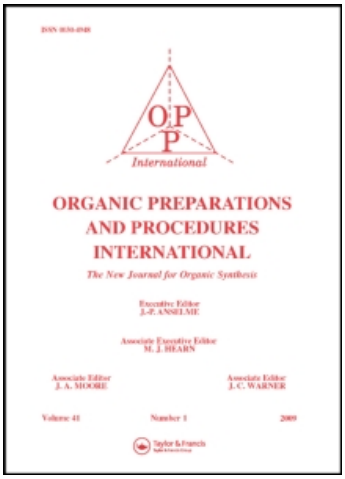

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A TWO-STEP PREPARATION OF 1-BENZYLPYRAZOLE-2-^{15}N

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ether. The combined organic solutions were washed successively with 5% aq. NaOH solution (3 x 100 mL), 5% HCl (3 x 100 mL), 5% $NaHCO_3$ solution (3 x 100 mL) and finally with 100 mL of saturated aq. NaCl solution. The resulting solution was dried and evaporated to give a yellow solid which turned brick red in light. Consequently, the product was kept in the dark and recrystallized (C_6H_6) to give 0.8 g (81%) of a yellow powder, mp. 202-203° (dec), lit.[3] mp. 202-203° (dec); IR (KBr) υ_{max}: 1675 (C=O), 2800, 2950-3000 cm^{-1} [C(O)H]; ^1H NMR ($DCCl_3$): δ 7.46-8.58 (9 H, m, Ar-H), 10.16 [1 H, s, C(O)H].

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A TWO-STEP PREPARATION OF 1-BENZYLPYRAZOLE-2-^{15}N

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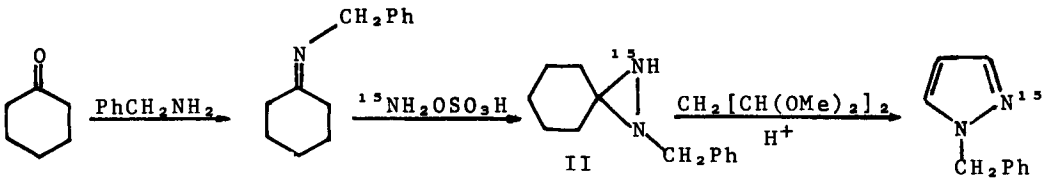
Recently an N-benzylpyrazole with a ^{15}N-label in a known position was needed. Although mono ^{15}N-labelled pyrazole is potentially readily prepared from commercially available hy-

drazine-1-^{15}N hydrate, alkylation would yield a mixture of the 1-alkylpyrazole-1-^{15}N and 1-alkylpyrazole-2-^{15}N. Clearly, similar problems would attend the alkylation of the labelled hydrazine and subsequent conversion of the product to the pyrazole. However, the preparation of 1-benzylhydrazine-1- or -2-^{15}N was attractive because of the high yield of the 1-alkylpyrazole obtainable from 1-benzylhydrazine and malondialdehyde diacetal.[1]

Our failure to aminate benzylamine by the reported procedure,[2] prompted us to utilize the treatment of an imine with hydroxylamine-O-sulphonic acid[3] to give a diaziridine (e.g. II) followed by hydrolysis.[4] In this case it was more economical to use the hydroxylamine as the labelled reactant. Cyclohexanone was converted into 1-benzyl-1,2-diazaspiro[2,5]octane (II) in one step[3] in 68% yield by the use of longer reaction time than previously reported.[4]



The similarity of the conditions required for the hydrolysis of the diaziridine[4] and the formation of the pyrazole from malondialdehyde diacetal permitted the isolation of 87% yield of 1-benzylpyrazole-2-^{15}N (III) from the N-benzyldiaziridine II in a one-pot reaction. The labelled pyrazole was obtained in a 44% overall yield from hydroxylamine-^{15}N-hydrochloride and had ^{15}N-nmr. ($CDCl_3$) with δ_{N_1} -168.617 and δ_{N_2} -74.433 ppm from CD_3NO_2. It seems likely that other specifically ^{15}N-

labelled N-alkylpyrazoles could be obtained by this route, including compounds of the type 1-alkylpyrazole-1-^{15}N for which the starting materials would be labelled amine and unlabelled hydroxylamine.

EXPERIMENTAL SECTION

1-Benzyl-1,2-diazaspiro[2,5]octane-2-^{15}N (II).- Six grams of hydroxylamine-O-sulphonic acid [prepared in 88% yield from hydroxylamine-^{15}N hydrochloride by the method reported starting from hydroxylamine sulphate[5]] was added portionwise to a stirred solution of benzylamine (34 g) and cyclohexanone (10.4 g) in 200 ml. of water at 5-10°. Stirring was continued for 1 hr and the mixture was left to stand in a refrigerator overnight. The cold solution was then extracted with ether (4 x 100 ml), the extract was dried (K_2CO_3) and the solvent removed. The residue was distilled at 0.25 mm Hg and the fraction, bp. 100-110°, was purified by chromatography on silica gel with diethyl ether to give 7.3 g. (68%) 1-benzyl-1,2-diazaspiro[2,5]octane-2-^{15}N. ν_{max} (liq.): 3220 cm^{-1} (NH), NMR, δ (CCl_4): 7.26 (5H, m, Ph), 3.81 (2H, s, N·CH_2·) and 1.58 (11H, m, 1H exchanged on addition of D_2O, NH and C_6H_{10}).

Anal. Calcd for $C_{13}H_{18}N_2$: C, 77.2; H, 8.9; N, 13.9.
Found: C, 76.9; H, 9.25; N, 13.4.

1-Benzylpyrazole-2-^{15}N (III).- 1,1,3,3-Tetramethoxypropane (7.95 g, 48 mmoles) was added to a solution of 8.9 g (44 mmoles) of 1-benzyl-1,2-diazaspiro[2,5]octane in 60 ml of 10% hydrochloric acid and the mixture left to stand at room temperature for 1 hr. The volatile organic materials were then removed under reduced pressure. The cold acidic residue was

washed with ether, basified with aqueous sodium hydroxide and extracted with ether. The ethereal extract yielded 6.05 g. (87%) of 1-benzylpyrazole-2-^{15}N, bp. 77-80°/0.5 mm, lit.,[1] bp. 255-257°/750 mm.

NMR (CCl_4): δ 5.2 (2H, s, CH_2), 6.17 (1H, t, 4-H), 7.2 (6H, m,5-H and Ph), and 7.37 (1H, d, J=2 Hz,3-H); δ_N ($CDCl_3$) - 74.433 (2-N) and - 168.617 ppm (1-N).

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SYNTHESIS OF A NOVEL ASARONE DIMER

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It has been recently claimed[1] that asarone (I), the main constituent of Guatteria goumeri, a plant used in southeast Mexico for the treatment of gallstones, has potentially useful