Chinese Chemical Letters Vol. 11, No. 3, pp. 217–218, 2000

An Improved Synthesis of the Natural Product Isorhapontigenin

Lian QIAN, Zhi Song PIAO, Lin WANG*,Zhi Zhong ZHAO

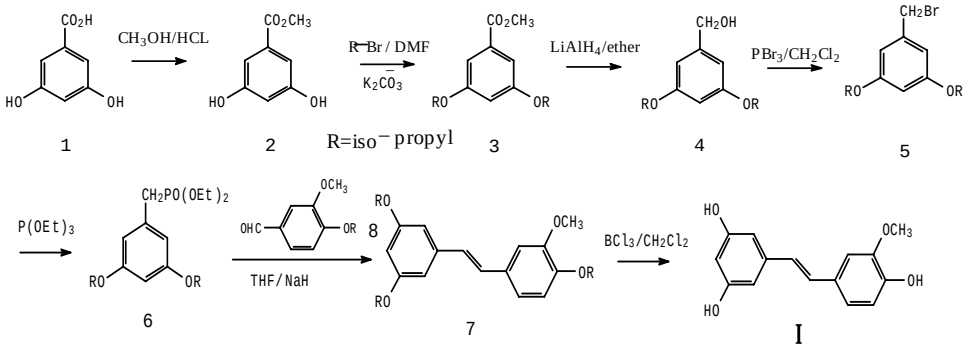
Institute of Materia Medica, Peking Union Medical Collage &
Chinese Academy of Medical Sciences, Beijing 100050

Abstract: We have developed an alternative route to synthesize the natural product, isorhapotogenin . The synthetic product was characterized by IR and ^{1}H-NMR in comparison with the corresponding natural product.

Keywords: Total synthesis , isorhapontigenin .

Isorhapontigenin (Ⅰ) is a natural product with many biological activities , M . Lin *et al* first isolated it from the traditional Chinese herb, *G.parvifolium* [1]. The total synthesis of (Ⅰ) has been reported[2] using *W*itting reaction and TMS as the protecting group, the reaction gives both *E* and *Z*-stilbene, In an attempt to obtain enough sample of (Ⅰ) for screening its bioactivities, we have developed an alternative synthetic route to prepare isorhapontigenin through a 7 steps reaction sequence [3]. However, the final deprotecting step is hard to operate and the yield is low. Herein we designed another route [4] as shown in **scheme 1**. Isopropyl groups were used to protect phenolic groups in stead of benzyl groups and finally, the deprotection of isopropyl groups were carried out by BCl_3 .

Scheme 1 The synthetic route of isorhapontigenin



Starting from 3,5-dihydroxybenzoic acid **1**, the compound **2** was prepared in good yield by esterification, followed by protection of phenolic groups as iso-propyl ether

(compound **3**). Subsequent reduction by $LiAlH_4$ to give compound **4**, through bromination and phosphonation , we obtained compound **6**.

Compound **6** reacted with the protected aldehyde **8** using *W*ittig-*H*orner reaction to give the precursor **7**. Finally, the protective iso-propyl groups were removed by BCl_3 at 0℃ under nitrogen. The product (**Ⅰ**) was purified by column chromatography and characterized by IR , TLC and ^{1}H-NMR. The spectral date were identical with that of the corresponding natural product .

Acknowledgment

We are grateful to Professor M. Lin, who kindly provided the natural product .

References and Notes

1. J. B. Li , M. Lin,*et al* . ,*Yao Xue Xue Bao*.,**1991**, *26*, 437.
2. E. Reimann ,*Liebigs Ann. Chem.*,**1971**,*750*,109.
3. Y. B. Feng, L. Wang,*et al* . , *Chinese Chem. Lett.*, **1998**, *9* (11) ,1003.
4. M. T. Gill, R. Bajaj, *et al* . , *J. Nat. Prod*,. **1987**, *50* (1) ,36.
5. For compound **7**, mp 67-68℃; ^{1}H-NMR,300MHz, DMSO-d_6 δ ppm: 7.189 (s,1H,4'-H), 7.040 (d,1H,J=8.7Hz,6-H), 6.921 (d,1H,J=8.7Hz,5-H), 6.666 (d,2H,J=2.1Hz,2',6'H) , 6.295 (s,1H,2-H), 4.596 (m,3H,-CH-Me_2), 3.786 (s ,3H, OCH_3), 1.246 (d,12H,J=6Hz, CH_3-3',5') ,1.234 (d,6H,J=6Hz, CH_3 –4) 7.148 , 6.998 , each 1H (d,J=16.5Hz, α , β -H); elemental analysis: $C_{24}H_{32}O_4$, calcd. C: 74.97%, H 8.39%, found C 74.87%, H 8.42% For compound Ⅰ, mp 195-197℃ (mp 180-183℃[1] ; 183-185℃[3]) ; IR (KBr) 3327 (broad), 1608, 1518, 955, 847. H-NMR , 300MHz CD_3COCD_3-d_6 δ ppm: 7.192 (d,1H, J=1.8Hz,2'-H), 6.982 (dd,1H,J=8.1Hz,1.8Hz,6'- H) , 6.792 (d,1H,J=8.1Hz,5'-H), 6.510 (d,2H,J=2.1Hz,2,6-H), 6.240 (t,1H,J=2.1Hz,4-H) , 6.996, 6.888, each 1H (d,J=16.5Hz α , β -H) , 8.423 (s, 2H, 3,5-OH, D_2O exchangeable) , 7.879 (s, 1H, 4'-OH , D_2O exchangeable) , 3.877 (s,1H,3'-OCH_3) its spectrum data and TLC is identical with the corresponding natural product.

Received 9 October 1999