

Figure 1. Relevant natural alkaloids derived from the 3-indolylmethanamine system.

As a result of their biological and synthetic importance, a variety of methods have been reported for the preparation of 3-substituted indoles, using indol or 3-indolcarboxyaldehyde as starting materials. Generally, the Mannich reaction[6,7] and the catalyzed Friedel-Crafts alkylation reactions of indoles[8-11] are considered as a powerful carbon-carbon bond process to afford the 3-indolylmethanamine derivatives **1**. However, another synthetic route to these compounds by using 3-indolcarboxyaldehyde via its imino derivatives formation is valid. This route has been employed by our laboratory, which recently started an own medicinal program directed to small molecules for drug delivery. We were particularly interested in 3-indolylmethanamine derivatives molecules that could serve as useful precursors to many drug-like indolic compounds in our quest for compounds with antiparasitic properties.[12-14] To the best of our knowledge, a simple preparation of new (3-indolmethyl) acetamide and (1-acetylindolmethyl-3) acetamide regulating only a solvent nature has not been described. The results of our investigation on preparation, spectral and structural characterization of new two acetamides based on 3-indolyl methanamine motif are reported in this work.

Materials and methods

All reagents were purchased from Aldrich, commercial grade. The purity of the products and the composition of the reaction mixtures were monitored by thin layer chromatography over Silufol UV_{254} 0.25 mm-thick chromatoplates. Product isolation and purification were performed by column chromatography over silica gel, using ethyl acetate-petroleum ether mixtures as eluents. The IR spectra were measured with a Lumex infralum FT-02 spectrophotometer in KBr. The ^{1}H-NMR spectra were acquired Bruker Advance AM-400 spectrometers using $CDCl_3$ as a solvent and TMS as internal reference. The mass spectra were obtained on an HP 5890A series II gas chromatograph interfaced to an HP 5972 mass selective detector that used electron impact ionization (70 eV). X-ray diffraction single-crystal technique with an AFC7S four circle diffractometer was used. The data acquisition was made to 293 K of temperature with MoKα (λ = 0.71073 Å) radiation and a measurement range between 1 and 25º to theta (θ). The structure elucidation and the refinement were made with the software Shelxs-97 and Shelxl-97, respectively.

N-(3-Indolyden)-2-cyanoaniline (**6**)

A mixture of the indol-3-carbaldehyde **4** (1.18 g, 8.14 mmol), the 2-cyanoaniline **5** (1.15 g, 9.77 mmol), and the glacial AcOH (7.40 mL) was prepared in dry toluene (50 mL). The reaction mixture was stirred and refluxed for 8 hours with a Dean-Stark trap. Once the reaction mixture was allowed to room temperature, the precipitated solid was filtered and washed with petroleum ether. Then, it was dried to vacuum to obtain 1.90 g (7.76 mmol, 95%) of clean white and stable solid product **6**. R_f 0.44 (2:1 petroleum ether/ethyl acetate). Mp. 207-208 ºC. Anal. calcd for $C_{16}H_{11}N_3$: C, 78.35; H, 4.52; N, 17.13. M = 245.10. Found: C, 78.16; H, 4.67; N, 17.18. GC-MS: R_t = 29.34 min; *m/z* (%): 245 ($M^{+\cdot}$, 100), 218 (12), 190 (8), 142 (18), 116 (19), 89 (14). IR (KBr): 3386 $\nu_{(NH)}$, 2222 $\nu_{(CN)}$, 1612 $\nu_{(C=N)}$, 1423 $\nu_{(C=C)}$, 1338 $\nu_{(C-N)}$ cm^{-1}.

2-*N*-[(1*H*-Indol-3-ylmethyl]aminobenzonitrile (**7**)

To an ethanol solution (100 mL) of 2.00 g (8.16 mmol) of the *N*-(3-indolyden)-2-cyanoaniline **6**, 1.54 g (40.7 mmol) of $NaBH_4$ in small proportions was slowly added to the reaction mixture. After the addition of the reductive agent, the reaction mixture was refluxed for 90 min. The reaction mixture was allowed to room temperature and diluted with 100 mL of distilled water to obtain the white precipitated solid, which was filtered and vacuum dried to obtain 1.40 g (5.97 mmol, 70%) of the product **7**. R_f 0.43 (3:1 petroleum ether/ethyl acetate). Mp. 148-149 ºC. Anal. calcd for $C_{16}H_{13}N_3$: C, 77.71; H, 5.30; N, 16.99. M = 247.11. Found: C, 77.53; H, 5.57; N, 16.90. GC-MS: R_t = 26.42 min; *m/z* (%): 247 ($M^{+\cdot}$, 7), 207 (8), 149 (9), 130 (100), 118 (36), 102 (23), 91 (18). IR (KBr): 3402 $\nu_{(NH)}$, 3352 $\nu_{(NH\text{-}indol)}$, 2218 $\nu_{(CN)}$, 1605 $\nu_{(NH)}$, 1419 $\nu_{(C=C)}$, 1335 $\nu_{(C-N)}$ cm^{-1}; ^{1}H NMR (400 MHz): δ 8.12 (1H, br.s, H-N), 7.63 (1H, d, *J* = 7.8 Hz, 4-H_{indol}), 7.22 (1H, dd, *J* = 8.8, 6.1 Hz, 5´-H_{Ar}), 7.40-7.36 (3H, m, 2,5,6-H_{indol}), 7.17-7.3 (2H, m, 7-H_{indol}, 3´-H_{Ar}), 6.81 (1H, d, *J* = 8.3 Hz, 6´-H_{Ar}), 6.68 (1H, t, *J* = 7.5 Hz, 4´-H_{Ar}), 4.84 (1H, br.s, H-N), 4.56 (2H, d, *J* = 4.9 Hz, -CH_2) ppm. ^{13}C NMR (100 MHz): δ 150.2, 136.3, 134.6 (+), 132.3 (+), 126.5, 122.7 (+), 122.5 (+), 119.9 (+) 118.6 (+), 117.1, 116.1 (+), 112.3, 111.3 (+), 110.9 (+), 95.6, 39.4 (-) ppm.

N-(2-Cyanophenyl)-*N*-(1*H*-indol-3-ylmethyl)acetamide (**8**)

A mixture of the amine **7** (1.00 g, 4.05 mmol), acetic anhydride (1.65 g, 16.20 mmol), and Et_3N (1.22 g, 12.10 mmol) was prepared in dry toluene (20 mL). The reaction mixture was heated at 70 ºC for 3 hours. The reaction mixture was allowed to reach room temperature and was treated with 30 mL of aqueous Na_2CO_3 and extracted with ethyl acetate (3 x 30 mL). The organic layer was dried over Na_2SO_4 and then concentrated in vacuum. The crude product was purified through silica gel preparative chromatography with petroleum ether / ethyl acetate (10:1) to obtain a white solid acetamide 8 0.50 g (1.73 mmol, 43%). R_f 0.43 (3:1 petroleum ether/ethyl acetate). Mp. 144-145 ºC. Anal. calcd for $C_{18}H_{15}N_3O$: C, 74.72; H, 5.23; N, 14.52. M = 289.33. Found: C, 74.64; H, 5.49; N, 14.37. GC-MS: R_t = 27.94 min; *m/z* (%): 289 ($M^{+\cdot}$, 12), 246 (3), 190 (8), 172 (23), 130 (100), 118 (22), 102 (11), 77 (9). IR (KBr): 3342 $\nu_{(NH)}$, 2211 $\nu_{(C-N)}$, 1701 $\nu_{(NC=O)}$, 1674 $\nu_{(N-H)}$, 1450 $\nu_{(C=C)}$, 1371 $\nu_{(C-N)}$ cm^{-1}; ^{1}H NMR (400 MHz): δ 8.44 (1H, d, *J* = 8.0 Hz, 6´-H_{Ar}), 7.57 (1H, ddd, *J* = 7.7, 7.3, 1.1 Hz, 4-H_{indol}), 7.40-7.35 (4H, m, 5,7-H_{indol}, 4´,5´-H_{Ar}), 7.31 (ddd, *J* = 7.7, 7.3, 1.1 Hz, 6-H_{indol}), 6.76-6.71 (2H, m, 2-H_{indol}, 3´-H_{Ar}), 4.95 (1H, br.s, H-N), 4.55 (2H, s, CH_2), 2.58 (3H, s, Me) ppm. ^{13}C NMR (100 MHz): δ 168.6, 149.2, 136.2, 134.1 (+), 132.8 (+), 128.9, 125.7 (+), 123.8 (+), 123.0 (+), 118.9 (+), 118.7 (+), 117.7, 117.2 (+), 116.4, 111.5 (+), 96.2, 39.3 (+), 23.9 (-) ppm.

N-(1-Acethyl-1*H*-indol-3-ylmethyl)-*N*-(2-cyanophenyl) acetamide (**9**)

A mixture of the amine **7** (0.50 g, 2.02 mmol), acetic anhydride (10.80 g, 98 mmol), and Et_3N (0.44 g, 4.30 mmol) was heated at 100 ºC for 3 hours. Then, the reaction mixture was allowed to reach room temperature and then treated with 50 mL of aqueous NaOH and extracted with ethyl acetate (3 x 30 mL). The organic layer was dried over Na_2SO_4 and later dried in vacuum. Silica gel preparative chromatography (petroleum ether / ethyl acetate, 2:1) of the crude product afforded diacetamide **9** (0.53 g, 80%) as a white and stable solid. R_f 0.50 (petroleum ether/ethyl acetate, 1:1). Mp. 124-125 ºC. Anal. Calcd for $C_{20}H_{17}N_3O_2$: C, 72.49; H, 5.17; N, 12.68. M = 331.13. Found: C, 72.23; H, 5.33; N, 12.35. GC-MS: R_t = 28.52 min; *m/z* (%): 331 ($M^{+\cdot}$, 12), 289 (7), 246 (7), 172 (9), 130 (100), 118 (10), 102 (7), 77 (7). IR (KBr): 2229 $\nu_{(CN)}$, 1704 $\nu_{(NC=O)}$, 1654 $\nu_{(NC=O)}$, 1658 $\nu_{(N-H)}$, 1454 $\nu_{(C=C)}$, 1348 $\nu_{(C-N)}$ cm^{-1}. ^{1}H NMR (400 MHz): δ 7.87 (1H, d, *J* = 8.0 Hz, 7-H_{indol}), 7.94 (1H, dd, *J* = 7.7 Hz, 4-H_{indol}), 7.78-7.69 (6H, m, 3´,4´,5´-H_{Ar}), 7.44 (2H, m, 6-H_{indol}), 7.36 (1H, s, 2-H_{indol}), 6.84-6.71 (2H, m, 5-H_{indol}, 3'-H_{Ar}), 5.10 (2H, s, CH_2), 2.66 (3H, s, Me), 2.03 (3H, s, Me) ppm. ^{13}C NMR (100 MHz): δ 169.4, 168.5, 144.7, 135.6, 134.4 (+), 133.9, 130.3 (+), 129.3, 128.8 (+), 125.4 (+), 123.7 (+), 118.9 (+), 117.3, 116.5 (+), 115.8, 113.1, 42.8 (-), 23.9 (+), 22.4 (+) ppm.

Results and discussion

Aldimines are valuable starting materials not only for different N-containing heterocycles but also for diverse secondary heteroaromatic amines,[15] which represent good

candidates for bio-screening with diverse types of activities.[16,17] Thus, the N-aryl imine **6**, the main starting material in this research, was prepared from commercially available 3-indolaldehyde (**4**) and 2-cyanoaniline (**5**), according to published methods.[18,19] This aldimine was obtained in 95 % as a white and stable solid. Since the reduction of aldimines with an excess of $NaBH_4$ in methanol is still the reaction of choice to produce the secondary amines in reasonably good yield, we employed this method in our work. Thus, *N*-(2-cyanophenyl)-*N*-(3-indolylmethyl)amine (**7**) was prepared as a white solid in 70 % yields after purification through recrystallization (**Figure 2**). Since this amine has interesting structural elements to use in the synthesis of different indolic heterocycles, we studied its acetylation reaction with acetic anhydride. Firstly, to a stirred solution of amine **7** in toluene as a solvent and in the presence of Et_3N, excessive acetic anhydride is added and refluxed during the appropriate period of time to allow the *N*-(2-cyanophenyl)-*N*-(3-indolmethyl)acetamide (**8**) synthesis in acceptable yields (45-50 %). Then, the acetylating reaction between the amine and excess acetic anhydride in the presence of Et_3N at 100 °C without an organic solvent (toluene) was performed. After usual workup, diacetylated indole **9** was obtained in good yields (80-85 %). Therefore, a simple change in the reaction conditions could afford different acetamides based on the 3-indolyl methanamine motif (**Figure 2**). This developed selective process represents a good protocol for the synthetic organic chemistry, especially within those processes requiring a particular position protection.

The structures of the C-3 substituted indoles **7-9** were confirmed on the basis of analytical and spectral data and were supported by inverse-detected 2D NMR experiments. The compound **7** IR spectrum characteristic absorption bands were observed at 3402 and 3352 cm^{-1}, assignable to tension vibrations CH_2-N-H and N-H_{indol} respectively. Its ^1H NMR spectrum displays a duplet at d 4.56 ppm (J = 4.9 Hz) ppm corresponding to two protons coupling with the neighbor N-H proton (br. s, 4.84 ppm), which suggest the presence of the methylenic unit linked to the N-H function. The peaks at d 7.17-7.3 (H-7), 7.36-7.40 (H-5, H-2, H-6), and 7.63 (H-4) ppm showed the presence of aromatic protons of the indole moiety. The ^{13}C NMR spectra, also showed all expected characteristic peaks at d 39.4 (CH_2), 117 (CN), and 95.6-150.2 (aromatic carbons).

The compound **8** gave a molecular ion peak $M^{+\cdot}$, at *m/z* 289, suggesting the molecular formula $C_{18}H_{15}N_3O$, and indicating the acetyl group coupling with **7**. The acetamide **8** displayed characteristic infrared absorption bands with a single amine absorption band at 3342 cm^{-1} and with a carbonyl signal at 1701 cm^{-1} suggesting the acetylation reaction involvement of the CH_2-N; this is the band appearing at high wave number of the corresponding N-H_{indol} vibration tension in the IR spectrum. Its ^1H NMR spectra analysis showed a singlet at 2.58 ppm corresponding to three protons which belong to the acetyl group and another singlet at 4.55 ppm due to the presence of the methylenic 3-CH_2-N indolic protons. This signal's multiplicity is explained by assuming the proton N-H next to it, substituted now for the acetyl group, which leaves no possibility to H,H coupling, while it does happen

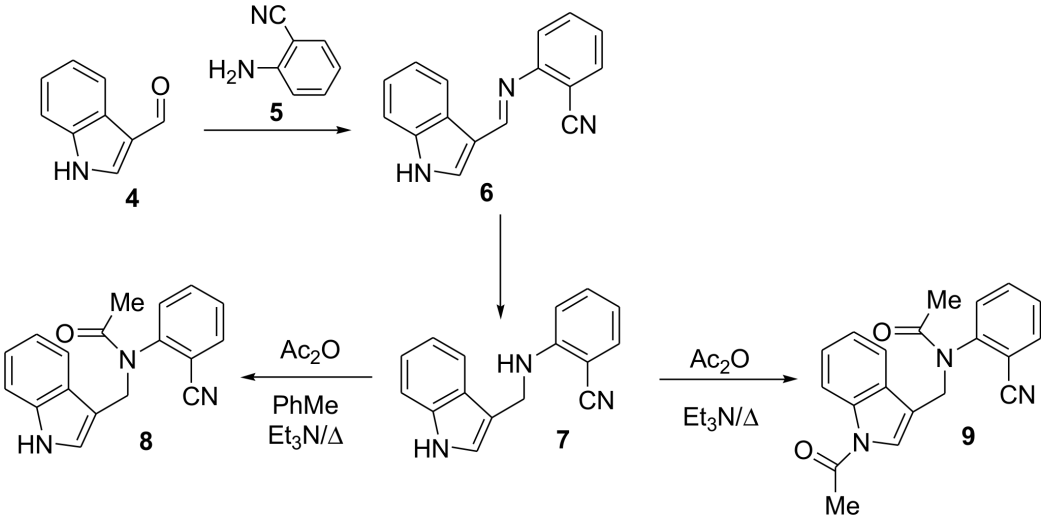

Figure 2. Preparation of *N*-aryl-*N*-(3-indolmethyl)acetamides.

with the amine **7**. The ^{13}C NMR spectrum of the acetamide **8** displayed characteristic carbonyl signal at 168 ppm, this is strong evidence to an acetyl group bonded to the molecule; in addition to a signal at 39.3 and 23.9 ppm, showing the presence of CH_2 and CH_3 in the molecule. Introduction of an acetyl group into the molecule affects the H-6´ chemical shift from the aromatic moiety; this is 116 ppm to the compound **7** an 123 ppm to the acetamide **8**. The signal at 39.3 ppm for CH_2-N has been distinguished on the basis of the DEPT-135 experiment. On the basis of these spectral studies, compound **8** was characterized as the *N*-(2-cyanophenyl)-*N*-(1*H*-indol-3-ylmethyl)acetamide.

The new compound **9** gave a molecular ion peak at *m*/*z* 331, corresponding to the molecular formula $C_{20}H_{17}N_3O_2$ as indicated by its EI-MS. The loss of 43 units (one acetyl group) generates the same mass spectrum as the acetamide **8**. The IR spectrum shows bands at 1704 and 1654 cm^{-1}, assignable to two carbonyl groups. The N-H absorption bands were not observed in the region of 3300-3400 cm^{-1}. The ^1H NMR spectrum showed, as expected, two singlets at d 22.4 and 23.9 ppm, which integrated three protons each. To the methylenic protons case, they appeared to be diasterotopic resonating at the high field frequencies d 4.75 and 5.46 ppm with a coupling constant J = 15 Hz, usual constant value to a germinal coupling. Of course, the aromatic protons were also assigned. The ^{13}C NMR spectrum showed all expected characteristic peaks at d 169.4 (ArN-CO-), 168.5 (Ar_{indol}N-CO-) ppm, in addition to a signal at δ 117.3 ppm showing the presence of TC≡N in the molecule. Besides, methyl carbons at 23.9 (Ar_{indol}NCO-CH_3) and 22.4 (ArNCO-CH_3) ppm and the methylene carbon at d 42.8 ppm were also displayed in the ^{13}C NMR.

With respect to the characterization of the diacetamide 9, through X-ray diffraction, the monoclinic system was determined with the compound crystallized at 25ºC from heptane-ethyl acetate (2:1) (**Figure 3**).

The crystallized material has the following cell constants: a = 11.1184(19) Å, b = 8.0048(13) Å, c = 20.534(4) Å, and space group P 2_1/n (Table 1), possessing the different bond lengths of the molecule constituent atoms was also extracted with this technique (Table 2).

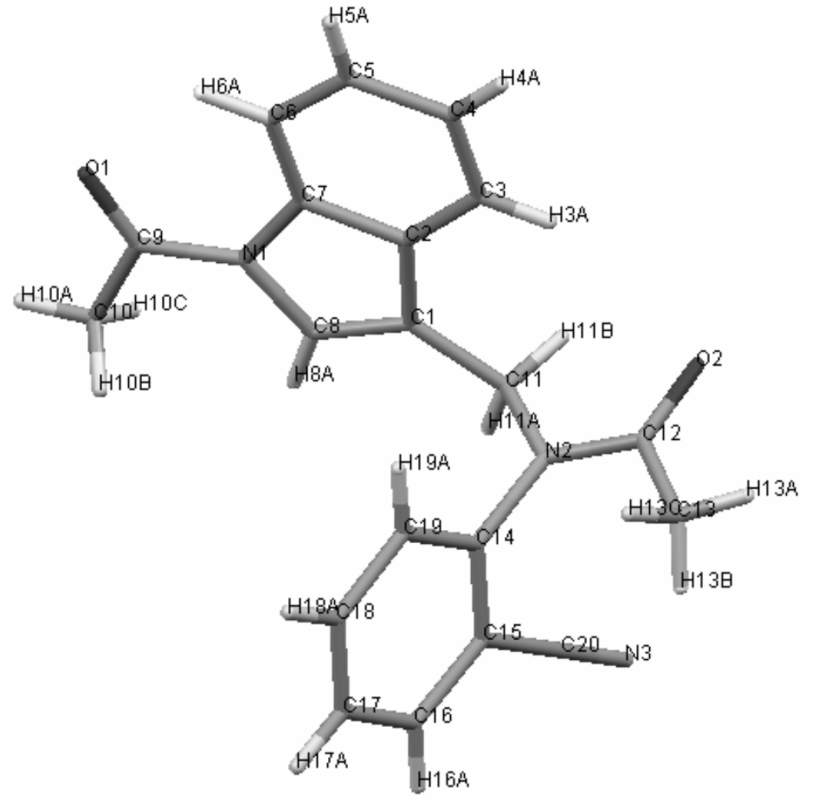

Figure 3. X-Ray structure of the diacetamide 9

Table 1. Crystal data and structure refinement parameters of diacetamide 9

Crystal morphology	**White parallelepiped**
Chemical formula	$C_{20}H_{17}N_3O_2$
Molecular weight	331.13
Crystal system	Monoclinic
Space group	P21/n
Cells constants	a = 11.1184(19) Å, b = 8.0048(13) Å and c = 20.534(4) Å, $\alpha = 90^o$, $\beta = 94.281(4)$, $\gamma = 90^o$
Volume	1822.4(5) $Å^3$
Absorption coefficient	0.082 mm^{-1}
Density	1.244 Mg m^{-3}
Temperature	293(2) K
Range for data collection	1.99- 28.09
Index range	h = -13→28, k = -9→7, l = -23→23
R	0.0567
Rw	0.0582
Threshold expression	>2sigma(I)
Diffraction radiation	$M_oK\alpha$
λ	0.71070 Å

From these data, the different bond lengths of the two amide bonds present within the structure were as expected. Even knowing the double bond character of the amide bonds, in this case, the amide bond distance between the aliphatic nitrogen N2 and C12 is 1.364 Å, while the distance between the aromatic nitrogen N1 and C9 is 1.388 Å. These data correspond with the idea that the amide bond N2-C12 is shorter because of the electron withdrawing inductive effect from the α-cyanophenyl substituent and the possibility of the nitrogen non-shared electrons to be delocalized on the amide bond through a mesomeric effect giving this bond a stronger double bond character.

From these data, the different bond lengths of the two amide bonds present within the structure were as expected. Even knowing the double bond character of the amide bonds, in this case, the amide bond distance between the aliphatic nitrogen N2 and C12 is 1.364 Å, while the distance between the aromatic nitrogen N1 and C9 is 1.388 Å. These data correspond with the idea that the amide bond N2-C12 is shorter because of the electron withdrawing inductive effect from the α-cyanophenyl substituent and the possibility of the nitrogen non-shared electrons to be delocalized on the amide bond through a mesomeric effect giving this bond a stronger double bond character.

On the other hand, the amide bond N1-C9 is longer because the nitrogen non-shared electrons are involved with the aromatic system and they are not so available to be delocalized on the amide bond giving it less double bond character.

Table 2. Bond lengths between the molecule atoms of diamide 9.

Number	Atom 1	Atom 2	Length (Å)
1	O1	C9	1.220
2	O2	C12	1.221
3	N1	C7	1.415
4	N1	C8	1.405
5	N1	C9	1.388
6	N2	C11	1.473
7	N2	C12	1.364
8	N2	C14	1.430
9	N3	C20	1.143
10	C1	C2	1.449
11	C1	C8	1.338
12	C1	C11	1.489
13	C2	C3	1.385
14	C2	C7	1.404
15	C3	H3A	0.931
16	C3	C4	1.371
17	C4	H4A	0.929
18	C4	C5	1.378
19	C5	H5A	0.931
20	C5	C6	1.377
21	C6	H6A	0.930
22	C6	C7	1.384
23	C8	H8A	0.930
24	C9	C10	1.481
25	C10	H10A	0.960
26	C10	H10B	0.961
27	C10	H10C	0.961
28	C11	H11A	0.971
29	C11	H11B	0.971
30	C12	C13	1.497
31	C13	H13A	0.961
32	C13	H13B	0.960
33	C13	H13C	0.960
34	C14	C15	1.387
35	C14	C19	1.364
36	C15	C16	1.388
37	C15	C20	1.427
38	C16	H16A	0.930
39	C16	C17	1.363
40	C17	H17A	0.929
41	C17	C18	1.360
42	C18	C18A	0.929
43	C18	C19	1.397
44	C19	H19A	0.931

Conclusions

An efficient, economic, and fast synthetic route was designed for the construction of the *N*-aryl-*N*-(3-indolmethyl)acetamides incorporating the indolic core, structural analogues of some alkaloids. The acylation method is worth as a regioselective process because the variations in conditions lead to the mono- or di-acetamide. The compound characterization through different techniques gives evidence enough and strong support with regard to the success of the proposed scheme.

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Conflict of interests

The authors are in agreement with the results published in this article and claim no conflicts of interest with the same.

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