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A FACILE SYNTHESIS OF 3-SUBSTITUTED-1-(3-CHLORO-4-(1*H*-PYRROL-1-YL) BENZENAMINESULFONYL) METHYL) BENZENES

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Reaction of 1-bromo-2-chloro-4-nitrobenzene with pyrrole gave 1-(2-chloro-4-nitrophenyl)-1*H*-pyrrole (**2**). This compound on reduction with iron in acetic acid gave 3-chloro-4-(1*H*-pyrrol-1-yl) benzenamine (**3**). 3-Substituted-1-(3-chloro-4-(1*H*-pyrrol-1-yl) benzenaminesulfonyl) methyl) benzenes (**4**a-e) were prepared from 3-chloro-4-(1*H*-pyrrol-1-yl) benzenamine by reaction with arylmethanesulfonyl chloride. The structural elucidation of these compounds was based on their IR, ^{1}H NMR and mass spectral data.

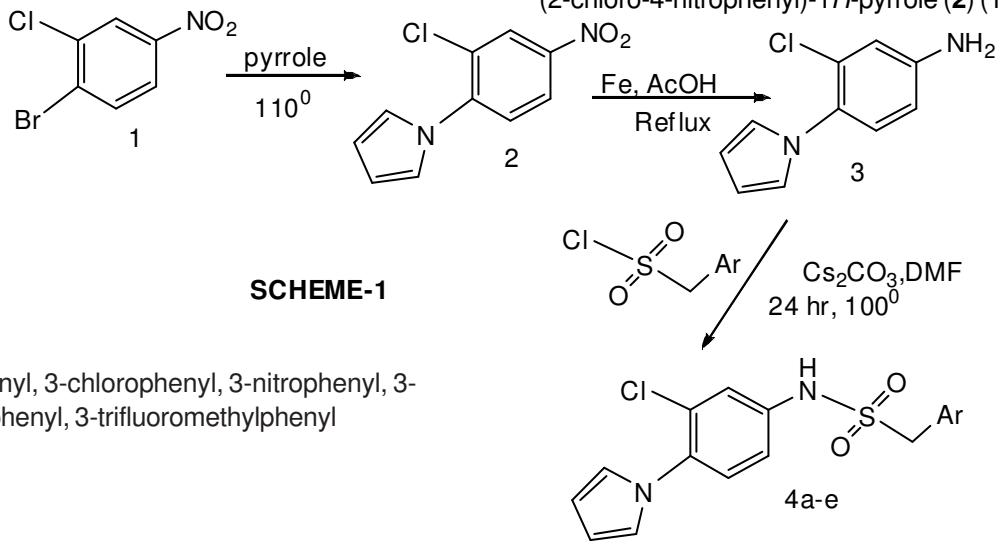
The synthesis of sulfonylcompounds has great interest as these compounds have shown anti-inflammatory, analgesic[1-3], antipyretic[4] and antibacterial activities[5]. The antineoplastic activity of some sulfonylhydrazones has also been reported[6]. Studies carried out by Barreiro *et al* have shown that sulfonylhydrazone derivatives of safrole have potent analgesic action, exceeding and/or equalling the potency observed under the same conditions for either dypirone or indomethacin[7].

The biological studies on sulfones revealed that they can be used in chemotherapy, agriculture, dyes and detergents[8]. Vinyl sulfones have been known for their synthetic utility in organic chemistry, easily participating in 1,4-addition reactions. This functional group has also recently been shown to be of potential for providing unique properties for drug design and medicinal chemistry[9]. Divinyl sulfones and hydroxydiethyl sulfones are used to give crease-resistant finishes, while other sulfones are used as fuel additives, plasticizers and antiicing additives[10]. On the other hand, pyrrole is an important structural attribute in many bioactive natural products[11], therapeutic compounds[12], new organic materials[13] and in biological processes[14].

This paper describes the synthesis of 1-((3-chloro-4-(1*H*-pyrrol-1-yl) benzenaminesulfonyl) methyl) benzenes, in a search for antibactericidal and / or antinociceptive lead compounds.

3-Chloro-4-(1*H*-pyrrol-1-yl) benzenamine (3)

Iron powder (1eq) was added to the solution of 1-(2-chloro-4-nitrophenyl)-1*H*-pyrrole (**2**) (1 eq) in acetic



SCHEME-1

Ar=phenyl, 3-chlorophenyl, 3-nitrophenyl, 3-bromophenyl, 3-trifluoromethylphenyl

Table-1
Characterization data of 4a-4e

Compd	Ar	M.P. (^{0}C)	Yield (%)
3	-	248	76
4a	Phenyl	268	72
4b	3-Chlorophenyl	264	68
4c	3-Nitrophenyl	252	69
4d	3-Bromophenyl	254	70
4e	3-Trifluoromethylphenyl	276	68

acid (1:1) and refluxed for 1 hr at 110^0. Reaction mixture was cooled, filtered and poured onto crushed ice, basified with 50% NaOH and extracted with ethylacetate. ^{1}H NMR ($CDCl_3$) : 8.32 (d, 2H), 7.81 (d, 2H), 6.82 (d, 1H), 6.71 (d, 1H), 6.52 (d, 1H), 3.5 (brs, 2H). Mass : m/z 193 (M+H).

1-((3-Chloro-4-(1*H*-pyrrol-1-yl) benzenaminesulfonyl) methyl) benzene (4a)

Benzylsulfonyl chloride (1.2 eq) was added to the solution of compound **3** (0.3g) and Cs_2CO_3 (3eq) in dry DMF (10 ml) and stirred for 18 hr at 100^0. Reaction mixture was diluted with water and extracted with ethyl acetate and dried over anhyd $MgSO_4$ and concentrated. Purified the product by column chromatography, silica gel (100-200 mesh) by using 40% ethyl acetate in hexane as an eluent. ^{1}H NMR (DMSO-d_6): 8.52 (s, 1H), 8.41 (d, 2H), 8.12 (d, 2H), 7.95 (brs, 1H), 7.58 (s, 1H), 7.4-7.2 (m, 3H), 7.1 (s, 1H), 6.92 (s, 1H), 6.61 (s, 1H), 4.22 (s, 2H). Mass : m/z 347 [M+H].

3-Chloro-1-((3-chloro-4-(1*H*-pyrrol-1-yl) benzenaminesulfonyl) methyl) benzene (4b)

^{1}H NMR (DMSO-d_6): 8.55 (s, 1H), 8.45 (d, 2H), 8.16 (d, 2H), 8.00 (brs, 1H), 7.65 (s, 1H), 7.4-7.2 (m, 2H), 7.00 (s, 1H), 6.92 (s, 1H), 6.71 (s, 1H), 7.25 (s, 2H). Mass : m/z 382 [M+H].

3-Nitro-((3-chloro-4-(1*H*-pyrrol-1-yl) benzenaminesulfonyl) methyl) benzene (4c)

^{1}H NMR (DMSO-d_6): 8.28 (s, 1H), 8.42 (d, 2H), 8.18 (d, 2H), 7.95 (brs, 1H), 7.69 (s, 1H), 7.3-7.1 (m, 2H), 7.95 (s, 1H), 6.85 (s, 1H), 6.70 (s, 1H), 4.30 (s, 2H). Mass : m/z 392 [M+1].

3-Bromo-((3-chloro-4-(1*H*-pyrrol-1-yl) benzenaminesulfonyl) methyl) benzene (4d)

^{1}H NMR (DMSO-d_6): 8.50 (s, 1H), 8.45 (d, 2H), 8.21 (d, 2H), 7.90 (brs, 1H), 7.6 (s, 1H), 7.2-7.1 (m, 2H), 6.90 (s, 1H), 6.81 (s, 1H), 6.70 (s, 1H), 4.28 (s, 2H). Mass : m/z 426 (M+1).

3-Trifluoromethyl-1-((3-chloro-4-(1*H*-pyrrol-1-yl) benzenaminesulfonyl) methyl) benzene (4e)

^{1}H NMR (DMSO-d_6): 8.45 (m, 1H), 8.38 (d, 2H), 8.20 (d, 2H), 7.91 (brs, 1H), 7.75 (s, 1H), 7.3-7.1 (m, 2H), 6.95 (s, 1H), 6.80 (s, 1H), 6.71 (s, 1H), 4.25 (s, 2H). Mass : m/z 415 [M+1].

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