HL
Heterocyclic Letters
(www.heteroletters.org) Vol. 1, No. 1, (2011), 35-42

SYNTHESIS AND ANTIBACTERIAL ACTIVITY OF SOME NOVEL SUBSTITUTED IMIDAZOLE DERIVATIVES

Vijay V Dabholkar* and Bharat M Parmar
Organic Research Laboratory, Department of Chemistry,
K C College, Churchgate, Mumbai-400 020. India.
E-mail: bparmar1976@rediffmail.com
vijaydabholkar@gmail.com

Abstract:

Compound 1*H*-2-butyl-4-chloro-5-(1*H*-4*H*-2,6 dimethyl-3,5 diacetyl-pyridin-4-yl)-1, 3-imidazole **1** is synthesized by reacting acetyl acetone with 2-butyl-5- chloro-4-formaldehyde-1,3 imidazole at reflux condition in presence of ammonium acetate. Compound 1*H*-2-butyl-4-chloro-5-(1*H*-4*H*-2, 6 dimethyl-3, 5-dicarbethoxy-pyridin-4-yl)-1, 3-imidazole **2** is synthesized by reacting Ethyl acetoaceate, ammonium acetate and 2-butyl-5- chloro-4-formaldehyde-1,3 imidazole at reflux condition. Dimedone reacted with ammonium acetate and 2-butyl-5- chloro-4-formaldehyde-1,3 imidazole at reflux conditon to give compounds 1*H*-2-butyl-4-chloro-5-(4, 4-dimethyl-2, 6-dioxo-cyclohexan)-methylene-1, 3 imidazole **3** and 1*H*-2-butyl-4-chloro-5-(9*H*, 10*H*-1, 8 dioxo-3, 3, 6, 6- tetramethyl- 1, 2, 3, 4, 5, 6, 7, 8-octahydro-acridin-9-yl)-1, 3-imidazole **4**. Compounds 1*H*-2-butyl-4-chloro-5-(2,2-dicarbethoxy-ethylen)-1,3-imidazole **5**/ 1*H*-2-butyl-4-chloro-5-(2,2-dicarbmethoxy-ethylen)-1, 3-imidazole **6** are prepared by reacting diethyl malonate and dimethyl malonate with ammonium acetate and 2-butyl-5- chloro-4-formaldehyde-1,3 imidazole at reflux conditon. Compound (E)1*H*-2-butyl-4-chloro-5-(2-carbethoxy-1-propylen)-1, 3-imidazole **7** is prepared by stirring mixture of 2-butyl-5- chloro-4-formaldehyde-1,3 imidazole and triphenyl phosporonium salt of ethyl propionate at room temperature in presence of isopropyl acetate as solvent. Compound (E)1*H*-2-butyl-4-chloro-5-(2-carbmethoxy-1-propylen)-1, 3-imidazole **8** is synthesized by refluxing compound (E)1*H*-2-butyl-4-chloro-5-(2-carbethoxy-1-propylen)-1, 3-imidazole **7** with sodium methoxide in methanol and compound 1*H*-2-butyl-4-chloro-5-(2-methyl-2-propenoic acid)-1, 3-imidazole **9** is synthesized by refluxing compound (E)1*H*-2-butyl-4-chloro-5-(2-carbethoxy-1-propylen)-1, 3-imidazole **7** with sodium methoxide and water in methanol followed by acidifying with HCl.

Introduction:

Substituted imidazole have attracted much attention due to their bactericidal[1] and fungicidal[2], Plant growth regulating[3], antiviral[4], anti bacterial[5], antihypertensive[6] and agrochemical fungicides activities[7], herbicides[8] and used as selective angiostenine II recepter antagonists[9]. The wide range of therapeutic value of the above ring system prompted us to synthesize several new imidazole derivatives **1-9** .The structures of the products were confirmed by elemental analysis, IR, ^{1}H, ^{13}C NMR and mass spectral analysis. The anti-microbial activities of the newly synthesized compounds were also investigated. In the present invention some new derivatives of imidazole **1-6** have been prepared using 2-butyl-5- chloro-4-formaldehyde-1,3 imidazole as starting material. More over wittig reaction under milder condition using 2-butyl-5-chloro-4-formaldehyde-1,3 imidazole and triphenyl phosporonium salt of ethyl propionate gave

the product **7** which on transesterification yielded compound **8.** Both the compounds **7** and **8** on hydrolysis under basic condition afforded product **9**.

Discussion:

In the view of above facts we report here in the preparation of a new series of compounds bearing imidazole moiety. The reaction of acetyl acetone / Ethyl acetoacetate with 2-butyl-5-chloro-4-formaldehyde-1,3 imidazole in presence of ammonium acetate under reflux condition gives compounds 1*H*-2-butyl-4-chloro-5-(1*H*-4*H*-2,6 dimethyl-3,5 diacetyl-pyridin-4-yl)-1, 3-imidazole **1**/1*H*-2-butyl-4-chloro-5-(1*H*-4*H*-2, 6 dimethyl-3, 5-dicarbethoxy-pyridin-4-yl)-1, 3-imidazole **2**. The reaction of 2 mole dimedone with ammonium acetate and 2-butyl-5- chloro-4-formaldehyde-1,3 imidazole and 1 mole dimedone with ammonium acetate in ethanol solvent under reflux conditions yielded 1*H*-2-butyl-4-chloro-5-(4, 4-dimethyl-2, 6-dioxo-cyclohexan)-methylene-1, 3 imidazole **3**/1*H*-2-butyl-4-chloro-5-(9*H*, 10*H*-1, 8 dioxo-3, 3, 6, 6- tetramethyl- 1, 2, 3, 4, 5, 6, 7, 8-octahydro-acridin-9-yl)-1, 3-imidazole **4.** Similarly compounds 1*H*-2-butyl-4-chloro-5-(2,2-dicarbethoxy-ethylen)-1,3-imidazole **5**/ 1*H*-2-butyl-4-chloro-5-(2,2-dicarbmethoxy-ethylen)-1, 3-imidazole **6** are prepared by reacting diethyl malonate and dimethyl malonate with ammonium acetate and 2-butyl-5- chloro-4-formaldehyde-1,3 imidazole at reflux conditon. 2-butyl-5- chloro-4-formaldehyde-1,3 imidazole when stirred with triphenyl phosporonium salt of ethyl propionate at room temperature in presence of isopropyl acetate for 2 hrs give the product (E)1*H*-2-butyl-4-chloro-5-(2-carbethoxy-1-propylen)-1, 3-imidazole **7**. Compound (E)1*H*-2-butyl-4-chloro-5-(2-carbethoxy-1-propylen)-1, 3-imidazole **7** when refluxed with sodium methoxide in methanol for 3-4 hrs gave compound (E)1*H*-2-butyl-4-chloro-5-(2-carbmethoxy-1-propylen)-1, 3-imidazole **8.** (E)1*H*-2-butyl-4-chloro-5-(2-carbethoxy-1-propylen)-1, 3-imidazole **7** and (E)1*H*-2-butyl-4-chloro-5-(2-carbmethoxy-1-propylen)-1, 3-imidazole **8** when refluxed with 1 mole sodium methoxide and 1 mole of water in methanol for 3-4 hrs gave hydrolysised product (E)1*H*-2-butyl-4-chloro-5-(2-methyl-2-propenoic acid)-1, 3-imidazole **9**.

Experimental:

IR spectra (KBr in cm^{-1}) were recorded on Perkin-Elmer spectrum One FTIR spectrophotometer in the range of 4000-400 cm^{-1}. Melting points of all the compounds were determined in soft glass open capillaries on an electrothermal apparatus and are uncorrected. ^{1}H NMR spectra as well as ^{13}C NMR were recorded on JEOL AL 400 FT NMR spectrophotometer using DMSO-d_6 as solvent and TMS as an internal standard (chemical shifts in δ ppm). Mass spectra were recorded on 1100 series LC/MSD trap, Agilent. The substiuted benzoyl chlorides were prepared according to the literature procedure[12,13]. Ammonium acetate, Wittig reagent i.e. triphenyl phosporonium salt of ethyl-2-propionate were used of Aldrich make**.** 2-butyl-5- chloro-4-formaldehyde-1,3 imidazole were used as per literature procedure[14]**.**

1*H*-2-butyl-4-chloro-5-(1*H*-4*H*-2, 6-dimethyl-3, 5-diacetyl-pyridin-4-yl)-1, 3-imidazole 1

Charged 2-butyl-5- chloro-4-formaldehyde-1,3 imidazole (1.0 gms, 0.0053 mole) in 10 ml of ethanol along with ammonium acetate (0.42 gms, 0.00549 mole) and acetyl acetone (1.07 gms, 0.0109 mole). The reaction mass was then refluxed at 80°C for 1 hr. Additional ammonium acetate (0.42 gms. 0.054 mole) was added and again refluxed at 80°C for 2 hrs. After the completion of reaction (monitored by TLC with mobile phase Ethyl acetate: n-Hexane (8:2)), the

reaction mass was dumped in 50 ml of ice water. Solid product precipitated out, filtered off and washed with 10 ml of ice water. The product was dried at 60-65°C for 4-5 hrs to yield 1.7 gms.
This compound was obtained as yellow colour powder in yield 91%, m.p. 153-156°C. Anal.Calcd for $C_{18}H_{24}N_3O_2Cl$: C, 61.80; H, 6.87; N, 12,02. found : C, 61.78; H, 6.88; N, 12.03. IR (cm^{-1}) 1578 (C=N), 1658 (C=O), 2960 (CH), 3552 (NH), ^{1}HNMR (DMSO-d_6): δ 0.86 (t, 3H, CH_3), 1.22 (m, 2H, CH_2), 1.5 (m, 2H, CH_2), 2.2 (2 x s,12H, 4xCH_3), 2.46 (t, 2H, CH_2), 5.0 (s, 1H, CH), 8.9 (s, 1H, NH), 11.4 (s,1H, NH), ^{13}C NMR (DMSO-d_6): δ 13.7 (CH_3), 19.1 (CH_3), 21.8 (CH_2), 27.4 (CH_2), 30.0 (CH_2), 30.0 (CH_3), 30.9 (CH), 108.9-144.4 (Ar-C), 145.7 (C=N), 196.5 (C=O), MS (m/z): 350.2

1*H*-2-butyl-4-chloro-5-(1*H*-4*H*-2, 6 dimethyl-3, 5-dicarbethoxy-pyridin-4-yl)-1, 3-imidazole 2

Charged 2-butyl-5- chloro-4-formaldehyde-1,3 imidazole (1.0 gms, 0.0053 mole) in 10 ml of ethanol along with ammonium acetate (0.42 gms, 0.00549 mole) and ethyl acetoacetate (1.4 gms, 0.0109 mole). The reaction mass was then refluxed at 80°C for 1 hr. Additional ammonium acetate (0.42 gms. 0.054 mole) was added and again refluxed at 80°C for 2 hrs. After the completion of reaction (monitored by TLC with mobile phase Ethyl acetate: n-Hexane (8:2)), the reaction mass was dumped in 50 ml of ice water. Solid product precipitated out, filtered off and washed with 10 ml of ice water. The product then recrystallised with ethanol + water (50:50) and dried at 60-65°C for 8-10 hrs to yield yellow colour powder 2.0 gms.

This compound was obtained as yellow colour powder in yield 91%, m.p. 210-212°C. Anal. Calcd for $C_{20}H_{28}N_3O_4Cl$: C, 58.60; H, 6.84; N, 10.26. found : C, 58.59; H, 6.85; N, 10.25. IR (cm^{-1}) 1697 (C=O), 2956 (CH), 3327 (NH) ^{1}HNMR (DMSO-d_6): δ 0.86 (t, 3H, CH_3), 1.14 (t, 6H, CH_3 x 2),1.25 (m, 2H, CH_2), 1.50-1.57 (m, 2H, CH_2), 2.23 (s, 6H, CH_3 x 2), 2.47 (t, 2H, CH_2), 4.01 (q, 4H, CH_2 x 2), 4.89 (s, 1H, CH), 8.85 (s, 1H, NH), 11.42 (s, 1H, NH), ^{13}C NMR (DMSO-d_6): δ 13.7 (CH_3), 14.3 (CH_3), 18.2 (CH_3), 21.7 (CH_2), 27.4 (CH_2), 30.0 (CH_2), 30.3 (CH), 58.9 (CH_2), 98.3-144.7 (Ar-C), 145.4 (C=N), 166.9 (C=O), MS (m/z): 410.2

1*H*-2-butyl-4-chloro-5-(9*H*, 10*H*-1, 8 dioxo-3, 3, 6, 6- tetramethyl- 1, 2, 3, 4, 5, 6, 7, 8-octahydro-acridin-9-yl)-1, 3-imidazole 3

2-butyl-5- chloro-4-formaldehyde-1,3 imidazole (1.0 gms, 0.0053 mole) in 10 ml of ethanol along with ammonium acetate (0.42 gms, 0.00549 mole) and dimedone (1.51 gms, 0.0109 mole) were refluxed at 80-84°C for 1 hr. Additional ammonium acetate (0.42 gms. 0.054 mole) was added and again refluxed at 80°C for 2 hrs. After the completion of reaction (monitored by TLC with mobile phase Ethyl acetate: n-Hexane (8:2)), the reaction mass was dumped in 50 ml of ice water. Solid product precipitated out, filtered off and washed with 10 ml of ice water. The product then recrystallised with ethanol + water (50:50) and dried at 60-65°C for 8-12 hrs to yield 2.2gms (95 %, m.p.: 179-183°C).

This compound was obtained as yellow colour powder in yield 95%, m.p. 179-183°C. Anal.Calcd for $C_{24}H_{32}N_3O_2Cl$: C, 67.05; H, 7.45; N, 9.78. found : C, 67.07; H, 7.46; N, 9.77. IR (cm^{-1}) 1651 (C=O), 3180 (CH), 3560 (NH) ^{1}HNMR (DMSO-d_6): δ 0.84 (t, 3H, CH_3), 0.95 (d, 12H, CH_3 x 4),1.24 (m, 2H, CH_2), 1.46-1.54 (m, 2H, CH_2), 1.97-2.40 (m, 8H, CH_2 x 4), 2.40 (t,

2H, CH_2), 4.73 (s, 1H, CH), 9.32 (s, 1H, NH), 11.75 (s, 1H, NH), ^{13}C NMR (DMSO-d_6): δ 13.7 (CH_3), 21.8 (CH_2), 24.5 (CH_3), 26.4 (CH_3), 27.4 (CH_2), 29.3 (CH), 30.0 (CH_2), 39.5 (CH_2), 50.2 (CH_2), 108.0-143.8 (Ar-C), 149.0 (C=N), 194.4 (C=O), MS (m/z): 430.2

1*H*-2-butyl-4-chloro-5-(4,4-dimethyl-2, 6-dioxo-cyclohexan)-methylene-1, 3 imidazole 4

2-butyl-5- chloro-4-formaldehyde-1,3 imidazole (1.0 gms, 0.0053 mole) in 10 ml of ethanol along with ammonium acetate (0.42 gms, 0.00549 mole) and dimedone (0.75gms, 0.0054 mole) were refluxed at 80-84°C for 1 hr. Additional ammonium acetate (0.42 gms. 0.054 mole) was added and again refluxed at 80°C for 2 hrs. After the completion of reaction (monitored by TLC with mobile phase Ethyl acetate: n-Hexane (8:2)), the reaction mass was dumped in 50 ml of ice water and extracted the product with ethyl acetate. Dried the ethyl acetate layer using anhydrous Magnesium sulphate and concentrated the dry organic layer under vacuum to get crude oily mass. Crude product then purified with the help of column chromatography using silica gel (60-120 mesh) and elution done by ethyl acetate: n-Hexane (10:90). Main fraction concentrated under vacuum to yield 1.4 gms.

This compound was obtained as red coloured semisolid mass in yield 84%, decomposition temp: 200°C. Anal.Calcd for $C_{16}H_{21}N_2O_2Cl$: C, 62.24; H, 6.81; N, 9.08. found : C, 62.23; H, 6.82; N, 9.09. IR (cm^{-1}) 1685 (C=O), 3018 (NH), ^{1}HNMR ($CDCl_3$): δ 0.94 (t, 3H, CH_3), 1.08 (s, 6H, 2xCH_3), 1.41 (m, 2H, CH_2), 1.73-1.81(m, 2H, CH_2), 2.54 (s, 2H, CH_2), 2.59 (s, 2H, CH_2), 2.80 (t, 2H, CH_2), 8.09 (s, 1H, CH), 13.32 (s, 1H, NH), ^{13}C NMR ($CDCl_3$): δ 13.6 (CH_3), 28.4 (CH_3), 22.3 (CH_2), 29.0 (CH_2), 29.3 (CH_2), 51.7-53.6 (CH_2), 133.7 (CH), 122.2-145.2 (Ar-C), 154.0 (C=N), 196.9-200.6 (C=O), MS (m/z): 309.2

1*H*-2-butyl-4-chloro-5-(2, 2-dicarbethoxy-ethylen)-1, 3-imidazole 5/ 1*H*-2-butyl-4-chloro-5-(2, 2-dicarbmethoxy-ethylen)-1, 3-imidazole 6

Charged 2-butyl-5- chloro-4-formaldehyde-1, 3 imidazole (1.0 gms, 0.0053 mole) in 10 ml of ethanol along with ammonium acetate (0.42 gms, 0.00549 mole) and diethyl malonate (0.86 gms, 0.0053 mole) / dimethyl malonate (0.71 gms, 0.0053) were refluxed at 80-84°C for 1 hr. Additional ammonium acetate (0.42 gms. 0.054 mole) was added and again refluxed at 80°C for 2 hrs. After the completion of reaction (monitored by TLC with mobile phase Ethyl acetate: n-Hexane (8:2), the reaction mass was dumped in 50 ml of ice water and extracted the product with ethyl acetate. Dried the ethyl acetate layer using anhydrous Sodium sulphate and concentrated the dry organic layer under vacuum to get crude oily mass. Crude product then purified with the help of column chromatography using silica gel (60-120 mesh) with the solvent system ethyl acetate: n-Hexane (10:90). Main fraction concentrated under vacuum to yield 1.6 gms of oil **5**./ 1.5 gms of oil **6**.

Compound **5** was obtained as yellow colour oil in yield 90%, b.p.: 275-280°C. Anal.Calcd for $C_{15}H_{21}N_2O_4Cl$: C, 54.79; H, 6.39; N, 8.52. found : C, 54.78; H, 6.40; N, 8.53. IR (cm^{-1}) 1718 (C=O), 2981 (CH), 3290 (NH) ^{1}HNMR ($CDCl_3$): δ 0.92 (t, 3H, CH_3), 1.30 (m, 2H, CH_2), 1.30-1.40 (s, 6H, CH_3 x 2), 1.70 (m, 2H, CH_2), 2.72 (t, 2H, CH_2), 4.29 (q, 4H, CH_2 x 2), 7.62 (s, 1H, CH), 11.79 (s, 1H, NH), ^{13}C NMR ($CDCl_3$): δ 13.6 (CH_3), 14.0-14.1 (CH_3), 22.2 (CH_2), 28.6 (CH_2), 29.5 (CH_2), 61.4-61.9 (CH_2), 131.7 (CH), 115.9-140.7 (Ar-C), 152.1 (C=N), 165.9 and 167.6 (C=O), MS (m/z): 329.1

Compound **6** was obtained as yellow colour oil in yield 89 %, b.p.: 268-272°C. ^{1}HNMR ($CDCl_3$): δ 0.91(t, 3H, CH_3), 1.32-1.40 (m, 2H, CH_2), 1.67-1.75 (m, 2H, CH_2), 2.72 (t, 2H, CH_2), 3.83 (d, 6H, CH_3 x 2), 7.66 (s, 1H, CH), 11.84 (s, 1H, NH), ^{13}C NMR ($CDCl_3$): δ 13.6 (CH_3), 22.2 (CH_2), 28.6 (CH_2), 29.5 (CH_2), 52.6 and 52.8.0 (CH_3), 132.5 (CH), 114.6-141.3 (Ar-C), 152.4 (C=N), 166.1 and 168.0 (C=O), MS (m/z): 301.2

(E) 1*H*-2-butyl-4-chloro-5-(2-carbethoxy-1-propylen)-1, 3-imidazole 7

Compound 2-butyl-5- chloro-4-formaldehyde-1, 3 imidazole (2.0 gms, 0.0107 mole) and tri phenyl phosphoronium salt of ethyl 2- propionate (4.1 gms, 0.0107 mole) in 25 ml iso propyl acetate stirred for 2 hrs. Reaction was monitored on TLC using mobile phase ethyl acetate: n-Hexane (3:7). After the completion of reaction, the reaction mass concentrated under vacuum at 60-70°C and purified by column chromatography using ethylacetate: n-Hexane (10:90). Main fraction collected was concentrated under vacuum at 50-60°C to yield 1.3 gms. (90 %, m.p.: 79-82°C).

This compound was obtained as light cream coloured powder in yield 90 %, m.p. 79-82°C. Anal.Calcd for $C_{13}H_{19}N_2O_2Cl$: C, 57.67; H, 7.02; N, 10.35. found : C, 57.68; H, 7.03; N, 10.34. IR (cm^{-1}) 1707 (C=O), 3068 (CH), 3124 (NH), ^{1}HNMR ($CDCl_3$): δ 0.87 (t, 3H, CH_3, J=7.3Hz), 1.30 (t, 3H, CH_3), 1.35 (m, 2H, CH_2), 1.63-1.71 (m, 2H, CH_2), 2.67 (t, 2H, CH_2, J=7.8Hz) , 2.10 (s, 3H, CH_3), 4.22 (q, 2H, CH_2, J=7.2Hz), 7.46 (s, 1H, CH), 9.81 (s, 1H, NH), ^{13}C NMR ($CDCl_3$): δ 13.6 (CH_3), 14.1 (CH_3), 14.3 (CH_3), 22.3 (CH_2), 28.6 (CH_2), 30.1 (CH_2), 61.1 (CH_2), 123.6 (CH), 122.9-150.4 (Ar-C), 168.1 (C=O), MS (m/z): 271.2

(E) 1*H*-2-butyl-4-chloro-5-(2-carbmethoxy-1-propylen)-1, 3-imidazole 8

Charged compound **7** (2.0 gms, 0.0074 mole) and sodium methoxide (0.40 gms, 0.0074 mole) in 20 ml methanol and refluxed the reaction mass at 65-67°C for 6-8 hrs. Reaction monitored on TLC using mobile phase ethyl acetate: n-Hexane (2.5:7.5). after the reaction completion, concentrated the reaction mass under vacuum at 50-55°C. Charged 25 ml water to the concentrated reaction mass and extracted the product with
25 ml of methylene chloride. Methylene chloride layer dried over anhydrous sodium sulphate and concentrated under vacuum to yield 1.8 gms.

This compound was obtained as cream coloured powder in yield 91%, m.p. 96-100°C. Anal.Calcd for $C_{12}H_{17}N_2O_2Cl$: C, 56.14; H, 6.62; N, 10.92. found : C, 56.15; H, 6.60; N, 10.93. ^{1}HNMR ($CDCl_3$): δ 0.92 (t, 3H, CH_3, J=7.3 Hz), 1.37 (m, 2H, CH_2, J= 14.9,7.3 Hz) , 1.67-1.75 (m, 2H, CH_2), 2.13 (s, 3H, CH_3), 2.70 (t, 2H, CH_2, J=7.8 Hz), 3.79 (s, 3H, CH_3), 7.48 (s, 1H, CH), 9.13 (s, 1H, NH), ^{13}C NMR ($CDCl_3$): δ 13.7 (CH_3), 14.1 (CH_3), 22.3 (CH_2), 28.6 (CH_2), 30.0 (CH_2), 52.3 (CH_3), 123.6 (CH), 121.8-150.4 (Ar-C), 168.1 (C=O), MS (m/z): 257.2

(E) 1*H*-2-butyl-4-chloro-5-(2-methyl-2-propenoic acid)-1, 3-imidazole 9

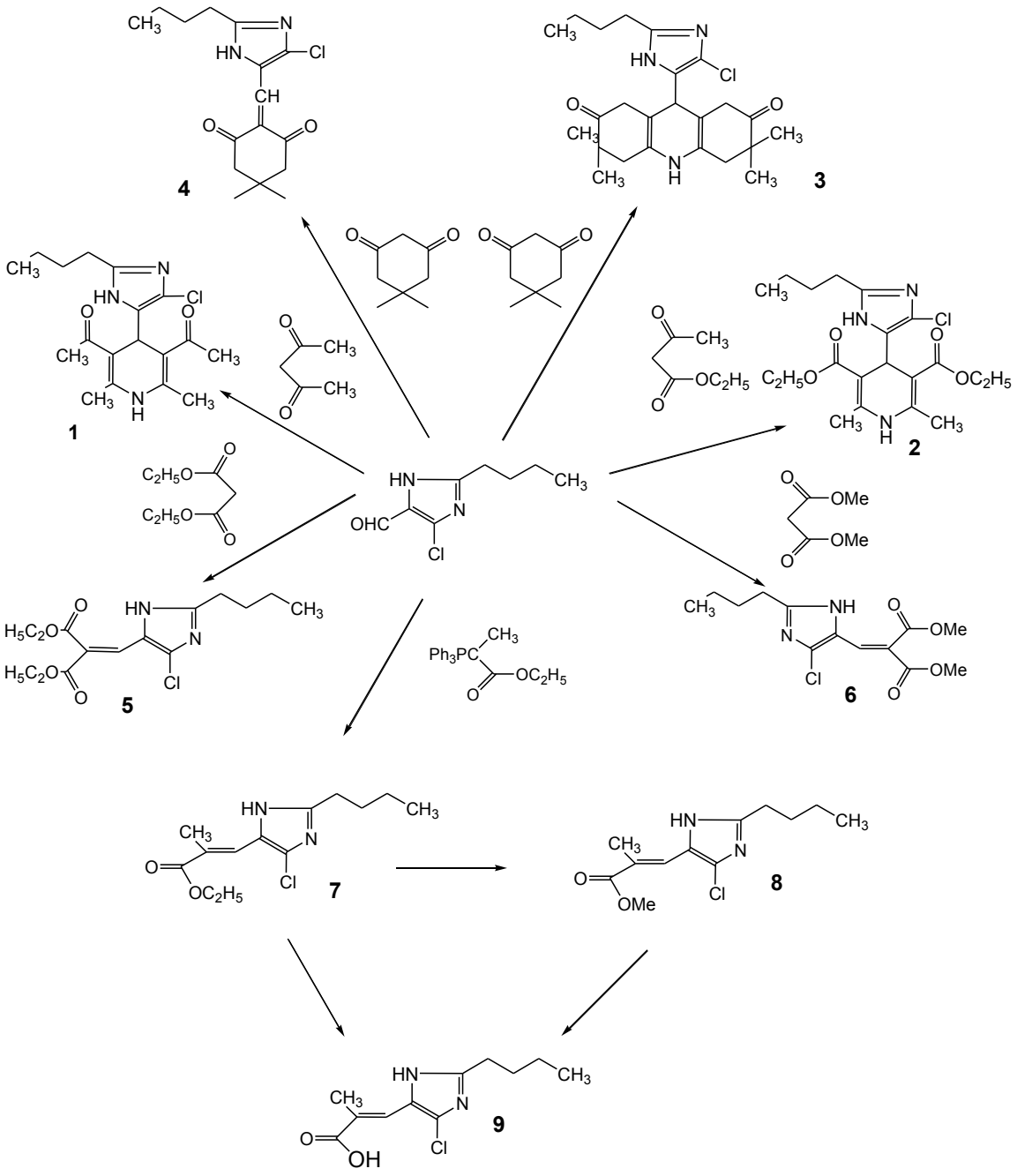
Compound **7**/**8** (2.0 gms/1.89 gms, 0.0074 mole), sodium methoxide (0.40 gms, 0.0074 mole) in 20 ml methanol containing 2 ml water refluxed at 65-67°C for 2-3 hrs. Reaction was monitored on TLC using mobile phase ethyl acetate: n-Hexane (3:7). After completion of reaction, the reaction mass was concentrated under vacuum at 50-55°C. Charged 20 ml water and

acidified with conc. hydrochloric acid till pH of the reaction mass observed acidic. The product was filtered and washed with water, dried at 60-65°C under vacuum to yield 1.62 gms.

This compound was obtained as light cream coloured powder in yield 89%, m.p. 197-200°C. Anal.Calcd for $C_{11}H_{15}N_2O_2Cl$: C, 54.43; H, 6.18; N, 11.54. found : C, 54.44; H, 6.19; N, 11.52. IR (cm^{-1}) 1666 (C=O), 2960 (CH), 3160 (NH), ^{1}HNMR (DMSO-d_6) : δ 0.86 (t, 3H, CH_3, J=7.3Hz), 1.29 (m, 2H, CH_2 , J=14.6,7.3 Hz), 1.56-1.64 (m, 2H, CH_2), 2.03 (s, 3H, CH_3), 2.64 (t, 2H, CH_2, J=7.5 Hz) , 7.28 (s, 1H, CH), 12.02 (s, 1H, NH), 12.46 (s, 1H, COOH), ^{13}C NMR (DMSO-d_6) : δ 13.6 (CH_3), 14.1 (CH_3), 21.7 (CH_2), 27.6 (CH_2), 29.9 (CH_2), 122.8 (CH), 120.8-131.5 (Ar-C), 150.9 (C=N), 169.1 (C=O), MS (m/z): 243.2

References:

1 T. Monoru, A. Takemitsu, *Euro pat*. EP319960.
2 T. Monoru, A. Takemitsu, *Chem Abstr*, **112** (1990) 55860s
3 *Chem Abstr*, **98**, (1983),29687p, *Ger offen* DE **3** 102, 588.
4 A. Paesseus, G. Streissle, M. Plempel, *Ger offen* DE **3** 315, 808.
5 J. L. Kane, B. H. Hirth, O. Laing, *Bioorg Med Chem Lett.* **13** (2003) 4463.
6 *Chem Abstr*, **112** (1989) P118817f.
7 H. Shimotori, J. Yanase, T. Ishii, *Jpn.Kokai Tokkyo Koho* JP01, **113** 372.
8 U. Wriedr, G. Hampredt, *Chem Abstr*, **113** (1990), 40679m.
9 Yoo sung eun, Lee Seung Heui, Kim Soo Kyung*, Bio Org.Med Chem,* **5(2)** (1997) 445-459 (Eng).
10 J. Berliner, S. Richter, *Chem Abstr*, **122** (1967) 81941.
11 Adams and Jenkins, *Organic Synthesis*, **3** (1923) 75.
12 J. Gareth Griffiths, B. Michael Hauck, Rene Imwinkelried, *J. Org. Chem.,* **64** (1999) 8084-89 (E).



Scheme I

Table III Antibacterial activity of compound

Compound	Zone of Inhibition (in mm)			
	Gram Positive		Gram Negative	
	S. aureus	*S.typhi*	*E.coli*	*B.Substilus*
1	----	---	++	++
2	++	---	++	---
3	+++	++	---	++
4	++	++	---	++
5	+++	++	++	++
7	++	++	++	++
9	----	---	++	---
Ampicillin	++++	++++	++++	++++

*** Diameter of the hole was 6mm**

*** Zone of inhibition: (-) 6mm, (+) 6-10mm, (++) 10-15mm, (+++) 15-20, (++++) 20-25.**