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Synthesis and characterization of new fatty Schiff base ethers of 4-((pyridin-3-ylmethylimino)methyl)phenol

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ABSTRACT

A series of ten new Schiff base ethers were synthesized by etherification of Schiff base-{4-(pyridine-3-methylimino) methyl phenol} with fatty alkyl bromides of different chain lengths (C_4-C_{18}) in the presence of base with 80-85% isolated yields. All the synthesized Schiff base ethers (2a-j) were characterized by FT-IR, ^{1}H NMR, ^{13}C NMR and Mass spectral studies. Presence of a characteristic peak for ether linkage, C-O at 1039 cm^{-1} in IR spectra; a triplet around 7.67 ppm in ^{1}H NMR and a characteristic peak around 69.7 in case of ^{13}C NMR further confirmed the structures of Schiff base ethers. The structure of all the compounds were further confirmed by their characteristic molecular ion peaks in ESI-MS.

1. Introduction

Schiff bases are compounds containing imine or azomethine moiety, a nitrogen analogue of an aldehyde or a ketone, where the carbonyl group (C=O) is replaced by an imine (or) azomethine group. Schiff bases are organic compounds used as pigments and dyes, catalysts, intermediates in organic synthesis and as polymer stabilizers [1]. The azomethine group present in the molecules exhibits many biological activities [2-4]. Literature survey revealed that, most of the Schiff bases exhibit wide range of biological activities like anti-fungal, anti-bacterial, anti-malarial, anti-inflammatory and antipyretic properties [5-10]. Similarly, fatty acids and derivatives showed biological activities like antimicrobial [11,12], antifungal [13], and pesticidal activities [14] and the presence of ether bond linked to a lipid molecule further increases the biological activity [15]. The existence of ether bond increases the resistance of a molecule to hydrolysis and forms chemically stable bond. Keeping this in view, in the present study, we focussed on the synthesis of a homologous series of ten novel Schiff base ethers by the etherification of Schiff base-4-((pyridin-3-ylmethylimino)methyl)phenol.

2. Experimental

2.1. Instrumentation

^{1}H and ^{13}C NMR spectra were recorded on AVANCE 300 and 500 MHz and 75 MHz, respectively in $CDCl_3$ and DMSO-d_6. Chemical shifts relative to TMS as internal standards were given as δ values in ppm while the coupling constants were measured by *J* values. The melting point was determined through open capillary tubes which are uncorrected. Infrared (IR) spectra were obtained on a 1600 FT-IR Perkin-Elmer Spectrometer (Norwalk, CT) with a liquid film between NaCl cells. Mass spectrometry was recorded by electron spray ionization (ESI) on Shimadzu LC/MS instrument.

2.2. General procedure for the synthesis of Schiff base 4-((pyridin-3-ylmethylimino)methyl)phenol (1)

Schiff base (**1**) {4-(pyridine-3-methylimino) methyl phenol} was prepared by the condensation of 4-hydroxy benzaldehyde (2 mmol) and 3-aminomethyl pyridine (2 mmol) in absolute ethanol for 6 h at 80-85 °C (Scheme 1) which yielded Schiff base [16]. $C_{13}H_{12}N_2O$. Yield: 80%. M.p.: 143.6 °C. ^{1}H NMR (300 MHz , DMSO-d_6, δ, ppm): 4.72 (s, 2H, N-C*H*$_2$-), 6.79 (d, 2H, *J* = 8.4 Hz, Ar-*H*), 7.26 (dd, 1H, *J* = 7.9 Hz, Ar-*H*), 7.57 (d, 2H, *J* = 7.7 Hz, Ar-*H*), 7.66 (d, 1H, *J* = 3.5 Hz, Ar-*H*), 8.30 (s, 1H, Ar-*H*), 8.42 (d, 1H, *J* = 4.7 Hz, Ar-*H*), 8.52 (s, 1H, C*H*=N), 9.6 (s, 1H, O*H*).

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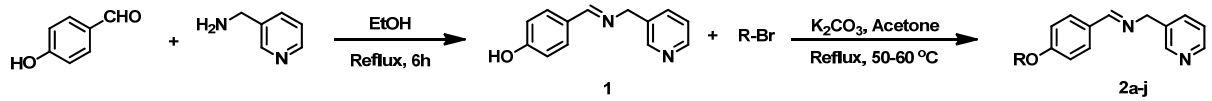

R = butyl (2a), pentyl (2b), hexyl (2c), heptyl (2d), octyl (2e), decyl (2f), dodecyl (2g), tetradecyl (2h), hexadecyl (2i), octadecyl (2j)

Scheme 1

^{13}C NMR (75 MHz, DMSO-d_6, δ, ppm): 60.08 (-*C*H$_2$-N), 114.51, 122.28, 126.13, 128.74, 130.90, 134.43, 146.76, 147.85, 159.15 (Aromatic), 161.02 (-*C*H=N). MS/ESI (*m/z*): Calcd: 212 [M$^+$], Found 213.2 [M+1].

2.2. Typical procedure for the synthesis of compound 2a-j

N-(4-butoxybenzylidene)-1-(pyridin-3-yl)methanamine was synthesized by etherification of Schiff base **1** with 1-bromo butane taken in equimolar ratios (Scheme 1). A solution of Schiff base (0.40 g, 2 mmol) and 1-bromo butane (0.27 g, 2 mmol) and little excess amount of base, potassium carbonate (2.76 g, 10 mmol) was dissolved in 50 mL dry acetone under N_2 atmosphere and the contents were refluxed for 12 h stirring magnetically. The progress of the reaction was monitored using thin layer chromatography eluted with the solvent $CHCl_3$: MeOH (95:5, *v*:*v*). The reaction was cooled to 45 °C, filtered off the by-product and washed with 20 mL distilled acetone. The acetone layer was concentrated, dissolved in ethyl acetate and washed the product with aqueous sodium bicarbonate (3×50 mL) solution. The organic layer was separated, passed through anhydrous sodium sulphate and concentrated to obtain the crude *N*-(4-butoxybenzylidene)-1-(pyridin-3-yl)methanamine. The crude product was extracted with hexane and acetonitrile, where the pure product goes into the hexane layer. The hexane layer was concentrated to yield *N*-(4-butoxybenzylidene)-1-(pyridin-3-yl)methanamine.

Similarly all the Schiff base ethers, (4-alkyloxy-benzylidene)-pyridin-3-ylmethyl amine (**2b**-**j**) were prepared following the above procedure (Scheme 1). The synthesized Schiff base ethers were characterized by FT-IR, ^{1}H NMR, ^{13} C NMR and Mass spectral studies.

N-(4-Butoxybenzylidene)-1-(pyridin-3-yl)methanamine (**2a**): Yield: 80% ($C_{17}H_{20}N_2O$). FT-IR (ν_{max}, cm^{-1}): 2890 (C-H aliphatic), 1625 (C=N), 1510 (C=C), 1039 (C-O). ^{1}H NMR (500 MHz, $CDCl_3$, δ, ppm): 0.93 (t, 3H, *J*= 6.9 Hz, -C*H*$_3$), 1.43 (m, 2H, CH$_3$-C*H*$_2$- CH$_2$-), 1.81 (quint, 2H, -C*H*$_2$-CH$_2$-O), 3.99 (t, 2H, *J* = 6.9 Hz, -C*H*$_2$-O), 4.75 (s, 2H, -C*H*$_2$-N=CH-), 6.92 (d, 2H, *J* = 8.8 Hz, Ar-*H*), 7.28 (d, 1H, *J* = 6.8 Hz, Ar-*H*), 7.67 (d, 1H, *J* = 7.8 Hz, Ar-*H*), 7.72 (d, 2H, *J* = 8.8 Hz, Ar-*H*), 8.31 (s, 1H, Ar-*H*), 8.46 (dd, 1H, *J* = 4.9 Hz, Ar-*H*), 8.52 (s, 1H, C*H*=N). ^{13}C NMR (75 MHz, $CDCl_3$, δ, ppm): 14.15, 24.52, 25.25 (Methylene carbons), 61.10 (-*C*H$_2$-N), 69.70 (-O-*C*H$_2$-CH$_2$-), 114.52, 123.52, 129.52, 131.5, 135.52, 136.18, 148.21, 149.31, 161.55 (Aromatic carbons), 162.28 (-*C*H=N). MS/ESI (*m/z*): Calcd: 268 [M$^+$], Found 269 [M+1].

N-(4-(Pentyloxy)benzylidene)-1-(pyridin-3-yl)methanamine (**2b**): Yield: 83% ($C_{18}H_{22}N_2O$). FT-IR (ν_{max}, cm^{-1}): 2895 (C-H aliphatic), 1604 (C=N), 1540 (C=C), 1039 (C-O). ^{1}H NMR (500 MHz , $CDCl_3$, δ, ppm): 0.93 (t, 3H, *J* = 6.9 Hz, -C*H*$_3$), 1.42 (m, 4H, CH$_3$-(C*H*$_2$)$_2$-), 1.80 (quint, 2H, -C*H*$_2$-CH$_2$-O), 3.99 (t, 2H, *J* = 6.9 Hz, -C*H*$_2$-O), 4.78 (s, 2H, -C*H*$_2$-N=CH-), 6.93 (d, 2H, *J* = 8.8 Hz, Ar-*H*), 7.27 (d, 1H, *J* = 6.7 Hz, Ar-*H*), 7.67 (d, 1H, *J* = 7.9 Hz, Ar-*H*), 7.71 (d, 2H, *J* = 8.8 Hz, Ar-*H*), 8.35 (s, 1H, Ar-*H*), 8.50 (dd, 1H, *J* = 4.9 Hz, Ar-*H*), 8.60 (s, 1H, -C*H*=N). ^{13}C NMR (75 MHz, $CDCl_3$, δ, ppm): 14.05, 23.58, 24.32, 25.78 (Methylene carbons), 61.04 (-*C*H$_2$-N), 69.71 (-O-*C*H$_2$-CH$_2$-), 114.51, 123.32, 128.52, 132.6, 135.18, 135.54, 148.22, 149.29, 161.45, 162.08 (Aromatic carbons), 162.08 (-*C*H=N). MS/ESI (*m/z*): Calcd: 282 [M+], Found 283 [M+1].

N-(4-(Hexyloxy)benzylidene)-1-(pyridin-3-yl)methanamine (**2c**): Yield: 80% ($C_{19}H_{24}N_2O$). FT-IR (ν_{max}, cm^{-1}): 2850 (C-H aliphatic), 1601 (C=N), 1587 (C=C), 1039 (C-O). ^{1}H NMR (500 MHz ,$CDCl_3$, δ, ppm): 0.91 (t, 3H, *J* = 6.9 Hz, -C*H*$_3$), 1.46 (m, 6H, CH$_3$-(C*H*$_2$)$_3$-), 1.80 (quint, 2H, -C*H*$_2$-CH$_2$-O), 4.11 (t, 2H, *J* = 6.9 Hz, -C*H*$_2$-O), 4.75 (s, 2H, -C*H*$_2$-N=CH-), 6.94 (d, 2H, *J* = 8.8 Hz, Ar-*H*), 7.29 (d, 1H, *J* = 6.7 Hz, Ar-*H*), 7.67 (d, 1H, *J* = 7.9 Hz, Ar-*H*), 7.78 (d, 2H, *J* = 8.8 Hz, Ar-*H*), 8.40 (s, 1H, Ar-*H*), 8.48 (dd, 1H, *J* = 4.7 Hz, Ar-*H*), 8.51 (s, 1H, -C*H*=N). ^{13}C NMR (75 MHz, $CDCl_3$, δ, ppm): 14.05, 23.58, 24.32, 25.78, 30.21 (Methylene carbons), 61.10 (-*C*H$_2$-N), 68.98 (-O-*C*H$_2$-CH$_2$-), 114.50, 122.32, 129.52, 132.7, 135.21, 136.18, 148.21, 149.25, 160.45 (Aromatic carbons), 161.92 (-*C*H=N). MS/ESI (*m/z*): Calcd: 296 [M+], Found 297 [M+1].

N-(4-(Heptyloxy) benzylidene)-1-(pyridin-3-yl)methanamine (**2d**): Yield: 81% ($C_{20}H_{26}N_2O$). FT-IR (ν_{max}, cm^{-1}): 2980 (C-H aliphatic), 1601 (C=N), 1540 (C=C), 1039 (C-O). ^{1}H NMR (300 MHz , $CDCl_3$, δ, ppm): 0.90 (t, 3H, *J* = 6.9 Hz, -C*H*$_3$), 1.46 (m, 8H, CH$_3$-(C*H*$_2$)$_4$-), 1.80 (quint, 2H, -C*H*$_2$-CH$_2$-O), 4.01 (t, 2H, *J* = 6.6 Hz, -C*H*$_2$-O), 4.78 (s, 2H, -C*H*$_2$-N=CH-), 6.93 (d, 2H, *J* = 8.8 Hz, Ar-*H*), 7.28 (d, 1H, *J* = 6.8 Hz, Ar-H), 7.69 (d, 1H, *J* = 7.8 Hz, Ar-*H*), 7.78 (d, 2H, *J* = 8.8 Hz, Ar-*H*), 8.35 (s, 1H, Ar-*H*), 8.50 (dd, 1H, *J* = 4.7 Hz, Ar-*H*), 8.53 (s, 1H, -C*H*=N). ^{3}C NMR (75 MHz, $CDCl_3$, δ, ppm): 14.01, 22.52, 25.89, 28.96, 29.22, 31.69 (Methylene carbons), 62.17 (-*C*H$_2$-N), 68.06 (-O-*C*H$_2$-CH$_2$-), 114.50, 123.31, 128.48, 129.78, 132.6, 135.44, 148.26, 149.29, 160.55, 161.47 (Aromatic carbons), 162.02 (-*C*H=N-). MS/ESI (*m/z*): Calcd: 310 [M+], Found 311 [M+1], 312 [M+2].

N-(4-(Octyloxy)benzylidene)-1-(pyridin-3-yl)methanamine (**2e**): Yield: 85% ($C_{21}H_{28}N_2O$). FT-IR (ν_{max}, cm^{-1}): 2950 (C-H aliphatic), 1625 (C=N), 1539 (C=C), 1040 (C-O). ^{1}H NMR (300 MHz, $CDCl_3$, δ): 0.89 (t, 3H, *J* = 6.7 Hz, -C*H*$_3$), 1.29 (m, 10H, CH$_3$-(C*H*$_2$)$_5$-), 1.79 (quint, 2H, -C*H*$_2$-CH$_2$-O), 3.99 (t, 2H, *J* = 6.7 Hz, -C*H*$_2$-O), 4.78 (s, 2H, -C*H*$_2$-N=CH-), 6.92 (d, 2H, *J* = 9.0 Hz, Ar-*H*), 7.29 (d, 1H, *J* = 6.7 Hz, Ar-*H*), 7.70 (d, 1H, *J* = 7.9 Hz, Ar-*H*), 7.71 (d, 2H, *J* = 9.0 Hz, Ar-*H*), 8.35 (s, 1H, Ar-*H*), 8.51 (dd, 1H, *J* = 4.5 Hz, Ar-*H*), 8.60 (s, 1H, -C*H*=N). ^{13}C NMR (75 MHz, $CDCl_3$, δ, ppm): 13.96, 22.48, 25.86, 28.88, 29.00, 29.17, 31.65 (Methylene carbons), 62.08 (-*C*H$_2$-N), 67.98 (-O-*C*H$_2$-CH$_2$-), 114.41, 123.26, 128.38, 129.72, 131.81, 135.04, 135.42, 148.13, 149.18, 161.40 (Aromatic carbons), 162.01 (-*C*H=N-). MS/ESI (*m/z*): Calcd: 324 [M+], Found 347 [M+Na].

N-(4-(Decyloxy)benzylidene)-1-(pyridin-3-yl)methanamine (**2f**): Yield: 82% ($C_{23}H_{32}N_2O$). FT-IR (ν_{max}, cm^{-1}): 2895 (C-H aliphatic), 1620 (C=N), 1539 (C=C), 1020 (C-O). ^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 0.88 (t, 3H, *J* = 6.7 Hz, -CH$_3$), 1.27 (m, 14H, CH$_3$-(CH$_2$)$_7$-), 1.79 (quint, 2H, -CH$_2$-CH$_2$-O), 3.99 (t, 2H, *J* = 6.6 Hz, -CH$_2$-O), 4.78 (s, 2H, -CH$_2$-N=CH-), 6.93 (d, 2H, *J* = 8.5 Hz, Ar-H), 7.28 (d, 1H, *J* = 6.7 Hz, Ar-H), 7.67 (d, 1H, *J* = 8.0 Hz, Ar-H), 7.71 (d, 2H, *J* = 8.8 Hz, Ar-H), 8.35 (s, 1H, -CH=N-), 8.51 (dd, 1H, *J* = 4.5 Hz, Ar-H), 8.60 (s, 1H, -CH=N). ^{13}C NMR (75 MHz, $CDCl_3$, δ, ppm): 13.99, 22.54, 25.85, 28.91, 29.03, 29.16, 29.43, 31.76 (Methylene carbons), 62.11 (-*C*H$_2$-N), 68.01 (-O-*C*H$_2$-CH$_2$-), 114.44, 123.32, 129.75, 132.22, 135.33, 139.87, 149.18, 161.07 (Aromatic carbons), 162.07 (-*C*H=N-). MS/ESI (*m/z*): Calcd: 352 [M$^+$], Found 353 [M+1], 354 [M+2].

N-(4-(Dodecyloxy)benzylidene)-1-(pyridin-3-yl)methan amine (**2g**): Yield: 85% ($C_{25}H_{36}N_2O$). FT-IR (ν_{max}, cm^{-1}): 2891 (C-H aliphatic), 1610 (C=N), 1529 (C=C), 1039 (C-O). ^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 0.89 (t, 3H, *J* = 6.7 Hz, -C*H*$_3$), 1.27 (m, 18H,

CH_3-(CH_2)$_9$-), 1.79 (quint, 2H, -CH_2-CH_2-O), 3.99(t, 2H, *J* = 6.6 Hz, -CH_2-O), 4.78 (s, 2H, -CH_2-N=CH-), 6.92 (d, 2H, *J* = 9.0 Hz, Ar-*H*), 7.28 (d, 1H, *J* = 6.8 Hz, Ar-*H*), 7.67 (d, 1H, *J* = 8.0 Hz, Ar-*H*), 7.71 (d, 2H, *J* = 8.9 Hz, Ar-*H*), 8.35 (s, 1H, Ar-H), 8.51 (dd, 1H, *J* = 4.0 Hz, Ar-*H*), 8.60 (s, 1H, -C*H*=N). ^{13}C NMR (75 MHz, $CDCl_3$, δ, ppm): 14.01, 21.54, 22.34, 24.82, 25.85, 28.91, 29.03, 29.43, 30.24, 31.56, 32.85 (Methylene carbons), 61.15 (-*C*H_2-N), 69.10 (-O-*C*H_2-CH_2-), 114.54, 122.39, 129.67, 132.32, 134.50, 138.57, 148.14, 149.19, 161.12 (Aromatic carbons), 162.04 (-*C*H=N-). MS/ESI (*m/z*): Calcd: 380 [M$^+$], Found 381 [M+1], 382 [M+2].

N-(4-(Tetradecyloxy)benzylidene)-1-(pyridin-3-yl)methan amine (**2h**): Yield: 68% ($C_{27}H_{40}N_2O$). FT-IR (ν_{max}, cm^{-1}): 2895 (C-H aliphatic), 1620 (C=N), 1520 (C=C), 1039 (C-O). ^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 0.89 (t, 3H, *J* = 6.7 Hz, -CH_3), 1.26 (m, 22H, CH_3-(CH_2)$_{11}$-), 1.78 (quint, 2H, -CH_2-CH_2-O), 3.99 (t, 2H, *J* = 6.6 Hz, -CH_2-O), 4.78 (s, 2H, -CH_2-N=CH-), 6.92 (d, 2H, *J* = 8.6 Hz, Ar-*H*), 7.28 (d, 1H, *J* = 6.9 Hz, Ar-*H*), 7.68 (d, 1H, *J* = 8.0 Hz, Ar-*H*), 7.71(d, 2H, *J* = 8.0 Hz, Ar-*H*), 8.35 (s, 1H, Ar-H), 8.50 (dd, 1H, *J* = 4.5 Hz, Ar-*H*), 8.61 (s, 1H, -C*H*=N). ^{13}C NMR (75 MHz, $CDCl_3$, δ, ppm): 14.01, 21.54, 22.34, 24.82, 25.85, 28.91, 29.16, 29.43, 30.24, 30.56, 31.08, 31.56, 32.85 (Methylene carbons), 61.05 (-*C*H_2-N), 69.14 (-O-*C*H_2-CH_2-), 114.50, 122.40, 129.70, 132.66, 135.23, 138.61, 148.04, 149.22, 161.02 (Aromatic carbons), 162.14 (-*C*H=N-). MS/ESI (*m/z*): Calcd: 408 [M$^+$], Found 409 [M+1].

N-(4-(Hexadecyloxy)benzylidene)-1-(pyridin-3-yl)methan amine (**2i**): Yield: 80% ($C_{29}H_{44}N_2O$). FT-IR (ν_{max}, cm^{-1}, KBr): 2890 (C-H aliphatic), 1621 (C=N), 1540 (C=C), 1040 (C-O). ^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 0.88 (t, 3H, *J* = 6.7 Hz, -CH_3), 1.27 (m, 26H, CH_3-(CH_2)$_{13}$-), 1.78 (quint, 2H, -CH_2-CH_2-O), 3.98 (t, 2H, *J* = 6.6 Hz, -CH_2-O), 4.78 (s, 2H, -CH_2-N=CH-), 6.92 (d, 2H, *J* = 8.6 Hz, Ar-*H*), 7.29 (d, 1H, *J* = 6.5 Hz, Ar-*H*), 7.69 (d, 1H, *J* = 8.6 Hz, Ar-*H*), 7.71 (d, 2H, *J* = 8.6 Hz, Ar-*H*), 8.35 (s, 1H, Ar-*H*), 8.51 (dd, 1H, *J* = 4.5 Hz, Ar-*H*), 8.60 (s, 1H, -C*H*=N-). ^{13}C NMR (75 MHz, $CDCl_3$, δ, ppm): 14.06, 22.54, 25.85, 29.42, 29.63 (Methylene carbons), 31.86 for methylene carbon, 62.17 (-*C*H_2-N), 68.09 (-O-*C*H_2-CH_2-), 114.52, 123.36, 129.82, 131.99, 135.14, 134.64, 148.11, 149.23, 161.50 (Aromatic carbons), 162.12 (-*C*H=N-). MS/ESI (*m/z*): Calcd: 436 [M$^+$], Found 437 [M+1], 438 [M+2].

N-(4-(Octadecyloxy)benzylidene)-1-(pyridin-3-yl)methan amine (**2j**): Yield: 81% ($C_{31}H_{48}N_2O$). FT-IR (ν_{max}, cm^{-1}, KBr): 2890 (C-H aliphatic), 1620 (C=N), 1540 (C=C), 1040 (C-O). ^{1}H NMR (300 MHz, $CDCl_3$, δ, ppm): 0.87 (t, 3H, *J* = 6.7 Hz, -CH_3), 1.26 (m, 30 H, CH_3-(CH_2)$_{15}$-), 1.78 (quint, 2H, -CH_2-CH_2-O), 3.99 (t, 2H, *J* = 6.7 Hz, -CH_2-O), 4.78 (s, 2H, -CH_2-N=CH-), 6.93(d, 2H, *J* = 9.0 Hz, Ar-*H*), 7.28 (d, 1H, *J* = 6.5 Hz, Ar-*H*), 7.67 (d, 1H, *J* = 9.0 Hz, Ar-*H*), 7.70 (d, 2H, *J* = 9.0 Hz, Ar-*H*), 8.35 (s, 1H, Ar-H), 8.51 (dd, 1H, *J* = 4.5 Hz, Ar-*H*), 8.60 (s, 1H, -C*H*=N-). ^{13}C NMR (75 MHz, $CDCl_3$, δ, ppm): 14.05, 22.63, 25.92, 29.09, 29.61 (Identical methylene carbons), 31.73 (Methylene carbon), 62.16 (-*C*H_2-N), 68.04 (-O-*C*H_2-CH_2), 114.47, 123.34, 128.44, 129.77, 131.50, 132.6, 135.50, 148.22, 149.24, 161.45 (Aromatic carbons), 162.07 (-*C*H=N-). MS/ESI (*m/z*): Calcd: 464 [M$^+$], Found 465 [M+1], 466 [M+2].

3. Results and discussion

Etherification was carried out by the reaction of Schiff base with fatty alkyl bromides of different chain lengths in the presence of base like potassium carbonate. Different fatty alkyl bromides employed were butyl (C_4), pentyl (C_5), hexyl (C_6), heptyl (C_7), octyl (C_8), decyl (C_{10}), dodecyl (C_{12}), tetradecyl (C_{14}), hexadecyl (C_{16}), octadecyl (C_{18}) bromides. The structure of the Schiff base ethers was confirmed by FT-IR, ^{1}H NMR, ^{13}C NMR and Mass Spectral Studies. These synthesized compounds will be evaluated for biological properties as an extension to the presence of work and the influence of different alkyl chain lengths on the activity will be studied. The synthesis of different Schiff base ethers was carried out using the following procedure.

Schiff base was prepared by a mixture of equimolar quantities of 4-hydroxy benzaldehyde with 3-aminomethyl pyridine in absolute ethanol under reflux to give the corresponding Schiff base [16]. The ^{1}H NMR spectra of Schiff base showed a signal at 8.5-8.6 ppm which confirmed the proton indicating the presence of azomethine group (-C*H*=N). The Schiff base (**1**) was etherified with different fatty alkyl bromides to give the corresponding Schiff base ethers **2a-j** that was indicated by the presence of a triplet at 3.96-4.01 ppm in ^{1}H NMR spectra. The synthesised Schiff base ethers were also characterized by FT-IR which showed the presence of C-O stretching frequency at 1039 cm^{-1}. Mass spectra of the synthesized Schiff base ethers showed characteristic molecular ions as indicated by their molecular formulae.

4. Conclusion

In the present study, we have focused on the synthesis and characterization of a series of 10 new (4-alkyloxybenzylidene)-pyridin-3-ylmethylamine-Schiff base ethers (**2a-j**) for the first time by employing a two step synthetic route. The synthesized molecules were thoroughly characterized using FT-IR, ^{1}H NMR, ^{13}C NMR and mass spectral studies. These molecules can find potential applications as anti-microbial and chemotheraupeutic agents.

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