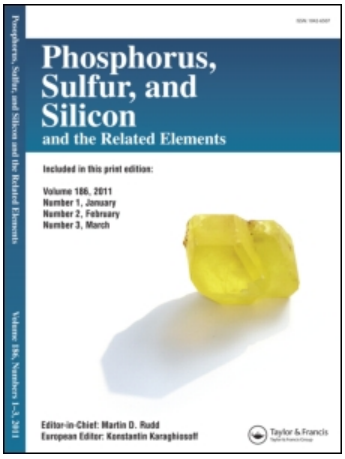


Phosphorus, Sulfur, and Silicon and the Related Elements
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713618290

Yeast-Mediated Regio- and Stereoselective Reduction of Dialkyl 2,4-Dioxy-4-substituted Butanephosphonates

Ke Wang[a]; Jinfeng Li[a]; Zuyi Li[a]; Chengye Yuan[a]
[a] Chinese Academy of Science, China

Online publication date: 27 October 2010

To cite this Article Wang, Ke , Li, Jinfeng , Li, Zuyi and Yuan, Chengye(2002) 'Yeast-Mediated Regio- and Stereoselective Reduction of Dialkyl 2,4-Dioxy-4-substituted Butanephosphonates', Phosphorus, Sulfur, and Silicon and the Related Elements, 177: 8, 2223 — 2224
To link to this Article: DOI: 10.1080/10426500213446
URL: http://dx.doi.org/10.1080/10426500213446

Phosphorus, Sulfur and Silicon, 2002, Vol. 177:2223–2224

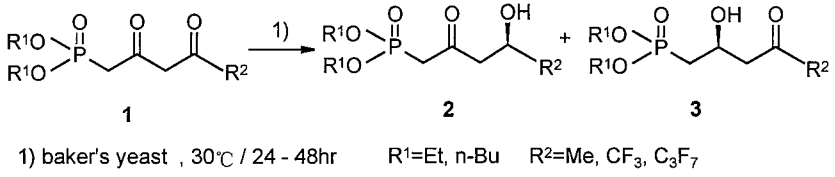
1042-6507/02 $12.00 + .00
DOI: 10.1080/10426500290095313

YEAST-MEDIATED REGIO- AND STEREOSELECTIVE REDUCTION OF DIALKYL 2,4-DIOXY-4-SUBSTITUTED BUTANEPHOSPHONATES

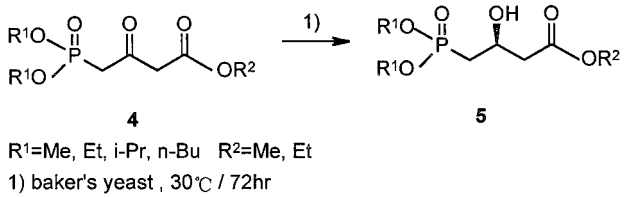
Ke Wang, Jinfeng Li, Zuyi Li, and Chengye Yuan
Chinese Academy of Science, China

(Received July 29, 2001; accepted December 25, 2001)

A series of phosphorus-based carbonyl compounds, namely, dialkyl 2,4-dioxy-4-substituted butane phosphonates (**1**), was prepared by reaction of carbanion resulted from 2-methyl-2-oxoethane phosphonate with substituted acetates. Bioreduction of **1** by baker's yeast at 30°C for 24–48 h usually offered an isomeric mixture); when R^1 is methyl, the isomeric mixture of **2** and **3** in 45 and 24 yield as well as 92% and 80% ee value respectively. It is interesting to note that when R^2 is CF_3 or C_3F_7, a regio- and stereoselective reduction was observed. Thus, only 2 was obtained in 54–67% yield and 90–94% ee value.



SCHEME 1



SCHEME 2

The project supported by the National Natural Science Foundation of China (NNSFC) Grants Number 20072052 and 29832050.

Address correspondence to Chengye Yuan, Shanghai Institute of Organic Chemistry, Chinese Academy of Science, 345 Lingling Lu, Shanghai 200032, China.

On the other hand, dialkyl 2,4-dioxy-4-alkoxy-butanephosphonates (**4**) constitute another class of diketo-phosphonates, in which carboxylate and phosphonate groups are located in the same molecule and separated by a carbonyl group. Our experimental results demonstrated that upon this bio-reduction, (R)-hydroxy derivatives (**5**) were isolated in medicate, 46–77% chemical yield and 50–85% ee value.