The
BIOCHEMICAL JOURNAL

REVIEWS 1989

Edited by P. J. England

The *Biochemical Journal* has published reviews on broad topics of general interest to biochemists and scientists in related disciplines since 1982. These reviews have proved extremely successful and popular (one classic review was one of the most-cited papers of the last decade) and with the aim of making them readily available even to those who do not subscribe to the journal it was decided to produce an annual compilation of all the reviews published in the previous year. This is the first such volume. The 23 reviews published in 1989 covered a wide range of molecular and cellular biochemistry, from fundamental chemical enzymology via the intricacies of signal transduction mechanisms through to cell biology and whole-animal metabolism. *Biochemical Journal* reviews are intended for research scientists, but are written in such a way as to be intelligible to the non-specialist who wishes to learn about progress in other areas. They are thus ideally suited as material both for teaching staff and for senior students.

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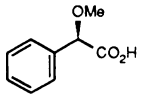
Chiral Derivatizing Reagents

Chiral derivatizing reagents are useful for determining the enantiomeric purity of a wide variety of compounds, usually by NMR analysis. Also, suitable derivatives often find preparative utility via chromatographic resolutions. These reagents have been applied to the analysis of alcohols (including primary alcohols with an α-chiral center), diols, amino alcohols, amines, amino acids, etc. Some examples are described below.



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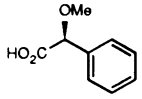
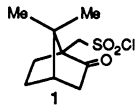


2

Resolution of a propynylamine[1] and of a diol in the synthesis of erythronolide A;[2] NMR analysis of the configuration of the bis-nor-Wieland-Miescher ketone.[3]

(1) Nisson, B.N.; Hacksell, V. *Acta Chem. Scand. Ser. B* **1988**, *B42*, 55. (2) Corey, E.J. *et al. J. Am. Chem. Soc.* **1979**, *101*, 7131. (3) Trost, B.M.; Curran, D.P. *Tetrahedron Lett.* **1981**, *22*, 4929.

24,896-7 (*R*)-(-)-α-Methoxyphenylacetic acid, 99% (1) 1g $27.80
24,898-3 (*S*)-(+)-α-Methoxyphenylacetic acid, 99% (2) 1g $27.80



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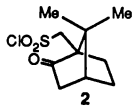
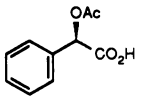


2

Suitable for use with D- and L-amino acids,[1] carbinols and amines.[2]

(1) Furukawa, H.; Sakakibara, F.; Kamei, A.; Ito, K. *Chem. Pharm. Bull.* **1975**, *23*, 1625. (2) Hoyer, G.A. *et al. Tetrahedron Lett.* **1972**, 985.

21,957-6 (+)-10-Camphorsulfonyl chloride, 97% (1) 5g $11.50; 25g $38.20 100g $105.40
30,194-9 (-)-10-Camphorsulfonyl chloride, 97% (2) 5g $21.80; 25g $73.60



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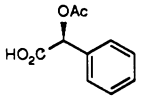
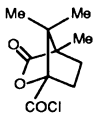


2

Direct resolution of an amino acid,[1] resolution of aryl methyl[1] and β-amino alcohols;[2] NMR assay of alcohols in the presence of an ester functionality.[3]

(1) Ramalingam, D. *et al. Tetrahedron* **1988**, *44*, 5597. (2) Parker, D.; Taylor, R.J. *ibid.* **1987**, *43*, 5451. (3) Batmangerlich, S.; Davidson, A.H. *Chem. Commun.* **1985**, *20*, 1399.

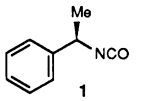
25,303-0 (*R*)-(-)-*O*-Acetylmandelic acid, 99% (1) 5g $23.30
25,302-2 (*S*)-(+)-*O*-Acetylmandelic acid, 99% (2) 5g $23.30



Resolving agent for 2,6-disubstituted bicyclo[3.3.1]nonanes[1]; used for the optical assay of an amino alcohol[2] in a bicyclic sultam.[3]

(1) Gerlach, H. *Helv. Chim. Acta* **1978**, *61*, 2793. (2) William, R.M.; Sinclair, P.J.; Zhai, D.; Chen, D. *J. Am. Chem. Soc.* **1988**, *110*, 1547. (3) Vandewalle, M.; Van der Eycken, J.; Oppolzer, W.; Vulliod, C. *Tetrahedron* **1986**, *42*, 4035.

22,617-3 (1*S*)-(-)-Camphanic chloride, 98% 1g $21.90; 5g $91.10



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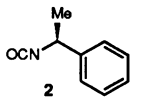

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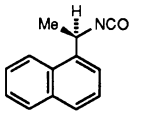

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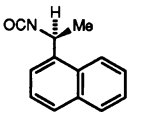
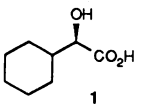


4

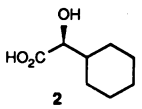
Reagents for HPLC resolution of tertiary amines;[1] absolute-configuration analysis of dialkyl glycerols[2] and the antimalarial (+)-primaquine;[3] resolving agent for alcohols, α-hydroxy esters and thiols.[4]

(1) Maibaun, J. *J. Chromatogr.* **1988**, *436*, 269. (2) Sonnet, P.E. *et al. ibid.* **1988**, *436*, 205. (3) Yu, Q.S.; Brossi, A.; Plippen-Anderson, J.L. *FEBS Lett.* **1987**, *221*, 325. (4) Pirkle, W.H.; Simmons, K.A.; Boeder, C.W. *J. Org. Chem.* **1979**, *44*, 4891.

22,057-4 (*R*)-(+)-α-Methylbenzyl isocyanate, 99% (1) 1g $18.20; 5g $59.20
22,056-6 (*S*)-(-)-α-Methylbenzyl isocyanate, 99% (2) 1g $18.20; 5g $59.20
22,044-2 (*R*)-(-)-1-(1-Naphthyl)ethyl isocyanate, 98% (3) 250mg $14.75 1g $41.20
29,595-7 (*S*)-(+)-1-(1-Naphthyl)ethyl isocyanate, 99% (4) 250mg $14.00 1g $39.30



1

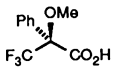


2

Used for the analysis of valine derivatives.

Goodman, M. *et al. Bioorg. Chem.* **1974**, *3*, 184.

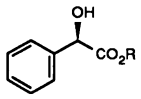
30,114-0 (*R*)-(-)-Hexahydromandelic acid, 98% (1) 1g $16.20
30,115-9 (*S*)-(+)-Hexahydromandelic acid, 98% (2) 1g $16.20



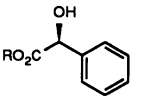
Resolution and assay of alcohols and amines. Stable toward racemization under acidic and basic conditions.

Dale, J.A.; Mosher, H.S. *J. Am. Chem. Soc.* **1973**, *95*, 512.

31,803-5 (*S*)-(-)-α-Methoxy-α-(trifluoromethyl)phenylacetic acid, 99+% 250mg $17.90; 1g $49.00



1, R = Me
3, R = Et

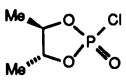


2, R = Me
4, R = Et

Versatile reagents for the NMR assay and resolution of carboxylic acids, alcohols, amines,[1] amino alcohols[2] and thiols.[3]

(1) Parker, D. *J. Chem. Soc., Perkin Trans. 2* **1983**, 83. (2) Kashima, C.; Harada, K.; Omote, Y. *J. Chem. Soc., Perkin Trans. 1* **1987**, 1495. (3) Klemisch, W.; Von Hodenberg, A. *Chromatogr. Commun.* **1985**, *8*, 37.

25,155-0 Methyl (*R*)-(-)-mandelate, 99+% (1) 1g $7.40; 5g $29.50
25,154-2 Methyl (*S*)-(+)-mandelate, 99+% (2) 1g $7.40; 5g $29.50
30,998-2 Ethyl (*R*)-(-)-mandelate, 99% (3) 5g $20.00; 25g $65.50
30,997-4 Ethyl (*S*)-(+)-mandelate, 99% (4) 5g $20.00; 25g $65.50



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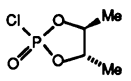

2

Derivatizing agents for the enantiomeric assay of alcohols and amines by ^{31}P-NMR.

Anderson, R.C.; Shapiro, M.J. *J. Org. Chem.* **1984**, *49*, 1304. Johnson, C.R.; Elliott, R.C.; Penning, D. *J. Am. Chem. Soc.* **1984**, *106*, 5019.

27,567-0 (4*R*,5*R*)-(+)-2-Chloro-4,5-dimethyl-1,3,2-dioxaphospholane-2-oxide, 98% (1) 250mg $28.80 1g $90.60
30,854-4 (4*S*,5*S*)-(-)-2-Chloro-4,5-dimethyl-1,3,2-dioxaphospholane-2-oxide, 98% (2) 250mg $29.10 1g $100.10

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