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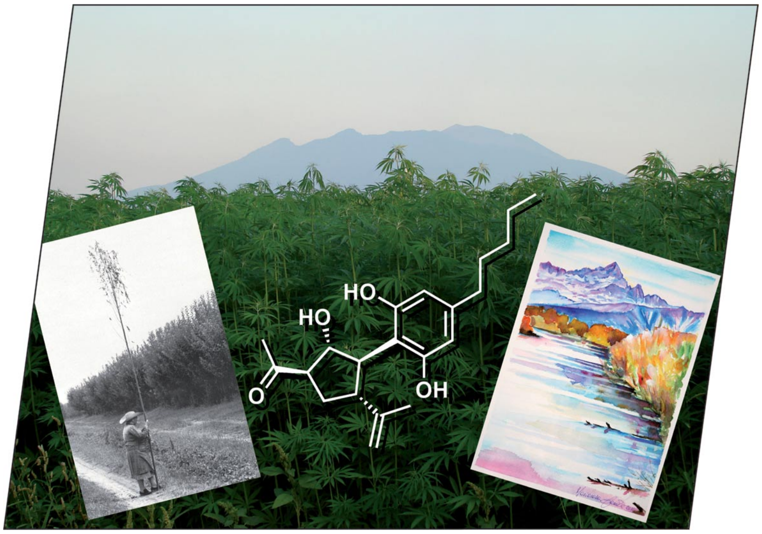
COVER PICTURE

The cover picture shows the formula of cannabimovone, a cannabinoid with a rearranged terpenoid skeleton isolated from an industrial strain of hemp derived from the old Italian variety Carmagnola. The trade of this exceptionally tall plant (up to 5–6 m, see picture on the left) from the homonymous Piedmontese town at the foot of the Monviso mountain (see the painting at the right) to Marseille in France was at the origin of the French revolutionary song and dance *la Carmagnole*. The picture shows the cultivation of Carmagnola hemp at the foot of the Vesuvio, exemplifying the collaboration between the Italian groups from Campania and Piedmont who report the discovery of cannabimovone on p. 2067ff. The authors acknowledge Mrs. Maria Rosa Gaude for the painting, Assocanapa (Carmagnola) and Dr. Nicola Ghietti for the pictures and their help, and Dr. Alberto Massarotti for the cover page design.



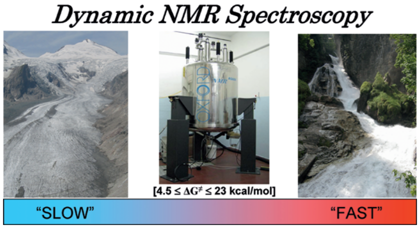
MICROREVIEW

Dynamic NMR

D. Casarini, L. Lunazzi,
A. Mazzanti* 2035–2056

Recent Advances in Stereodynamics and Conformational Analysis by Dynamic NMR and Theoretical Calculations

Keywords: NMR spectroscopy / Density functional calculations / Conformation analysis / Atropisomerism / Molecular motions



This review covers recent advances in stereodynamic analysis by variable-temperature NMR (also known as dynamic NMR) and the theoretical support to this analysis offered by theoretical calculation. The papers on stereodynamics presented here cover the most frequent conformational processes occurring in organic chemistry: ring inversion, restricted rotation, nitrogen inversion and multiple motions.

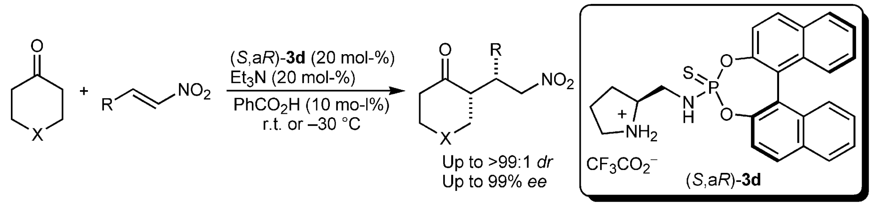
SHORT COMMUNICATIONS

Asymmetric Michael Addition

A. Lu, R. Wu, Y. Wang,* Z. Zhou,*
G. Wu, J. Fang, C. Tang 2057–2061

Chiral Thiophosphoramidate-Catalyzed Asymmetric Michael Addition of Ketones to Nitro Olefins

Keywords: Diastereoselectivity / Enantioselectivity / Michael addition / Asymmetric catalysis / Organocatalysis



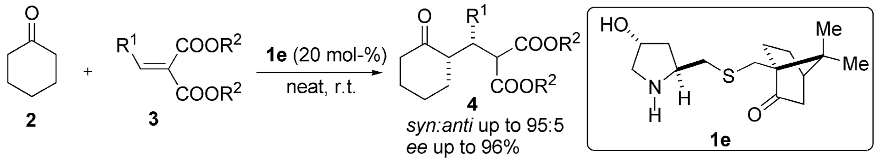
A novel chiral (thio)phosphoramidate functions well as an efficient bifunctional organocatalyst for the asymmetric Michael addition of ketones to nitro olefins to afford the corresponding synthetically valuable γ-nitro ketones in good to excellent yields with high levels of diastereo- and enantioselectivities (up to >99:1 *dr* and 99% *ee*).

Organocatalytic Conjugate Addition

D. R. Magar, C. Chang, Y.-F. Ting,
K. Chen* 2062–2066

Highly Enantioselective Conjugate Addition of Ketones to Alkylidene Malonates Catalyzed by a Pyrrolidinyl–Camphor-Derived Organocatalyst

Keywords: Michael addition / Lactones / Diesters / Organocatalysis / Enantioselectivity / Ketones

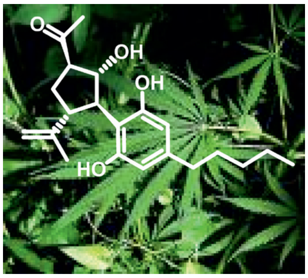


Highly enantio- and distereoselective conjugate addition of various ketones to alkylidene malonates by pyrrolidinyl–camphor derived organocatalyst **1e** proceeded smoothly to provide the corresponding Michael adducts in high chemical yields (up to 95%) with high levels of enantioselectivities (up to 96% *ee*) and diastereoselectivities (up to >99:1 *dr*).

FULL PAPERS

Natural Products

A nonpsychotropic variety of *Cannabis sativa* L. afforded cannabimovone, a new type of cannabinoid characterized by a rearrranged terpenoid skeleton and a biological profile similar to that of cannabidiol. Attempts to prepare cannabimovone from cannabidiol gave only the intramolecular oxy-Michael adduct of the crotonized natural product, a compound with a biological profile similar to that of THC.



O. Taglialatela-Scafati,* A. Pagani,
F. Scala, L. De Petrocellis, V. Di Marzo,
G. Grassi, G. Appendino* 2067–2072

Cannabimovone, a Cannabinoid with a Rearranged Terpenoid Skeleton from Hemp

Keywords: Hemp / Phytocannabinoids / Aldol reactions / Biomimetic synthesis / Cannabinoid receptors / Terpenoids

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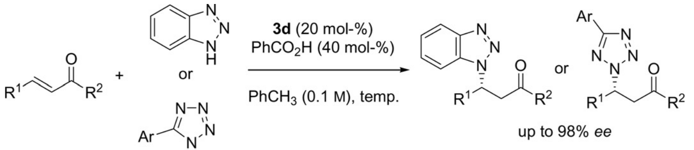
Asymmetric Catalysis



A procedure for enantioselective organocatalytic conjugate additions of a variety of N-heterocycles to α,β-unsaturated enones is presented. The reactions are efficiently catalyzed by 9-amino-9-deoxy-epiquinine (**3d**) salts. Cyclic, acyclic, and aromatic enones and 1*H*-benzotriazole or 5-phenyltetraole derivatives can be used, giving addition products in high yields and with good enantioselectivities.

J. Lv, H. Wu, Y. Wang* 2073–2083

Organocatalytic Enantioselective aza-Michael Additions of N-Heterocycles to α,β-Unsaturated Enones

Keywords: Asymmetric catalysis / Organocatalysis / Nitrogen heterocycles / aza-Michael addition

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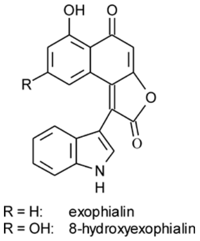
Natural Products

A new type of indole alkaloids, containing an aromatic pentaketide moiety has been isolated from cultures of the black yeast-like fungus *Exophiala dermatitidis* upon cultivation on a medium containing tryptophan as sole amino acid. While the wild-type strain produces exophialin, the mutant Mel-1 generates 8-hydroxyexophialin, suggesting that exophialin originates partially from 2-hydroxyjuglone.



B. L. J. Kindler, H.-J. Krämer, S. Nies,
P. Gradicsky, G. Haase, P. Mayser,
M. Spiteller, P. Spiteller* 2084–2090

Generation of Indole Alkaloids in the Human-Pathogenic Fungus *Exophiala dermatitidis*

Keywords: Alkaloids / Fungi / Melanin / Natural products / Mycosis

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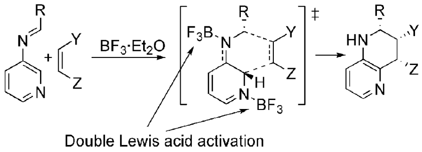
N-Pyridylaldimine Povarov Reactions

Computational and experimental studies indicate that the modified aza-Povarov reactions between *N*-(3-pyridyl)aldimines and olefins take place by an asynchronous concerted process through *endo* transition states to give tetrahydro-1,5-naphthyridine derivatives with three stereocenters in a regio- and stereoselective manner.



F. Palacios,* C. Alonso, A. Arrieta,
F. P. Cossío,* J. M. Ezpeleta, M. Fuertes,
G. Rubiales 2091–2099

Lewis Acid Activated Aza-Diels–Alder Reaction of *N*-(3-Pyridyl)aldimines: An Experimental and Computational Study

Keywords: Povarov reaction / Cycloaddition / Imines / Alkenes / Heterocycles / Aldimines

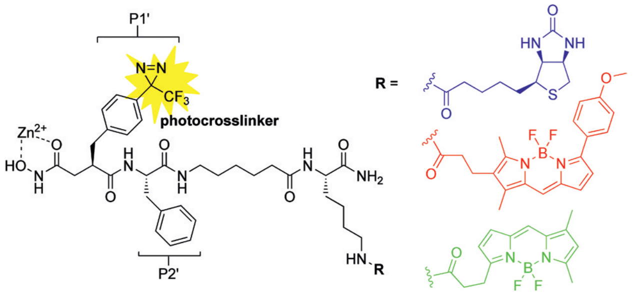
CONTENTS

Photocrosslinking Metalloproteases

P. P. Geurink, T. Klein, L. Prèly, K. Paal, M. A. Leeuwenburgh, G. A. van der Marel, H. F. Kauffman, H. S. Overkleeft,* R. Bischoff* 2100–2112

Design of Peptide Hydroxamate-Based Photoreactive Activity-Based Probes of Zinc-Dependent Metalloproteases

Keywords: Metalloenzymes / Activity-based profiling / Photoaffinity labeling / Diazirine / Alkylation / Diastereoselectivity



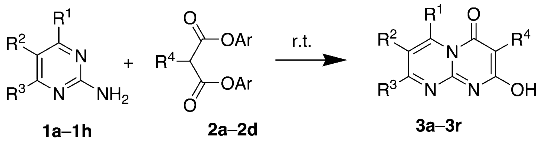
The development of photoactivatable activity-based probes and their use in the visualization of active metalloproteases is described.

Heterocyclic Chemistry

M. Güllü,* A. Dinçsönmez, Ö. Özyavaş 2113–2120

Facile Synthesis of Novel Pyrimido[1,2-*a*]pyrimidin-4-ones from Highly Reactive Malonates

Keywords: Nitrogen heterocycles / Fused-ring systems / Cyclization / Condensation / Malonates



Ar = 2,4,6-$C_6H_2Cl_3$

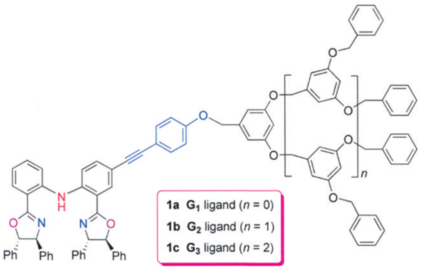
A very simple and efficient procedure for the synthesis of novel 2-hydroxy-4*H*-pyrimido[1,2-*a*]pyrimidin-4-ones is described. Title compounds were obtained from the room temperature reaction of 2-aminopyrimidine and its derivatives with bis(2,4,6-trichlorophenyl) malonates. High yields were observed under optimized conditions. The reaction was conducted with a range of phenyl malonates.

Dendrimer-Immobilized Ligands

H. Liu, D.-M. Du* 2121–2131

Immobilization of Diphenylamine-Linked Bis(oxazoline) Ligands and Their Application in the Asymmetric Friedel–Crafts Alkylation of Indole Derivatives with Nitroalkenes

Keywords: Immobilization / Dendrimers / Heterocycles / Friedel–Crafts reaction / Alkylation



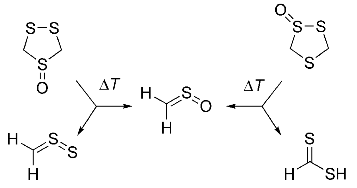
The diphenylamine-linked bis(oxazoline) ligand was immobilized onto Fréchet-type dendrimers and a C_3-symmetric core structure. The immobilized ligands showed similar catalytic reactivities and enantioselectivities in the asymmetric Friedel–Crafts alkylation of indole derivatives with nitroalkenes. The catalyst loading can be reduced by an in situ recycling process.

Sulfur Heterocycles

G. Mloston,* J. Romanski, M. L. McKee, H. P. Reisenauer, P. R. Schreiner* 2132–2137

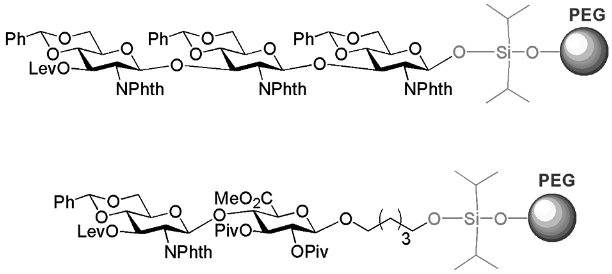
Thermal Reactions of Regioisomeric 1,2,4-Trithiolane *S*-Oxides

Keywords: Flash pyrolysis / Matrix isolation / Sulfur heterocycles / Thiocarbonyl compounds / Thiocarbonyl *S*-oxides



Regioisomeric *S*-oxides, derived from the parent 1,2,4-trithiolane, undergo thermal cycloreversion reactions in the gas phase following different reaction mechanisms. The experimental results are discussed in the light of computed data.

Oligosaccharide Synthesis



The combined use of a diisopropylsiloxane linker and trichloroacetimidate glycosyl donors is an attractive approach for the polyethylene-glycol-supported synthesis of oligosaccharides. Following this strategy, we have successfully prepared the trisaccharide repeating unit of *Neisseria meningitidis* capsule (serogroup L) and the disaccharide containing the structural motif of hyaluronic acid.

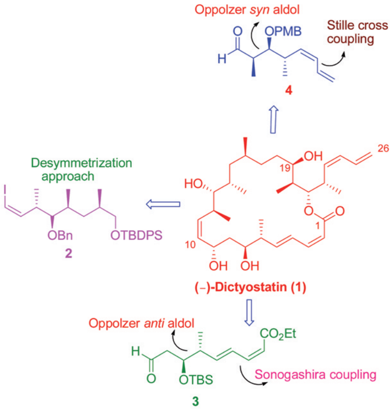
M. Mar Kayser, J. L. de Paz,*
P. M. Nieto* **2138–2147**

Polymer-Supported Synthesis of Oligosaccharides Using a Diisopropylsiloxane Linker and Trichloroacetimidate Donors

Keywords: Carbohydrates / Glycosylation / Oligosaccharides / Solid-phase synthesis

Desymmetrization Strategy

Three key subunits of (−)-dictyostatin have been synthesized in a highly stereoselective manner. A desymmetrization approach and Oppolzer *syn* and *anti* aldol protocols were successfully used to install the stereogenic centers. The *E* and *Z* diene systems were established by Takai olefination, Sonogashira coupling, Stork's protocol, and Stille cross-coupling.



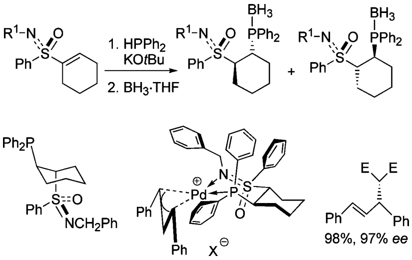
J. S. Yadav,* V. Rajender **2148–2156**

Studies Directed Towards the Total Synthesis of (−)-Dictyostatin

Keywords: Aldol reactions / Natural products / Cross coupling / Stereoselective synthesis

Asymmetric Allylic Alkylation

The phospha-Michael reaction of alkenyl sulfoximines gave phosphanyl sulfoximines which function as 1,5-N,P ligands for the Pd atom. The bidentate coordination of the Pd^{II} atom induces a conformational change of the cyclic ligand, which was revealed by NMR spectroscopy. The Pd-catalyzed allylic alkylation of the malonate anion with 1,3-diphenylallyl actate gave the corresponding malonate with 97% *ee.*



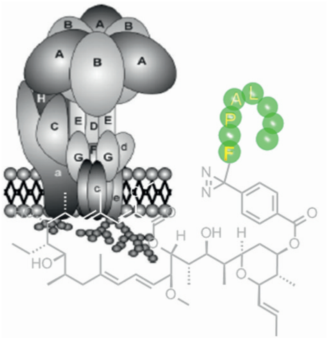
F. Lemasson, H.-J. Gais,* J. Runsink,
G. Raabe **2157–2175**

Synthesis of Phosphanyl Sulfoximines Through Phospha-Michael Reaction of Alkenyl Sulfoximines and Their Evaluation as Chiral Bidentate 1,5-N,P Ligands for Palladium in Asymmetric Allylic Alkylation

Keywords: Palladium / Alkylation / Asymmetric allylic alkylation / Sulfoximine / Phospha-Michael reaction

Fluorous Photoaffinity Labels (F-PAL)

Combination of the concepts of photoaffinity labelling (PAL) and fluorous chromatography led to the development of new (perfluoroalkyl)diazirines. Labelled derivatives of concanamycin and bafilomycin showed inhibitory activity in binding studies with the V-ATPase holoenzyme. The advantages of the new fluorous labels (F-PAL) will add to more efficient ligand target binding investigations.



N. Burkard, T. Bender, J. Westmeier,
C. Nardmann, M. Huss, H. Wieczorek,
S. Grond,*
P. von Zezschwitz* **2176–2181**

New Fluorous Photoaffinity Labels (F-PAL) and Their Application in V-ATPase Inhibition Studies

Keywords: Bafilomycin / Concanamycin / Fluorous chromatography / Perfluorinated reagents / Photoaffinity labeling / V-ATPase inhibitors

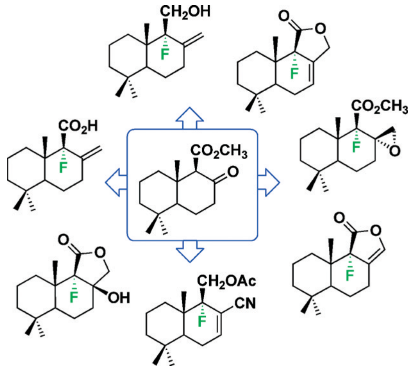
CONTENTS

Fluorinated Antifeedant Terpenoids

A. Abad,* C. Agulló, A. C. Cuñat, A. González-Coloma, D. Pardo ... 2182–2198

Preparation of 9α-Fluorinated Sesquiterpenic Drimanes and Evaluation of Their Antifeedant Activities

Keywords: Natural products / Terpenoids / Fluorine / Total synthesis / Biological activity



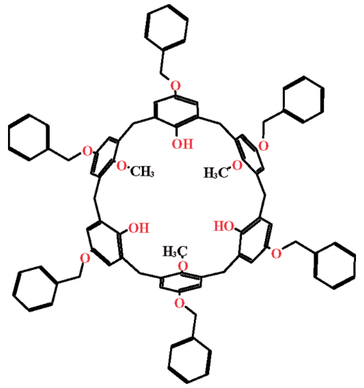
The preparation of a number of 9α-fluoro analogues of both natural and unnatural drimane-type sesquiterpenes is described. The paper also presents a comparative study of the antifeedant activities of a selection of the 9α-fluorodrimanes prepared and the corresponding hydrogen analogues against several insect species with different feeding ecologies.

Functionalized Calix[6]arenes

V. Huc,* V. Guérineau 2199–2205

C_{3v} (Trimethyl) *p*-(Benzyloxy)calix[6]arene: A Versatile Platform for the Synthesis of Functionalized C_{3v} Calix[6]arenes

Keywords: Calixarenes / Alkylation / Quinones / Macrocycles



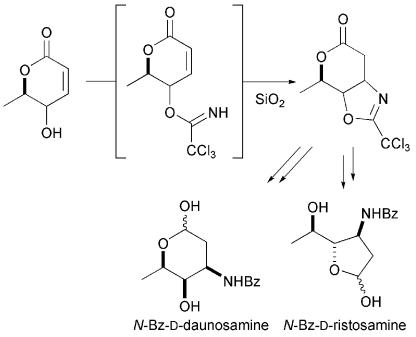
The synthesis of the C_3v-trimethylated and C_2v-tetrametylated derivatives of *p*-(benzyloxy)calix[6]arene is described for the first time. The synthesis of a whole set of new functional derivatives is also described. Oxidation with hypervalent iodine reagents results in the one-step formation of calix(quinones). These new calixarenes hold great promise for the synthesis of new receptors.

Intramolecular Conjugate Addition

Y. Matsushima,* J. Kino 2206–2211

Synthesis of *N*-Bz-Protected D-Daunosamine and D-Ristosamine by Silica Gel Promoted Intramolecular Conjugate Addition of Trichloroacetimidates obtained from Osmundalactone and Its Epimer

Keywords: Nucleophilic addition / Heterocycles / Natural products / Amino sugars



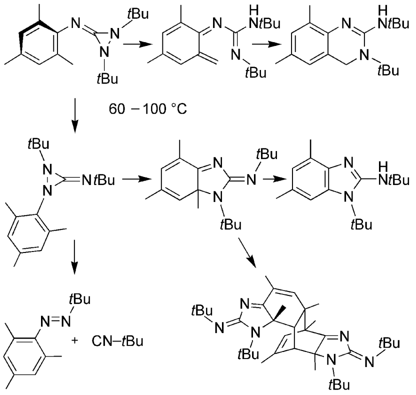
Trichloroacetimidates, which are prepared from osmundalactone and its epimer, unexpectedly undergo silica gel promoted stereoselective intramolecular conjugate addition to produce the oxazolines in excellent yields. The novel, simple synthesis of *N*-Bz-protected D-daunosamine and D-ristosamine from these oxazolines is described.

Pericyclic Cascade Reactions

H. Quast,* K.-H. Ross, G. Philipp 2212–2217

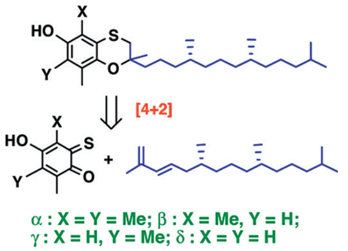
Thermal Rearrangements of (Arylimino)diaziridines by Simultaneous Cascades of Pericyclic Reactions

Keywords: Domino reactions / Nitrogen heterocycles / Diaziridines / Ring expansion / Sigmatropic rearrangement



Depending on the substituents of the aryl rings, thermal rearrangements of (arylimino)diaziridines yield 3-amino-2*H*-indazoles, 2-amino-1*H*-benzimidazoles, 2-imino-2,3-dihydro-3a*H*-benzimidazoles, 2-amino-3,4-dihydroquinazolines, and isocyanides plus azo compounds.

A practical hetero-Diels–Alder approach, that exploits the ability of *o*-TQs to react with 1,3-dienes with complete control of the regio and chemoselectivity, has been applied to the synthesis of (2-*ambo*, 4′*R*,8′*R*)-α/β/γ/δ-4-thiatocopherol. The activity of these efficient multi-defence antioxidants has been measured and rationalized using natural tocopherols as model compounds.



S. Menichetti,* R. Amorati, M. G. Bartolozzi, G. F. Pedulli, A. Salvini, C. Viglianisi 2218–2225

A Straightforward Hetero-Diels–Alder Approach to (2-*ambo*,4′*R*,8′*R*)-α/β/γ/δ-4-Thiatocopherol

Keywords: Vitamins / Tocopherols / Sulfur heterocycles / Antioxidant / Cycloaddition

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* Author to whom correspondence should be addressed.

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