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SYNTHESIS OF SYMMETRICAL/UNSYMMETRICAL 1-ALKYL-2-(((1-(1-ALKYL-1H-BENZIMIDAZOL-2-YL)ETHYL)THIO)METHYL)-1H-BENZIMIDAZOLE OF POTENTIAL PHARMACOLOGICAL INTEREST

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ABSTRACT
2-(1-chloroethyl)-1H-benzimidazole **1a** on condensation with 2-thiomethylbenzimidazole **2a** in methanol using triethylamine as a base under reflux for 3 hr yielded 2-((1-(1H-benzimidazol-2-yl)ethyl)thiomethyl)-1H-benzimidazole **3a** which on alkylation using two equivalents of alkylating agent under PTC conditions gave N,N^1-dialkylbisbenzimidazolesulphides **3b-e**. Using this synthetic strategy, N,N^1- unsymmetricallydialkylbisbenzimidazolesulphides **3f-q** were prepared by condensing 2-(1-chloroethyl)-1H-benzimidazole **1a** with N^1-alkyl-2-thiomethylbenzimidazole **2b-e** to obtain **3** followed by alkylation under PTC conditions.

Keywords: 2-thiomethylbenzimidazole, 2-(1-chloroethyl)-1-alkyl-1H-benzimidazole, K_2CO_3, triethylamine, bisbenzimidazolesulphides.

INTRODUCTION
Benzimidazoles and pyrazoles are important moieties in various natural and synthetic compounds and also in medicinal chemistry[I-IV]. Benzimidazole derivatives themselves play an important role with diverse types of pharmacological activities[V-VIII].

Abele et al reported[IX] that the reaction of 2-mercaptobenzimidazole with bis(chloromethyl)dimethylsilane in the two-phase catalytic system of solid K_2CO_3-18-crown-6-toluene gave tricyclic benzimidazole sulfides in 56 and 92% yields. Cecil et al studied[X] that the presence of a sulfur atom as a sulfide in drugs provides a greater stability to the three dimensional structure of the molecule. It is also reported that benzimidazole sulphide is capable of inhibiting gastric acid[XI] secretion *in vivo*. So in this connection, herein is reported the synthesis of sulphur containing benzimidazoles, more specifically those of unsymmetrical bisbenzimidazole sulphides, which are the heterocyclic deoxy analogues of the well-known anti-ulcer agent and the proton pump inhibitor – Omeprazole[XII].

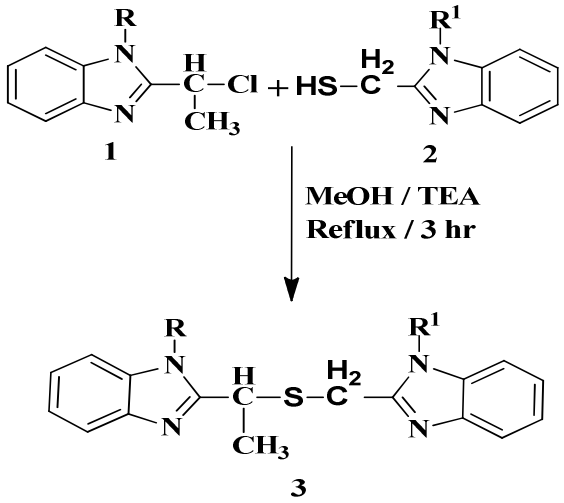
RESULTS AND DISCUSSION

2-(1-chloroethyl)-1H-benzimidazole **1a** (*i.e.*, **1**, R=H) on Condensation with 2-thiomethylbenzimidazole **2a** in methanol using triethylamine (TEA) as a base under reflux for 3 hr gave 2-((1-(1H-benzimidazol-2-yl)ethyl)thio)-1H-benzimidazole **3a**. **3a** on methylation using two equivalents of dimethylsulphate in dimethylformamide (DMF) as a solvent and K_2CO_3 as a base using tetrabutylammonium bromide (TBAB) as phase transfer catalyst (PTC) at RT for 3 hr gave N,N^1**-** dimethylbisbenzimidazolesulphide **3b**. Using this strategy, the reactions of **3a** was also performed with two equivalents of each of diethyl sulphate, benzyl chloride and n-butyl bromide to obtain N,N^1-diethylbisbenzimidazolesulphide **3c**, N,N^1**-** dibenzylbisbenzimidazolesulphide **3d** and N,N^1**-** dibutylbisbenzimidazolesulphide **3e** respectively**.** The structures of **3b-e** have been assigned on the basis of their spectral and analytical data. (Pl. see Experimental Section for details).

3b (*i.e.***, 3**, R=R^1=methyl) was also synthesized by condensing N-methyl-2-chloromethylbenzimidazole **1b** with 1-methyl-2-thiomethylbenzimidazole **2b** in methanol using triethylamine (TEA) as a base under refluxing conditions for 3 hr. Similarly, **3c**, **3d** and **3e** were also synthesized by the condensation of N-ethyl-2-thiomethylbenzimidazole **2c**, N-benzyl-2-thiomethylbenzimidazole **2d** and N-n-butyl-2-thiomethylbenzimidazole **2e** with the corresponding 2-(1-chloroethyl)-1-ethylbenzimidazole **1c**, 2-(1-chloroethyl)-1-benzylbenzimidazole **1d** and 2-(1-chloroethyl)-1-n-butylbenzimidazole **1e** respectively. The products obtained above have been found to be identical with reported sample with respect to m.p. and TLC.

Table I - Physical Data of the Synthesized Compounds **3a-e**

S.No.	Substrate	Alkylating agent	Product	Yield (%)	M.P (^{0}C)
1.	3	-	3a	84	289
2.	3	DMS	3b	82	283
3.	3	DES	3c	84	275
4.	3	$PhCH_2Cl$	3d	75	283
5.	3	n-BuBr	3e	68	256



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3a, R = R^1 = H
3b, R = R^1 = CH_3
3c, R = R^1 = C_2H_5
3d, R = R^1 = $PhCH_2$
3e, R = R^1 = n-Bu
3f, R = CH_3, R^1=C_2H_5
3g, R = CH_3, R^1= $PhCH_2$
3h, R= CH_3, R^1= n-Bu
3i, R = C_2H_5, R^1=CH_3
3j, R= C_2H_5, R^1= $PhCH_2$
3k, R= C_2H_5, R^1= n-Bu
3l, R= $PhCH_2$, R^1= CH_3
3m, R= $PhCH_2$, R^1= C_2H_5
3n, R= $PhCH_2$, R^1= n-Bu
3o, R= n-Bu, R^1= CH_3
3p, R= n-Bu, R^1= C_2H_5
3q, R= n-Bu, R^1= $PhCH_2$

Using this protocol, N,N^1-unsymmetrically disubstituted derivatives **3f-q** were prepared as follows:- Condensation of 2-(1-chloroethyl)-1-methylbenzimidazole **1b** with 2-thiomethylbenzimidazole **2a** gave **3r** followed by ethylation under PTC conditions gave **3f**. Similarly **3g** was synthesized by condensing 2-(1-chloroethyl)-1-methylbenzimidazole **1b** with 2-thiomethylbenzimidazole **2a** to obtain **3s** followed by benzylation under PTC conditions or by condensing 2-(1-chloroethyl)-1-H-benzimidazole **1a** with N-benzyl-2-thiomethylbenzimidazole **2d** to yield **3t** followed by methylation under PTC conditions. Direct condensation of 2-(1-chloroethyl)-1-methylbenzimidazole **1b** with N^1-benzyl-2-thiomethylbenzimidazole **2d** also gave **3g**. Following the same procedure other compounds were prepared. The structures of **3f-q** have been established on the basis of IR, ^{1}H-NMR and LC-MS (Q+1) Spectral data.

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Table II - Physical Data of the Synthesized Compounds **3f-q**

S.No.	Starting Materials Used		Product	Yield (%)	M.P (^{0}C)
1.	1b	2c	**3f**	79	>300
2.	1b	2d	**3g**	67	286
3.	1b	2e	**3h**	65	278
4.	1c	2b	**3i**	72	>300
5.	1c	2d	**3j**	64	272
6.	1c	2e	**3k**	66	282
7.	2d	1b	**3l**	60	258
8.	2d	1c	**3m**	66	>300
9.	2d	2e	**3n**	53	269
10.	2e	1b	**3o**	49	265
11.	2e	1c	**3p**	59	>300
12.	2e	2d	**3q**	68	255

EXPERIMENTAL SECTION

Melting points were determined in open capillaries in sulfuric acid bath and are uncorrected. Thin-layer chromatography (TLC) performed on precoated with silica gel glass plates GF-254. IR Spectra were recorded on Jasca FT-IR 5300. ^{1}H NMR were recorded in $CDCl_3$ / DMSO using Varian 400-MHz instrument, and Mass spectra were recorded on an Agilent LC-MS instrument giving only M^+ values in Q+1 mode.

Preparation of 3b-e from 3a (R=R^1=H)

A mixture of **3a** (0.14 g, 5 mmol), K_2CO_3 (1.3 g, 10 mmol), TBAB (10 mg), DMF (20 mL) and two equivalents of appropriate alkylating agent were stirred at RT for 3 hr. At the end of this period, the reaction mixture was poured into ice-cold water. The separated solid was filtered, washed with water (2×10 mL) and dried to obtain crude **3b-e** which on recrystallization from a suitable solvent gave pure **3b-e**.

1-methyl-2-((1-(1-methyl-1H-benzimidazol-2-yl)ethyl)methylthio)-1H-benzimidazole, 3b

IR (KBr): No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^{1}H- NMR (400 MHz, DMSO-d_6/ TMS): 1.75 (d, 3H, -$CHCH_3$), 4.74 (s, 2H, -CH_2), 3.74 (s, 3H, -NCH_3 of –$CHCH_3$Bz), 3.79 (s, 3H, -NCH_3 of -SBz), 3.89 (m, 1H, -$CHCH_3$), 6.76-7.59 (complex, m, 8H, aryl protons); MS (CI): m/z 337 [$M^{\cdot+}$+1].

1-ethyl-2-((1-(1-ethyl-1H-benzimidazol-2-yl)ethyl) methylthio)-1H-benzimidazole, 3c

IR (KBr): No diagnostic peak in IR region 3500 –3000 cm^{-1}, indicating absence of -NH group; ^{1}H- NMR (400 MHz, DMSO-d_6/ TMS): ð 1.18 (m, 2H, -NCH_2 of ethyl of – $CHCH_3$Bz), 1.55 (m, 2H, -NCH_2 of ethyl of -SBz), 1.64 (d, 3H, -$CHCH_3$), 3.75 (t, 3H, -CH_3 of ethyl of – $CHCH_3$Bz), 3.84 (m, 1H, -$CHCH_3$), 3.87 (s, 3H, -CH_3 of ethyl of -SBz), 4.78 (s, 2H, -CH_2), 6.55-7.63 (complex, m, 8H, aryl protons); MS (CI): m/z 365 [$M^{\cdot+}$+1].

1-benzyl-2-((1-(1-benzyl-1H-benzimidazol-2-yl)ethyl)methylthio)-1H-benzimidazole, 3d

IR (KBr): No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^{1}H- NMR (400 MHz, DMSO-d_6/ TMS): ð 1.68 (d, 3H, -$CHCH_3$), 3.92 (m, 1H, -$CHCH_3$), 4.68 (s, 2H, -NCH_2 of benzyl of – $CHCH_3$Bz), 4.82 (s, 2H, -CH_2), 5.25 (s, 2H, NCH_2 of benzyl of -SBz), 7.27-8.36 (complex, m, 18H, 10 aromatic benzyl + 8H aryl protons); MS (CI): m/z 489 [$M^{\cdot+}$+1].

1-(n-butyl)-2-((1-(1-(n-butyl)-1H-benzimidazol-2-yl)ethyl)methylthio)-1H-benzimidazole, 3e

IR (KBr): No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^{1}H- NMR (400 MHz, DMSO-d_6/ TMS): ð 1.26 (t, 2H, -NCH_2 of butyl of –$CHCH_3$Bz), 1.65 (m, 2H, -NCH_2CH_2 of butyl of – $CHCH_3$Bz), 1.70 (d, 3H, -$CHCH_3$), 2.54 (m, 2H, -$NCH_2CH_2CH_2$ of butyl of – $CHCH_3$Bz), 3.72 (t, 3H, -$NCH_2CH_2CH_2CH_3$ of butyl of – $CHCH_3$Bz), 1.45 (t, 2H, -NCH_2 of butyl of SBz), 1.79 (m, 2H, -NCH_2CH_2 of butyl of – SBz), 2.68 (m, 2H, -$NCH_2CH_2CH_2$ of butyl of – SBz), 3.92 (m, 1H, -$CHCH_3$), 3.85 (t, 3H, -$NCH_2CH_2CH_2CH_3$ of butyl of – SBz), 4.88 (s, 2H, -CH_2), 6.68-7.68 (complex, m, 8H, aryl protons),; MS (CI): m/z 421 [$M^{\cdot+}$+1].

Alternative Procedure for Preparation of 3b-e

A mixture of **1** (R=alkyl) (0.87 g, 5 mmol), **2** (R^1=alkyl) (0.95 g, 5 mmol), methanol (20 mL) and triethylamine (0.46 mL) was refluxed for 3 hr. At the end of this period, the reaction mixture was poured into ice-cold water. The separated solid was filtered, washed and dried to obtain crude **3b-e** which on recrystallization from a suitable solvent gave pure **3b-e**.

Preparation of 3f-q from 3 (R=H, R^1=alkyl) **/ 3** (R=alkyl, R^1=H) (**General Procedure**)

A mixture of **3** (R=H, R^1=alkyl)/ **3** (R=alkyl, R^1=H) (0.14 g, 5 mM), K_2CO_3 (1.6 g, 10 mM), TBAB (10 mg), DMF (20 mL) and alkylating agent (5 mM) were stirred at RT for 3 hr. At the end of this period, the reaction mixture was poured into ice-cold water. The separated solid was filtered, washed with water and dried to obtain crude **3f-q** which on recrystallization from ethyl acetate gave pure **3f-q**.

1-ethyl-2-((1-(1-methyl-1H-benzimidazol-2-yl)ethyl) methylthio)-1H-benzimidazole 3f
IR (KBr): No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^1H NMR(400 MHz, DMSO-d_6/ TMS): ð 3.65 (s, 3H, -NCH_3 of - $CHCH_3Bz$), 1.68 (m, 2H, -NCH_2 of ethyl of –SBz), 3.94 (t, 3H, - CH_3 of ethyl of –SBz), 6.65-7.64 (complex, m, 8H, aryl protons), 1.74 (d, 3H, -$CHCH_3$), 4.55 (s, 2H, -CH_2), 3.91 (m, 1H, -$CHCH_3$); MS (CI): m/z 351 [$M^{\cdot+}$+1].

1-benzyl-2-((1-(1-methyl-1H-benzimidazol-2-yl)ethyl) methylthio)-1H-benzimidazole 3g
IR (KBr): No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^1H- NMR (400 MHz, DMSO-d_6/ TMS): ð 3.70 (s, 3H, -NCH_3 of - $CHCH_3Bz$), 4.62 (s, 2H, -NCH_2 of benzyl of SBz), 7.22-8.58 (complex, m, 13H, 5H aromatic benzyl + 8H aryl protons), 1.65 (d, 3H, -$CHCH_3$), 3.85 (m, 1H, -$CHCH_3$), 4.65 (s, 2H, -CH_2),; MS (CI): m/z 413 $[M+H]^+$.

1-butyl-2-((1-(1-methyl-1H-benzimidazol-2-yl)ethyl)methylthio)-1H-benzimidazole 3h IR (KBr): No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^1H- NMR (400 MHz, DMSO-d_6/ TMS): ð 3.56 (s, 3H, -NCH_3 of - $CHCH_3Bz$), ð 1.32 (t, 2H, -NCH_2 of butyl of –SBz), 1.65 (m, 2H, -NCH_2CH_2 of butyl of –SBz), 2.54 (m, 2H, -$NCH_2CH_2CH_2$ of butyl of –SBz), 3.68 (t, 3H, -$NCH_2CH_2CH_2CH_3$ of butyl of –SBz), 6.69-7.68 (complex, m, 8H, aryl protons), 1.70 (d, 3H, -$CHCH_3$), 3.88 (qt, 1H, -$CHCH_3$), 4.63 (s, 2H, -CH_2),; MS (CI): m/z 379 [$M^{\cdot+}$+1].

1-ethyl-2-(1-((1-methyl-1H-benzimidazol-2-yl)methylthio)ethyl)-1H-benzimidazole 3i: IR (KBr): No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^1H- NMR (400 MHz, DMSO-d_6/ TMS): ð 1.54 (m, 2H, -NCH_2 of ethyl of - $CHCH_3Bz$), 3.76 (t, 3H, -CH_3 of ethyl of - $CHCH_3Bz$), 3.53 (s, 3H, -NCH_3 of -SBz), 4.78 (s, 2H, -CH_2),6.65-7.58 (complex, m, 8H, aryl protons), 1.69 (d, 3H, -$CHCH_3$), 3.78 (m, 1H, -$CHCH_3$); MS (CI): m/z 351 [$M^{\cdot+}$+1].

1-benzyl-2-((1-(1-ethyl-1H-benzimidazol-2-yl)ethyl)methylthio)-1H-benzimidazole 3j: No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^1H- NMR (400 MHz, DMSO-d_6/ TMS): ð 1.50 (m, 2H, -NCH_2 of ethyl of - $CHCH_3Bz$), 3.80 (t, 3H, -CH_3 of ethyl of - $CHCH_3Bz$), 4.65 (s, 2H, -NCH_2 of benzyl of SBz), 7.22-8.19 (complex, m, 13H, 5H aromatic benzyl + 8H aryl protons), 4.82 (s, 2H, -CH_2),1.79 (d, 3H, -$CHCH_3$), 3.85 (m, 1H, -$CHCH_3$); MS (CI): m/z 427 [$M^{\cdot+}$+1]

1-butyl-2-((1-(1-ethyl-1H-benzimidazol-2-yl)ethyl)methylthio)-1H-benzimidazole 3k: No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^1H- NMR (400 MHz, DMSO-d_6/ TMS): ð 1.55 (m, 2H, -NCH_2 of ethyl of - $CHCH_3Bz$), 3.80 (t, 3H, -CH_3

of ethyl of - $CHCH_3Bz$), 1.38 (t, 2H, -NCH_2 of butyl of –SBz), 1.68 (m, 2H, -NCH_2CH_2 of butyl of –SBz), 2.59 (m, 2H, -$NCH_2CH_2CH_2$ of butyl of –SBz), 4.80 (s, 2H, -CH_2), 3.72 (t, 3H, -$NCH_2CH_2CH_2CH_3$ of butyl of –SBz), 6.65-7.62 (complex, m, 8H, aryl protons), 1.82 (d, 3H, -$CHCH_3$), 3.96 (m, 1H, -$CHCH_3$); MS (CI): m/z 393 [$M^{\cdot+}$+1].

1-benzyl-2-(1-((1-methyl-1H-benzimidazol-2-yl) methylthio)ethyl)-1H-benzimidazole 3l: No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^{1}H- NMR (400 MHz, DMSO-d_6/ TMS): ð 4.85 (s, 2H, -NCH_2 of benzyl of - $CHCH_3Bz$), 3.70 (s, 3H, -NCH_3 of -SBz), 7.30-8.26 (complex, m, 13H, 5H aromatic benzyl + 8H aryl protons), 1.72 (d, 3H, -$CHCH_3$), 4.91 (s, 2H, -CH_2),3.88 (m, 1H, -$CHCH_3$); MS (CI): m/z 413 $[M+H]^+$.

1-benzyl-2-(1-((1-ethyl-1H-benzimidazol-2-yl) methylthio)ethyl)-1H-benzimidazole 3m: No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^{1}H- NMR (400 MHz, DMSO-d_6/ TMS): ð 4.82 (s, 2H, -NCH_2 of benzyl of - $CHCH_3Bz$), 1.60 (m, 2H, -NCH_2 of ethyl of -SBz), 3.90 (t, 3H, -CH_3 of ethyl of –SBz) 7.62-8.34 (complex, m, 13H, 5H aromatic benzyl + 8H aryl protons), 4.77 (s, 2H, -CH_2),1.65 (d, 3H, -$CHCH_3$), 3.98 (m, 1H, -$CHCH_3$); MS (CI): m/z 427 [$M^{\cdot+}$+1].

1-benzyl-2-(1-((1-butyl-1H-benzimidazol-2-yl) methylthio)ethyl)-1H-benzimidazole 3n: No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^{1}H- NMR (400 MHz, DMSO-d_6/ TMS): ð 4.82 (s, 2H, -NCH_2 of benzyl of - $CHCH_3Bz$), 1.35 (t, 2H, -NCH_2 of butyl of –SBz), 1.67 (m, 2H, -NCH_2CH_2 of butyl of –SBz), 2.56 (m, 2H, -$NCH_2CH_2CH_2$ of butyl of –SBz), 3.70 (t, 3H, -$NCH_2CH_2CH_2CH_3$ of butyl of –SBz), 6.62-7.62 (complex, m, 8H, aryl protons), 4.85 (s, 2H, -CH_2), 1.48 (d, 3H, -$CHCH_3$), 3.32 (m, 1H, -$CHCH_3$); MS (CI): m/z 455 [$M^{\cdot+}$+1].

1-butyl-2-(1-((1-methyl-1H-benzimidazol-2-yl) methylthio)ethyl)-1H-benzimidazole 3o: No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^{1}H- NMR (400 MHz, DMSO-d_6/ TMS): ð 1.35 (t, 2H, -NCH_2 of butyl of – $CHCH_3Bz$), 1.67 (m, 2H, -NCH_2CH_2 of butyl of – $CHCH_3Bz$), 2.56 (m, 2H, -$NCH_2CH_2CH_2$ of butyl of – $CHCH_3Bz$), 3.70 (t, 3H, -$NCH_2CH_2CH_2CH_3$ of butyl of – $CHCH_3Bz$), 4.88 (s, 2H, -CH_2),3.72 (s, 3H, -NCH_3 of -SBz), 6.62-7.62 (complex, m, 8H, aryl protons), 1.58 (d, 3H, -$CHCH_3$), 3.49 (m, 1H, -$CHCH_3$); MS (CI): m/z 379 [$M^{\cdot+}$+1]

1-butyl-2-(1-((1-ethyl-1H-benzimidazol-2-yl) methylthio)ethyl)-1H-benzimidazole 3p: No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^{1}H- NMR (400 MHz, DMSO-d_6/ TMS): ð 1.35 (t, 2H, -NCH_2 of butyl of – $CHCH_3Bz$), 1.67 (m, 2H, -NCH_2CH_2 of butyl of – $CHCH_3Bz$), 2.56 (m, 2H, -$NCH_2CH_2CH_2$ of butyl of – $CHCH_3Bz$), 3.70 (t, 3H, -$NCH_2CH_2CH_2CH_3$ of butyl of – $CHCH_3Bz$), 1.60 (m, 2H, -NCH_2 of ethyl of -SBz), 3.90 (t, 3H, -NCH_3 of ethyl of –SBz), 4.92 (s, 2H, -CH_2),6.62-7.62 (complex, m, 8H, aryl protons), 1.66 (d, 3H, -$CHCH_3$), 3.87 (m, 1H, -$CHCH_3$); MS (CI): m/z 393 [$M^{\cdot+}$+1].

1-benzyl-2-((1-(1-butyl-1H-benzimidazol-2-yl)ethyl) methylthio)-1H-benzimidazole 3q: No diagnostic peak in IR region 3500 – 3000 cm^{-1}, indicating absence of -NH group; ^{1}H- NMR (400 MHz, DMSO-d_6/ TMS): ð 1.35 (t, 2H, -NCH_2 of butyl of – $CHCH_3Bz$), 1.67 (m, 2H, -NCH_2CH_2 of butyl of – $CHCH_3Bz$), 2.56 (m, 2H, -$NCH_2CH_2CH_2$ of butyl of – $CHCH_3Bz$), 3.70

(t, 3H, -$NCH_2CH_2CH_2CH_3$ of butyl of – $CHCH_3Bz$), 4.79 (s, 2H, -CH_2),4.82 (s, 2H, -NCH_2 of benzyl of - SBz), 7.30-8.26 (complex, m, 13H, 5H aromatic benzyl + 8H aryl protons), 1.79 (d, 3H, -$CHCH_3$), 3.76 (m, 1H, -$CHCH_3$); MS (CI): m/z 455 [M^{+}+1].

Alternative route for preparation of 3f-q

A mixture of N-alkyl-2-chloromethylbenzimidazole (**1,** R=alkyl) (0.95 gr, 5 mmol), N-alkyl-2-mercaptobenzimidazole **2** (R^1=alkyl) (5 mM), in methanol using triethylamine (TEA) as a base under reflux for 3 hr. **3f-q** obtained above and found to be identical in m.p., m.m.p. and tlc with the corresponding derivatives prepared earlier in the route **3** (R=H, R^1=alkyl) / **3** (R=alkyl, R^1=H) to **3f-q**.

CONCLUSION

In conclusion, we have developed a mild and simple method for the synthesis of a variety of symmetrical/unsymmetrical substituted bisbenzimidazole sulphides which are having biologically active compounds.

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