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SYNTHESIS AND REACTIONS OF *N*-*o*-ANISYLSULFONYLMETHYL- AND *N*-*o*-*sec*-BUTOXYSULFONYLMETHYLCARBODIIMIDES WITH ALDEHYDES

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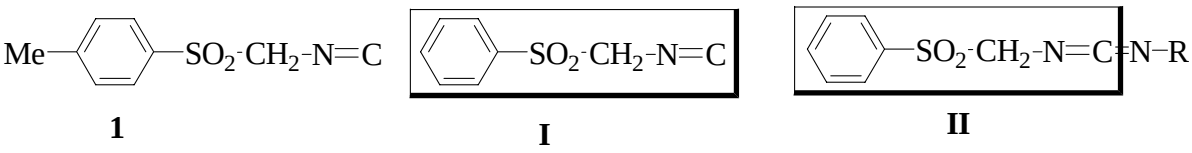
Abstract– *N*-*o*-Anisylsulfonylmethyl- and *N*-*o*-*sec*-butoxysulfonylmethyl-carbodiimides (**2)** and (**3)** have been synthesized from the corresponding sulfinic acids by Mannich reaction. **2** and **3** are useful synthons in two step synthesis of 2-amino-1,3-oxazoles(**4)**.

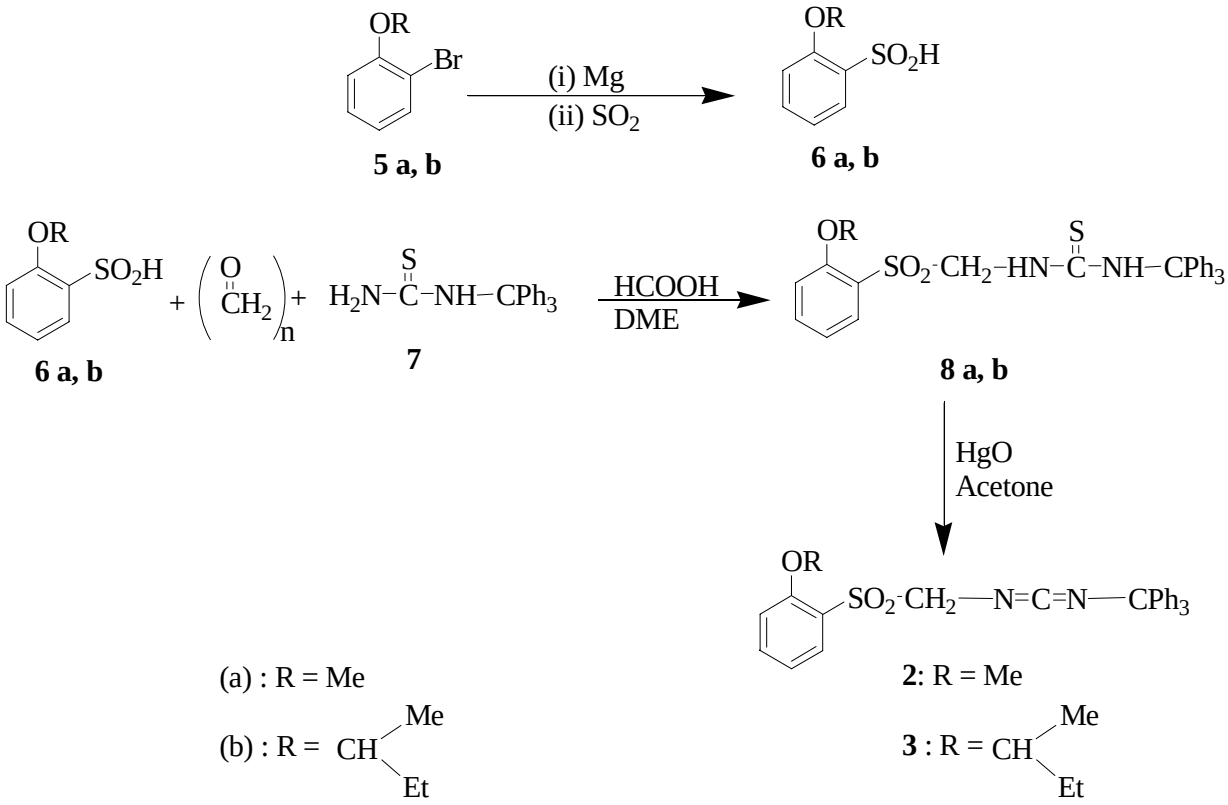
Carbodiimides have evoked considerable interest of organic chemists since the pioneering work of Khorana[1] and its applications in the synthesis of polymers, nucleotides, peptides and phosphorus esters.[2] Tosylmethyl isocyanide (TosMIC, **1**) has been widely used as a useful synthon in organic chemistry.[3-5] It has been used in various synthetic transformations.[6] Since the stability of TosMIC (**1**) is essentially due to the presence of benzenesulfonyl group present in it,[3,4] we envisioned that incorporation of benzenesulfonyl group would lead to stable carbodiimides. Moreover, the common structural feature present in isonitrile (I) [an analog of TosMIC (I)] and carbodiimide (II) would lead to analogous reactions. This stimulated us to synthesize *N*-*o*-anisylsulfonylmethyl- and *N*-*o*-*sec*-butoxysulfonylmethyl carbodiimides (**2)** and (**3).**
TosMIC (**1**) has been extensively used for synthesis of a variety of monosubstituted and disubstituted 1,3-oxazoles.[4] However, no method is available to synthesize 2-amino-1,3-oxazoles from TosMIC (**1**). 2-amino-1,3-oxazoles and related compounds have been found to act as 5-H_{2B} receptor antagonists,[7] p38 kinase inhibitors,[8] antitumor agents[9,10] and antidepressants.[11] Since 2-amino-1,3-oxazoles and its derivatives have been reported to exhibited pronounced biological effects,[7-11] we utilized carbodiimides (**2)** and (**3)** for the synthesis of 2-amino-1,3-oxazoles (**4**).

*This paper is dedicated to Dr. Pierre Potier on the occasion of his 70th birthday.



1 **I** **II**

The successful approach to synthesis of *N*-*o*-anisylsulfonylmethyl-*N*′-triphenylmethylcarbodiimide (**2**) and *N*-*o*-*sec*-butoxysulfonylmethyl-*N*′-triphenylmethylcarbodiimide (**3**) is depicted in **Scheme 1**. *o*-Anisylsulfinic acid (**6a**) (R=Me) was prepared by reaction of SO_2 gas with Grignard reagent prepared from *o*-anisyl bromide (**5a**). Mannich condensation reaction of *o*-anisylsulfinic acid (**6a**) with $(HCHO)_n$ or aqueous formaldehyde solution and *N*-triphenylmethylthiourea (**7**) resulted in the formation of *N*-*o*-anisylsulfonylmethyl-*N*′-triphenylmethylthiourea (**8**) in 76% yield. Treatment of thiourea derivative (**8**) with HgO in acetone resulted in the formation of carbodiimide (**2**) in 90% yield. **2** was characterized on the basis of spectral and analytical data. In the IR spectrum, carbodiimide (**2**) exhibited characteristic band for N=C=N at 2180 cm^{-1} and characteristic bands for SO_2 absorption at 1150 and 1330 cm^{-1}. In the ^{1}H-NMR spectrum of **2**, CH_2 appeared as a singlet at δ 4.20.



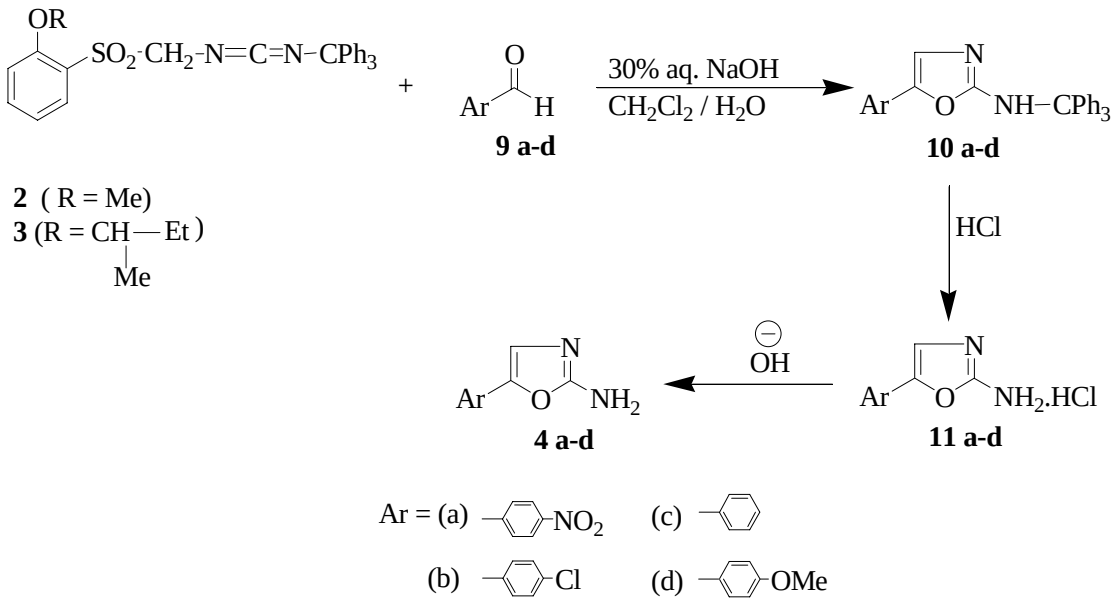
Scheme 1

The synthesis of *N*-*o*-*sec*-butoxysulfonylmethyl-*N*′-triphenylmethylcarbodiimide (**3)** was carried out analogously to carbodiimide (**2)** according to **Scheme 1**. **3** was prepared from *N*-*o*-*sec*-butoxyphenyl-sulfonylmethyl-*N*′-triphenlymethylthiourea (**8b)** in 92% yield by oxidation with HgO in acetone. In the IR

spectrum, **3** exhibited characteristic band for N=C=N at 2185 cm^{-1} and bands for SO_2 absorptions at 1335 and 1150 cm^{-1}. In the ^{1}H-NMR spectrum of **3**, CH_2 protons appeared at δ 4.85 as a singlet. The carbodiimides (**2)** and (**3)** were found to be stable compounds, which could be kept in the open air for months without any notable change. The stability of **2** and **3** at room temperature was further established by keeping a solution of **2** and **3** in a THF-MeCOOH-H_2O mixture for 3 d. After 3 d the solution of **2** and **3** predominantly contains carbodiimide which is evidenced by IR spectroscopy.

Reaction of carbodiimides (**2**) and (**3**) with aromatic aldehydes (**9**) under phase transfer condition afforded the 2- triphenylmethylamino-substituted oxazoles (**10**) as depicted in **Scheme 2**. The reaction was carried out with benzaldehyde (**9c**), *p*-chlorobenzaldehyde (**9b**), *p*-anisylaldehyde (**9d**) and *p*-nitrobenzaldehyde (**9a**). The details of results of these reactions are given in the EXPERIMENTAL. The reaction of carbodiimide (**2**) and (**3**) with *p*-nitrobenzaldehyde (**9a**) resulted in the formation of 2-triphenylmethylamino-5-*p*-nitrophenyloxazole (**10a**) in 71% yield. The structure of **10a** was established on the basis of spectral and analytical data.

In IR spectrum all 2-triphenylmethylamino- substituted oxazoles (**10 a-d**) show bands in the region of 1600-1630 cm^{-1} for the C=N bond in the oxazole ring. The NH absorption at 3300 cm^{-1} is characteristic of its presence in **10** (**a-d**). The chemical shift of the ring proton C4-H in the oxazoles (**10**) at δ 6.1- 6.34 was found upfield. The upfield shift might be caused for C4-H due to intramolecular or intermolecular influence of the



Scheme 2

phenyl rings present in the triphenylmethylamino substituent by complexation with the oxazole oxygen. The triphenylmethylamino group is quantitatively removed by treatment of oxazoles (**10**) with conc. HCl in MeOH. The hydrolysis of **10** afforded 2-amino-5-aryl-substituted oxazoles (**4**). The structure of **4** was established by comparison with authentic compounds and spectroscopic data. Analogous reactions of carbodiimide (**3**) with aromatic aldehydes (**9**) under phase transfer conditions resulted in the formation of

2-tripenylmethylamino- substituted oxazoles (**10**) in comparable yields. The hydrolytic removal of triphenylmethyl group from **10** resulted in the formation of 2-amino-5-aryloxazoles (**4**) which were correlated by mp and IR data to the same compounds prepared from carbodiimides (**2**). The carbodiimides prepared from *p*-toluenesulfinic acid were found to be less stable compared to **2** and **3**.

EXPERIMENTAL

Mp's are uncorrected IR spectra were recorded on a Unicam SP-200 spectrophotometer. ^{1}H-NMR (200 MHz) spectra were recorded on Perkin-Elmer model R-32 spectrometer using TMS as an internal standard. ^{13}C-NMR spectra were recorded on Bruker AC 250F and MS spectra on AEI 902 spectrometer. Elemental microanalyses were carried out at the University of Groningen, Holland.

o-Anisylsulfinic Acid (6a)

To a flame dried three-necked round bottom flask was placed Mg (960 mg, 0.04 mol) and two crystals of iodine. Ether (50 mL) was added and to the stirred refluxing mixture was added dropwise a solution of *o*-bromoanisole (**5a**) (7.48 g, 0.04 mol) in ether (100 mL). The mixture was refluxed with stirring for 3 h by which time all Mg disolves. The suspension was cooled to –50°C. During the cooling dry N_2 was introduced and SO_2 gas was passed into the solution through a set of driers ($CaCl_2$, H_2SO_4) keeping temperature below –15°C. The completion of the reaction was indicated by a continuous drop in temperature (about 2 h). The flask was allowed to warm up to rt after reaction was complete and salt hydrolyzed with ice cooled 10% H_2SO_4 solution. The ether layer was decanted and the remaining sulfinic acid extracted several times with 50 mL portion of ether. Ether extract was shaken with saturated aq. Na_2CO_3 solution. Na_2CO_3 solution was cooled in ice bath and acidified with cold dilute 10% H_2SO_4, extracted three times with 50 mL portion of ether. Ether portion was washed with brine (100 mL), dried over $MgSO_4$, filtered and concentrated *in vacuo* at rt. Pale yellow oil, crystallized on cooling overnight at -20°C, colorless solid; mp 42-43°C. Crystallization from benzene-hexane affords crystalline sample (mp 44-45°C); Yield 3.74 g (60%); IR (CCl_4): 1090, 1280, 2550 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ 3.98(s, 3H, OCH_3), 6.72-7.82 (m, 4H, phenyl-H), 8.22 (s, 1H, SO_2H). The sodium salt of **6a** was crystallized with water to afford analytically pure sample as **6a** was unstable for long. Anal. Calcd for $C_7H_7O_3NaS$: C, 43.29; H, 3.60. Found C, 43.38; H, 3.72.

o-Anisylsulfonylmethyl-*N'*-triphenylmethylthiourea (8a)

A solution of triphenylmethylthiourea (**7**) (15.9 g, 0.05 mol), formaldehyde (6.4 g of 36% solution in water, 0.075 mol), *o*-anisylsulfinic acid (**6**) (62.4 g, 0.1 mol) and formic acid (3.45 g, 0.075 mol) in DMF (75 mL) was refluxed for 1.5 h. The mixture was cooled externally with ice for 0.5 h. The clear solution thus obtained was concentrated *in vacuo* to *ca.* 60 mL, a suspension was formed during concentration. To this

suspension was added while stirring, MeOH (25 mL), followed slowly by ether (100 mL) after stirring for 15 min the precipitate was collected by filtration to give **8a** (26 g). Concentration of filtrate and treatment of the residue with MeOH (5 mL) and ether (20 mL) affords another crop of **8a** (12 g), mp 175-176°C; Yield: 38 g (76%); Crystallization from CH_2Cl_2-pentane affords an analytical pure sample (180-181°C); IR (KBr): 1140, 1350, 3400 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ 3.96 (s, 3H, OCH_3), 4.85 (d, 2H, *J=6 Hz*, CH_2), 5.7 (t, 1H, *J=6 Hz*, NH), 7.10-7.52 (m, 20H, phenyl-H and NH); Anal. Calcd for $C_{28}H_{26}N_2O_3S_2$: C, 66.93; H, 5.17; N, 5.57. Found C, 67.02; H, 5.30; N, 5.72.

_o_-Anisylmethyl-_N'_-triphenylmethylcarbodiimide (2)

To a solution of thiourea derivative (**8a**) (17.5 g, 0.035 mol) in dry acetone (100 mL) was added yellow HgO (22 g, 0.105 mol). The mixture is refluxed with stirring for 0.5 h. Another batch of HgO (22 g, 0.105 mol) was added and refluxing continued for another 0.5 h. The mixture was cooled to rt and filtered with suction over celite. The cake was washed with 20 mL acetone and the filtrate and washings were concentrated in vacuo. The residual oil was stirred with MeOH (20 mL) to afford after filteration **2**, mp 126-127°C; Crystallization from CH_2Cl_2-pentane affords an analytical pure sample having mp 130-131°C; Yield 14.7 g (90%); IR (KBr): 1150, 1330, 2180 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ 3.98 (s, 3H, OCH_3), 4.20 (s, 2H, CH_2), 7.20 (m, 19H, phenyl-H); Anal. Calcd for $C_{28}H_{24}N_2O_3S$: C, 71.79; H, 5.12; N, 5.98. Found C, 71.92; H, 5.24; N, 6.12.

_o_-Bromophenyl _sec_-Butyl Ether (5b)

It was prepared according to the method of Niederl[12] with a slight modification. *o*-Bromophenol (17.3 g, 0.10 mol) was placed in three necked flask fitted with a dropping funnel extended to the stem of the flask and a reflux condenser. Finely powdered KOH (5.80 g, 0.103 mol) was added to it and the mixture was heated on a very low flame. The color of reaction mixture changed to dark green as soon as the whole mass liquifies. The whole assembly was put on oil bath preheated to 100°C and stirred. 2-Bromobutane (18.0 g, 0.132 mol) was added dropwise with stirring in 0.5 h. The mixture was stirred with refluxing for 2 h, cooled, 100 mL of H_2O added. Red colored oil separated and KBr dissolved in solution. The oil was separated through a separating funnel and aq. layer extracted with ether (3×200 mL). The combined organic layer were washed with 10% aq. NaOH solution (100 mL) and twice with water (2×50 mL), dried over $MgSO_4$, concentrated *in vacuo*. Yellow oil thus obtained was distilled *in vacuo* to give **11** as colorless oil; bp 60-62°C/0.05 mn; Yield 11.04 g (64%); IR (Neat): 1490, 1590, 3300 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ 0.98 (t, *J*= 7 Hz, 3H, CH_3), 1.30 (d, *J*= 6 Hz, 3H, CH_3), 1.45-2.0 (m, 2H, CH_2) 4.27 (q, *J*= 6 Hz, splitted into a sextet 1H, CH), 6.60-7.40 (m, 4H, phenyl-H); Anal. Calcd for $C_{10}H_{13}OBr$: C, 52.40; H, 5.67. Found C, 52.62; H, 5.78.

***o-sec*-Butoxybenzenesulfinic Acid (6b)**

6b was prepared from **5b** (9.16 g) according to the procedure reported above for *o*-anisylsulfinic acid (**6a**). It was obtained as a colorless solid; mp 48-50°C; Crystallization from benzene-hexane gave crystalline sample having mp 50-51°C; Yield 50%; IR (CCl_4): 1090, 1280, 2550 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ 0.92 (t, *J*= 7 Hz, 3H, CH_3), 1.25 (d, *J*= 6 Hz, 3H, CH_3), 1.40-2.50 (m, 2H, CH_2) 4.30 (q, *J*= 6 Hz, splitted into a sextet, 1H, CH) 6.60-7.85 (m, 4H, phenyl-H), 8.10 (s, 1H, SO_2H); The sodium salt of **6b** was crystallized with water to afford analytically pure sample as **6b** was unstable for long. Anal. Calcd for $C_{10}H_{13}O_3NaS$: C, 50.84; H, 5.50. Found C, 50.62; H, 5.62.

***N*-*o*-*sec*-Butoxyphenylsulfonylmethyl-*N'*-triphenylmethylthiourea (8b)**

It was synthesized according to the procedure outlined for the synthesis of **8a** from *o-sec*-butoxy-benzenesulfinic acid (**6b**) (21.4 g). Colorless solid; mp 145-147°C; Crystallization from CH_2Cl_2-pentane affords an analytically pure sample having mp 149-150°C; Yield 78%; IR (KBr): 1140, 1352, 3405 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ 0.92 (t, *J*= 7 Hz, 3H, CH_3), 1.22 (d, *J*= 6 Hz, 3H, CH_3), 1.50-2.20 (m, 2H, CH_2) 4.35 (q, *J*= 6 Hz, splitted into a sextet, 1H, CH), 4.85 (d, 2H, *J=6 Hz*, SO_2CH_2), 7.00-7.62 (m, 20H, 19 phenyl-H and 1NH); Anal. Calcd for $C_{31}H_{32}N_2O_3S_2$: C, 68.38; H, 5.88; N, 5.14. Found C, 68.52; H, 6.04; N, 5.25.

***N*-*o*-*sec*-Butoxyphenylsulfonylmethyl-*N'*-triphenylmethylcarbodiimide (3)**

It was synthesized according to the procedure outlined for the synthesis of *o*-anisylmethyl-*N*-triphenylmethylcarbodiimide (**2**) from thiourea derivative (**8b**) (19.04 g). **3** was obtained as colorless solid which was crystallized from CH_2Cl_2-pentane to give an analytically pure sample. mp 115-116°C; Yield 92%; IR (KBr): 1150, 1335, 2185 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ 1.02 (t, *J*= 7 Hz, 3H, CH_3), 1.42 (d, *J*= 6 Hz, 3H, CH_3), 1.55-2.20 (m, 2H, CH_2) 4.20-4.60 (m, 1H, CH), 4.85 (s, 2H, CH_2), 7.25 (m, 19H, phenyl-H); Anal. Calcd for $C_{31}H_{30}N_2O_3S$: C, 72.94; H, 5.88; N, 5.49. Found C, 73.14; H, 5.92; N, 5.54.

5-Aryl-2-triphenylmethylaminooxazoles (10)

Phase Transfer Conditions

5-*p*-Nitrophenyl-2-triphenylmethyloxazoles (10a)

To a solution of carbodiimide (**2**) (2.06 g, 4.4 mmol), *p*-nitrobenzaldehyde (**9a**) (0.8 g, 4.4 mmol) and *n*-Bu_4NBr (1.5g, 4.4 mmol) in CH_2Cl_2 (30 mL) was added a 30% aq. NaOH solution (15 mL). The mixture was stirred for 1 h at rt and water (100 mL) added to the reaction mixture. The solution was extracted with CH_2Cl_2 (2×25 mL) and the organic layer separated and washed with water (3×50 mL). After drying (Na_2SO_4) and removal of the solvent *in vacuo*, the residue thus obtained was stirred with MeOH (10 mL) the precipitate was filtered and crystallized from $CHCl_3$-MeOH to give orange crystals of **10a**. mp

242-243C, Yield 1.42g (71%); IR (KBr): 1630, 3300 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ 6.35 (s, 1H, C_4-H) 6.90-7.55 (m, 17H, phenyl-H), 8.0 (Half Abq, 2H, *J*=8 Hz), 8.40 (s, 1H, NH). Anal. Calcd for $C_{28}H_{21}N_2O_3$: C, 75.17; H, 4.70; N, 9.40. Found C, 75.10; H, 4.70; N, 9.20.

Carbodiimide (**3**) (2.24 g, 4.4 mmol) and *p*-nitrobenzaldehyde (**9a**) (0.8 g, 4.4 mmol) under identical conditions used for carbodiimide (**2**) afforded **10a** (76%).

5-*p*-Chlorophenyl-2-triphenylmethylaminooxazole (10 b)

It was obtained analogously to **10a** from carbodiimide (**2**) (1.54 g, 3.3 mmol), *p*-chlorobenzaldehyde (0.5 g, 3.3 mmol) and n-Bu_4NBr (1.1g, 3.3 mmol) in a yield of 80%; mp 222 – 224°C; IR (KBr): 1610, 3300 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ 6.10 (s, 1H, C_4-H) 6.75 and 7.05 (Abq, 4H, J=9 Hz), 7.05–7.5 (m, 15H, phenyl–H), 8.15 (s, 1H, NH); Anal. Calcd for $C_{28}H_{21}N_2OCl$: C, 76.97; H, 4.81; N, 6.41. Found C, 76.90; H, 4.80; N, 6.40.

Carbodiimide (**3**) (1.68 g, 3.3 mmol) and *p*-chlorobenzaldehyde (0.5 g, 3.3 mmol) under identical conditions used for carbodiimides (**2**) gave **10b** (69%).

5- Phenyl-2-triphenylmethylaminooxazole (10c)

10c was obtained analogously to **10a** from carbodiimide (**2**) (2.06 g, 4.4 mmol), benzaldehyde (0.47 g, 4.4 mmol) and n-Bu_4NBr (1.5 g, 4.4 mmol) as a colorless solid which was crystallized from CH_2Cl_2-MeOH; mp 215 – 216°C; Yield 78%; IR (KBr): 1610, 3300 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ 6.30 (s, 1H, C_4-H) 6.72 and 7.56 (m, 20H, phenyl-H), 7.92 (br s, 1H, NH); Anal. Calcd for $C_{28}H_{22}N_2O$: C, 83.58; H, 5.47; N, 6.97. Found C, 83.34; H, 5.50; N, 7.21.

Carbodiimide (**3**) (2.24 g, 4.4 mmol) and benzaldehyde (0.47 g, 4.4 mmol) under analogous conditions used for synthesis of **10c** for carbodiimides (**2**) afforded **10c** (72%).

5-*p*- Methoxyphenyl-2-triphenylmethylaminooxazole (10d)

10d was obtained analogously to **10a** from carbodiimide (**2**) (2.06 g, 4.4 mmol), *p*-methoxybenzaldehyde (0.6 g, 4.4 mmol) and n-Bu_4NBr (1.5 g, 4.4 mmol) as a pale yellow solid which was crystallized from CH_2Cl_2-MeOH; mp 227 – 228°C; Yield 80%; IR (KBr): 1610, 3300 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ 3.72 (s, 3H, OCH_3), 6.27 (s, 1H, C_4-H) 6.7 and 6.95 (Abq, 4H, *J*= 10 Hz, phenyl-H), 7.12-7.70 (m, 16H, phenyl-H, NH); Anal. Calcd for $C_{29}H_{24}N_2O_2$: C, 80.55; H, 5.55; N, 6.48. Found C, 80.34; H, 5.60; N, 6.60.

Carbodiimide (**3**) (2.24 g, 4.4 mmol) and *p*-methoxybenzaldehyde (0.6 g, 4.4 mmol) under analogous conditions used for carbodiimides (**2**) afforded 66% of **10d**.

2. NaH in DME

5-*p*-Nitrophenyl-2-triphenylmethylaminooxazole (10a)

A solution of carbodiimide (**2**) (2.06 g, 4.4 mmol) and *p*-nitrobenzaldehyde (0.8 g, 4.4 mmol) in dry DME (25 mL) was cooled in ice bath. NaH (0.3 g, 50% dispersion in mineral oil, about 6 mmol) was added and the mixture stirred for 20 h at rt. The suspension was poured onto 100 mL water and extracted with CH_2Cl_2 (100 mL). Organic layers were washed with brine (50 mL), dried ($MgSO_4$) and solvent removed *in vacuo*. The residue thus obtained was stirred with methanol (5 mL) to afford **10a** (1.35 g, 70%) mp, IR and ^{1}H-NMR spectral data were identical to the compound obtained under conditions using Phase Transfer Catalyst.

5-Aryl-2-aminooxazoles (4)

5-*p*-Nitrophenyl-2-aminooxazole (4a)

To a suspension of oxazole (**10a**) (1.77 g, 4 mmol) in methanol (20 mL) was added concentrated HCl (0.7 mL, 8.0 mmol). The mixture was refluxed for 0.5 h and the clear solution thus obtained was cooled in ice bath. 1N aq. NaOH solution (40 mL) was added to the suspension and the precipitate collected by filtration. The precipitate was washed with ethanol and ether and crystallized from acetone to give **4a**; mp 235-237°C (lit.,[13] mp not reported); Yield 0.57g (80%); IR (KBr): 1670, 3400, 3500 cm^{-1}; ^{1}H-NMR (DMSO-d_6): δ 7.25 (s, 2H, NH_2), 7.62 (1/2 Abq, 3H, phenyl-H), 8.22 (1/2 Abq, 2H, *J*=10 Hz, phenyl-H); Anal. Calcd for $C_9H_7N_3O_3$: C, 52.68; H, 3.41; N, 20.49. Found C, 52.70; H, 3.40; N, 20.50.

5-*p*-Chlorophenyl-2-aminooxazole (4b)

It was obtained analogously to **4a** from oxazole (**10b**) (0.42 g, 1.0 mmol) and concentrated HCl (0.30 mL, 3.3 mmol) in methanol (5mL) as a colorless solid; mp 220-222°C; Yield: 85%; Analytically pure sample was prepared from acetone. Anal. Calcd for $C_9H_7N_2OCl$; C, 55.53; H, 3.69; N, 14.40. Found C, 55.82; H, 3.73; N, 14.45.

5-Phenyl-2-aminooxazole (4c)

It was obtained by procedure outlined for **4a** from oxazole (**10c**) (1.62 g, 4.0 mmol) and concentrated HCl (0.8 mL, 9 mmol) in methanol (20 mL). **4c** was obtained as colorless solid which was crystallized from acetone, mp 215-216°C (lit.,[14] 216°C); Yield 84%; Anal. Calcd for $C_9H_8N_2O$: C, 67.50; H, 5.00; N, 17.50. Found C, 67.72: H, 5.00; N, 17.32.

5-*p*-Methoxyphenyl-2-aminooxazole (4d)

It was obtained analogously to **4a** from oxazole (**10d**) (1.75 g, 4 mmol) and concentrated HCl (0.8 mL, 9 mmol) in methanol (20 mL) in a yield of 86%, mp 222-224°C (lit.,[15] 220-222°C) Anal. Calcd for $C_{10}H_{10}N_2O_2$: C, 63.16; H, 5.26; N, 14.74. Found C, 63.5; H, 5.32; N, 14.36.

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