# Fischer carbene catalysis of alkynol cycloisomerization: Application to the synthesis of the altromycin B disaccharide

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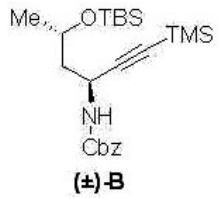
## SUPPORTING INFORMATION

$^{1}$H and $^{13}$C NMR spectra of new compounds (part 2)

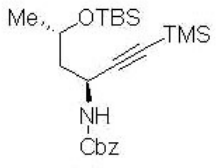
$^1$H NMR of compound **(±)-B** ($CDCl_3$, 600 MHz)




**(±)-B**

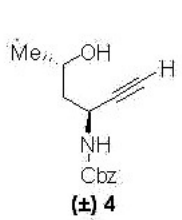



$^{13}$C NMR of compound **(±)-B** ($CDCl_3$, 150 MHz)




**(±)-B**

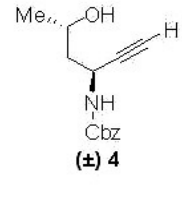
$^1$H NMR of compound **(±)-4** ($CDCl_3$, 400 MHz)




**(±) 4**

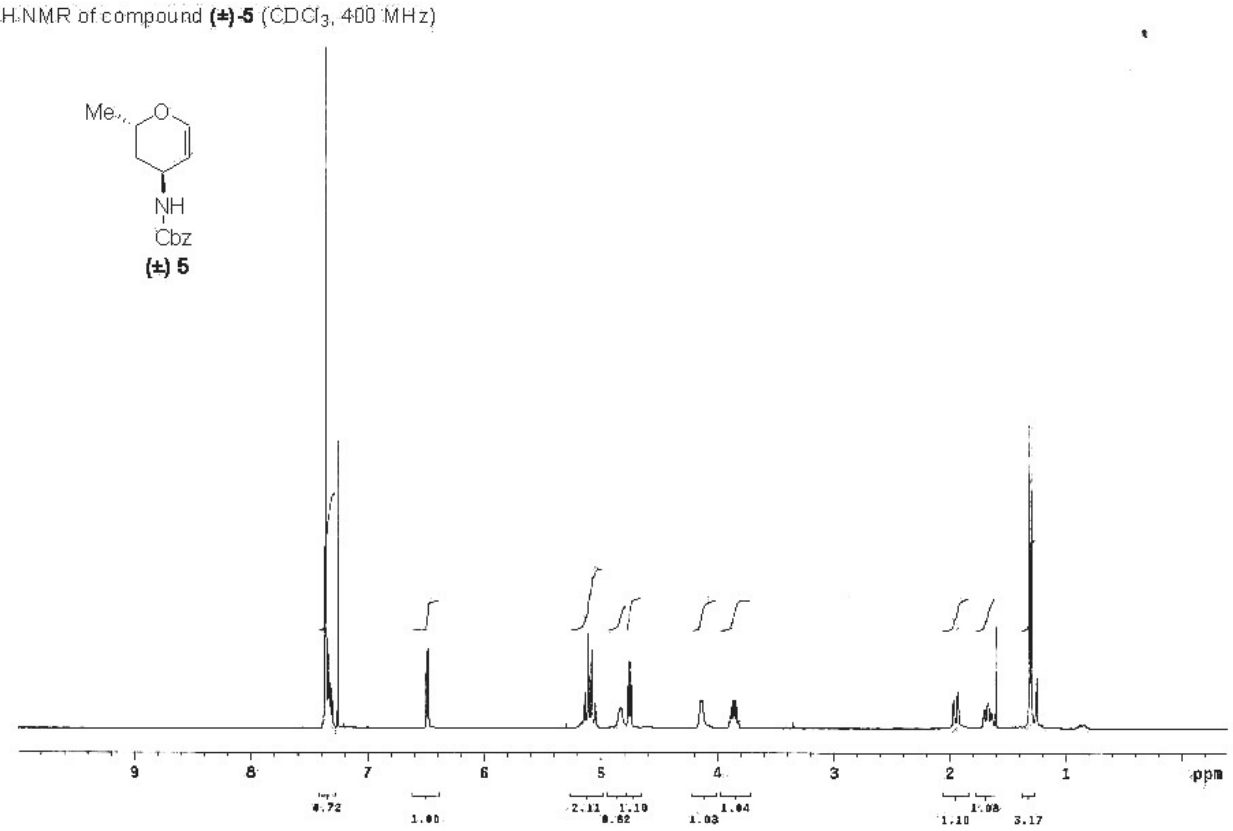



$^{13}$C NMR of compound **(±)-4** ($CDCl_3$, 100 MHz)

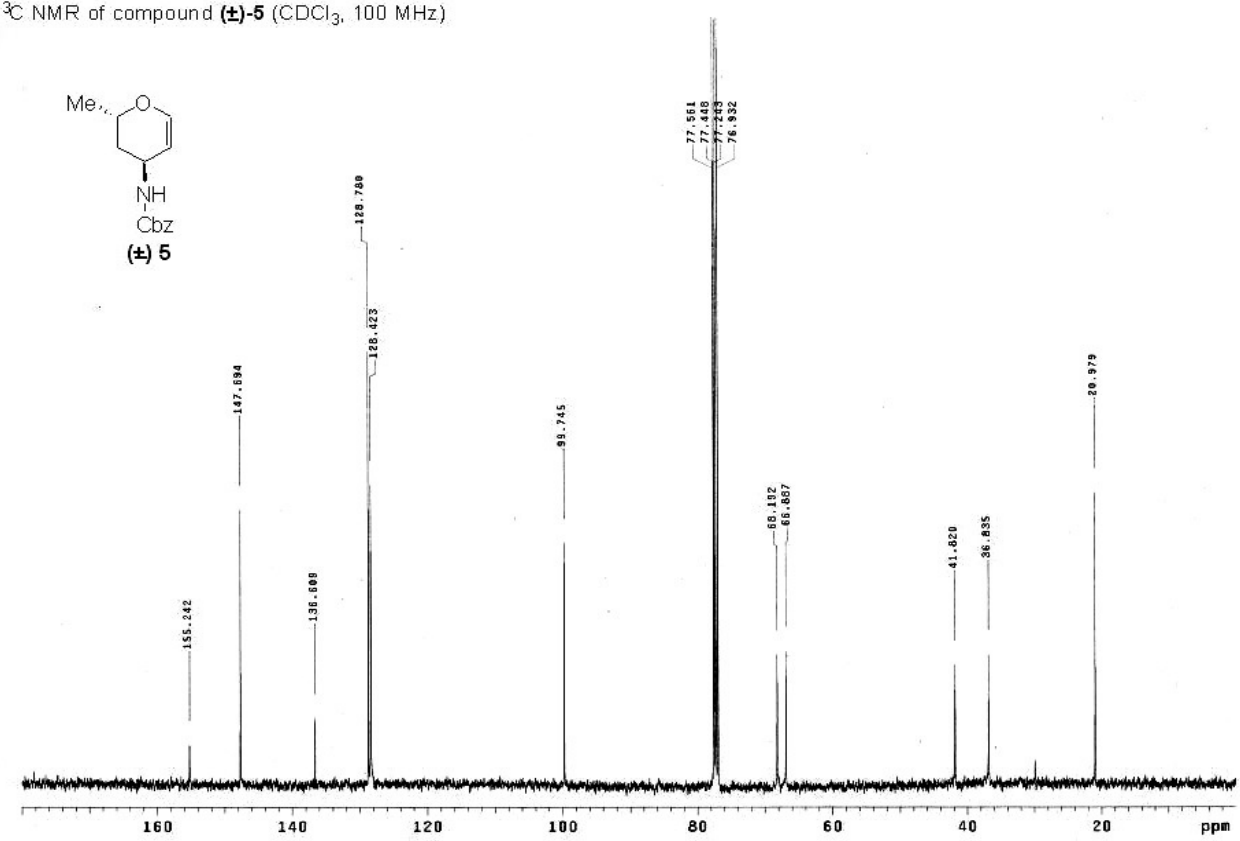



**(±) 4**

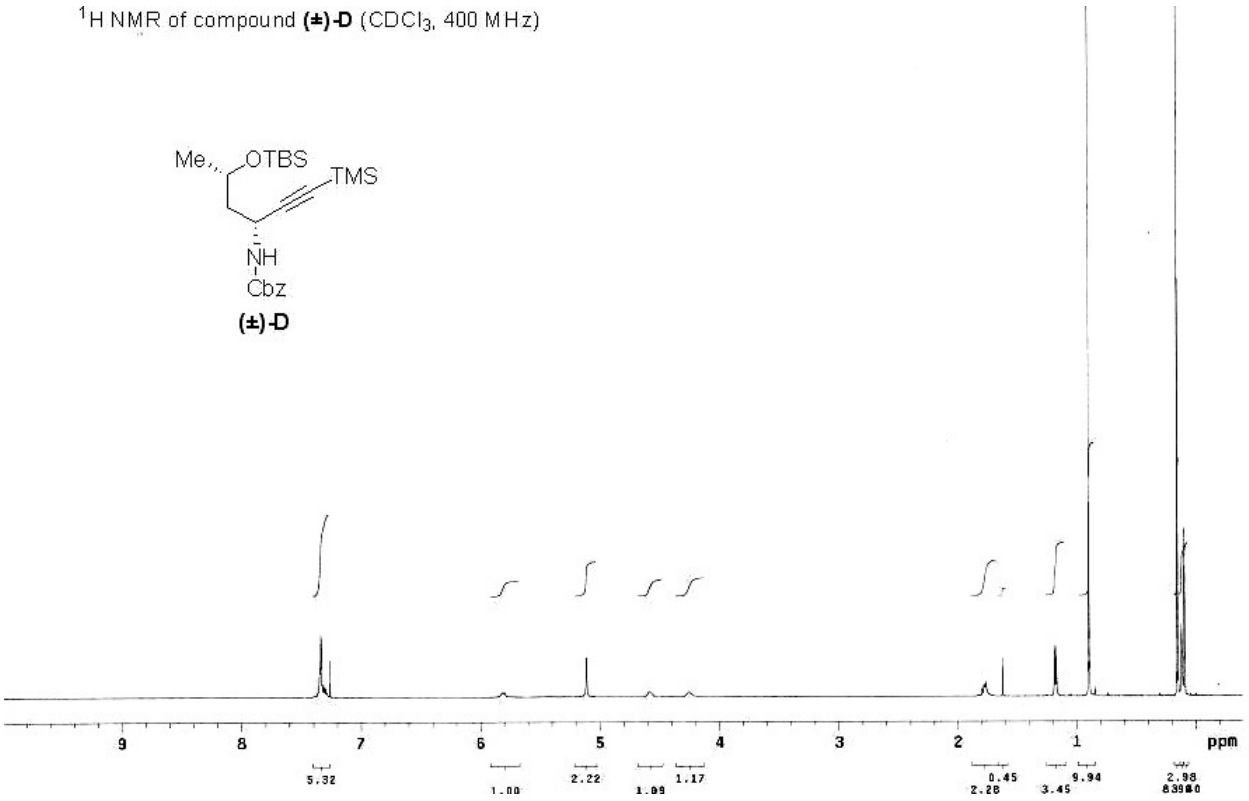
$^1$H NMR of compound **(±)-5** ($CDCl_3$, 400 MHz)



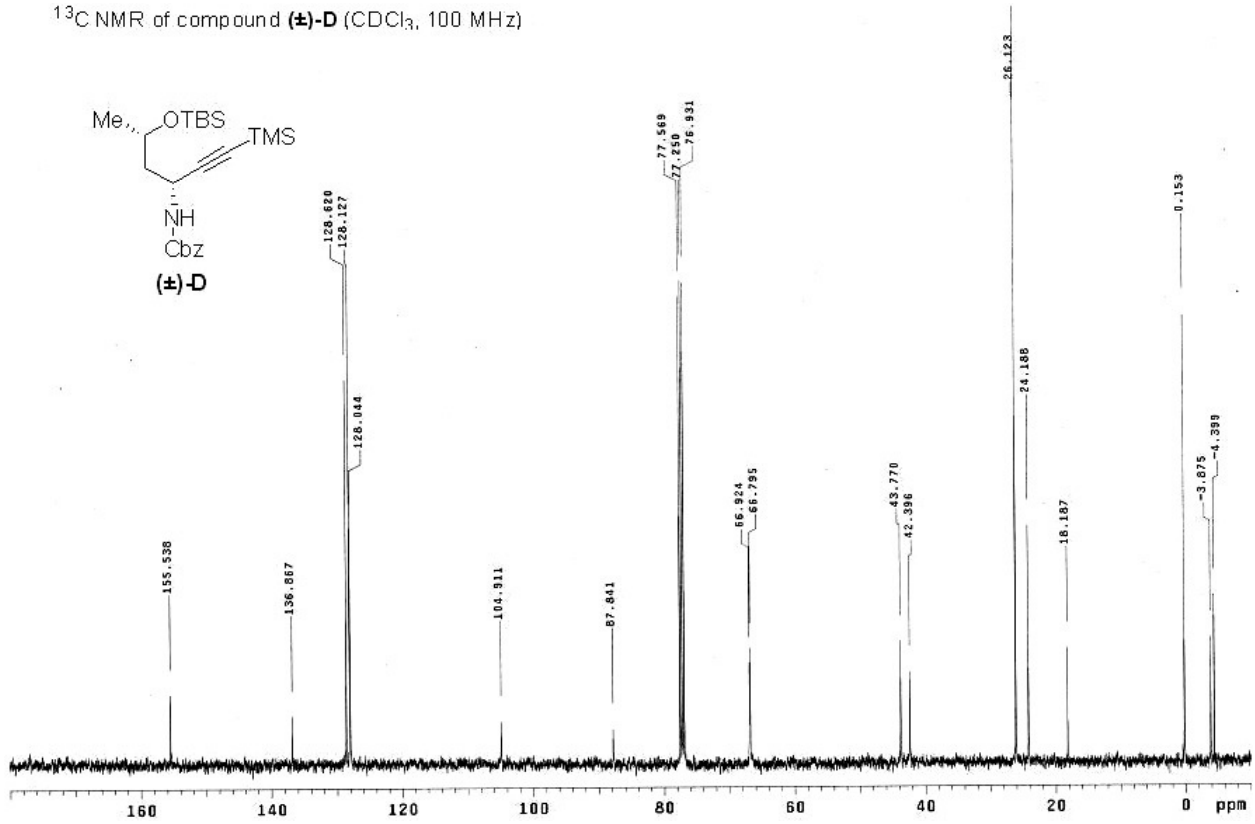

$^{13}$C NMR of compound **(±)-5** ($CDCl_3$, 100 MHz)



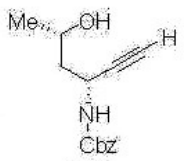
$^{1}$H NMR of compound **(±)-D** ($CDCl_3$, 400 MHz)




$^{13}$C NMR of compound **(±)-D** ($CDCl_3$, 100 MHz)



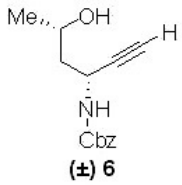
$^{1}$H NMR of compound **(±)-6** ($CDCl_3$, 400 MHz)




**(±) 6**

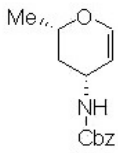



$^{13}$C NMR of compound **(±)-6** ($CDCl_3$, 100 MHz)




**(±) 6**

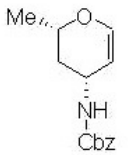
$^{1}$H NMR of compound **(±)-7** ($CDCl_3$, 400 MHz)




**(±) 7**

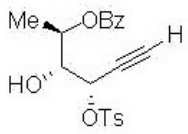



$^{13}$C NMR of compound **(±)-7** ($CDCl_3$, 100 MHz)




**(±) 7**

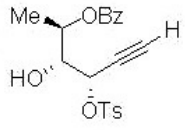
$^1$H NMR of compound **F** ($CDCl_3$, 400 MHz)




**F**

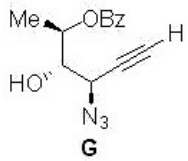



$^{13}$C NMR of compound **F** ($CDCl_3$, 100 MHz)




**F**

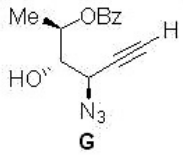
$^1$H NMR of compound **G** ($CDCl_3$, 400 MHz)




**G**

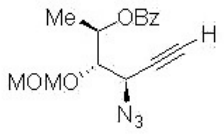



$^{13}$C NMR of compound **G** ($CDCl_3$, 100 MHz)

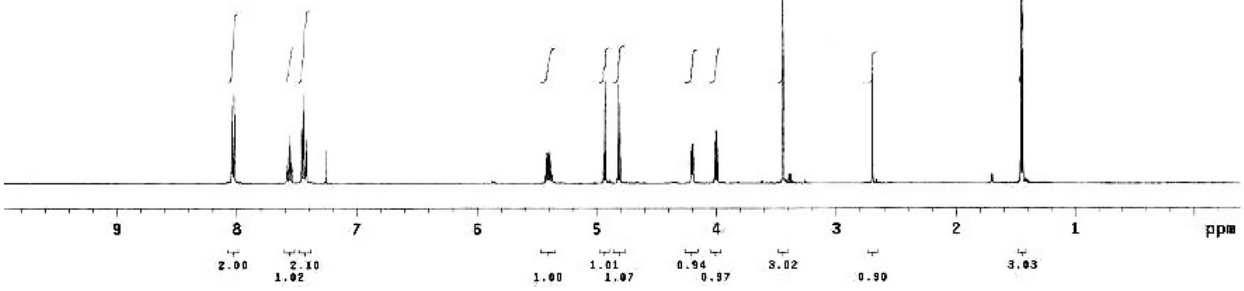



**G**

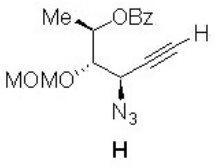
$^1$H NMR of compound **H** ($CDCl_3$, 400 MHz)




**H**

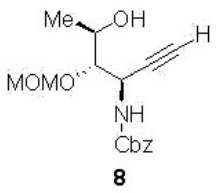



$^{13}$C NMR of compound **H** ($CDCl_3$, 100 MHz)




**H**

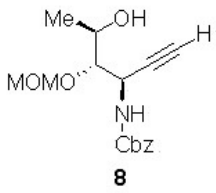
$^{1}$H NMR of compound **8** ($CDCl_3$, 400 MHz)




**8**

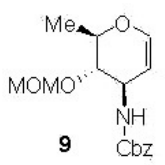



$^{13}$C NMR of compound **8** ($CDCl_3$, 100 MHz)




**8**

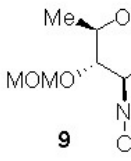
$^1$H NMR of compound **9** ($CDCl_3$, 400 MHz)




**9**

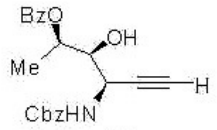



$^{13}$C NMR of compound **9** ($CDCl_3$, 100 MHz)




**9**

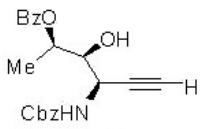
$^1$H NMR of compound **14** ($CDCl_3$, 400 MHz)




**14**

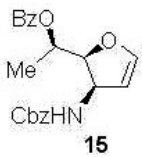



$^{13}$C NMR of compound **14** ($CDCl_3$, 100 MHz)




**14**

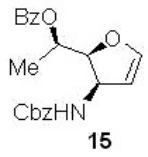
$^1$H NMR of compound **15** ($CDCl_3$, 400 MHz)




**15**

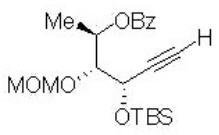



$^{13}$C NMR of compound **15** ($CDCl_3$, 100 MHz)




**15**

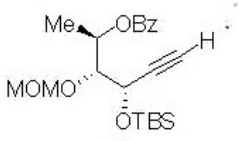
$^{1}$H NMR of compound **K** ($CDCl_3$, 400 MHz)




**K**

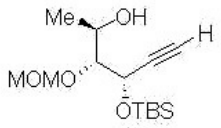



$^{13}$C NMR of compound **K** ($CDCl_3$, 100 MHz)




**K**

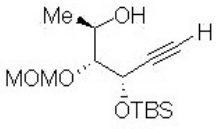
$^1$H NMR of compound **20b** ($CDCl_3$, 400 MHz)




**20b**

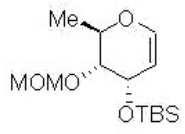



$^{13}$C NMR of compound **20b** ($CDCl_3$, 100 MHz)




**20b**

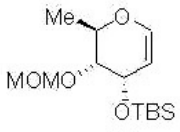
$^{1}$H NMR of compound **21b** ($CDCl_3$, 400 MHz)




**21b**

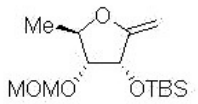



$^{13}$C NMR of compound **21b** ($CDCl_3$, 100 MHz)



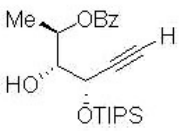

**21b**

$^1$H NMR of compound **22b** ($CDCl_3$, 400 MHz)




**22b**

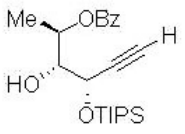
$^1$H NMR of compound **L** ($CDCl_3$, 400 MHz)




**L**

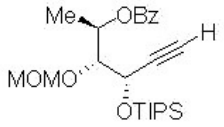



$^{13}$C NMR of compound **L** ($CDCl_3$, 100 MHz)




**L**

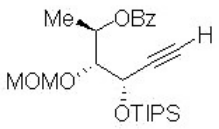
$^1$H NMR of compound **M** ($CDCl_3$, 400 MHz)




**M**

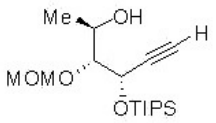



$^{13}$C NMR of compound **M** ($CDCl_3$, 100 MHz)




**M**

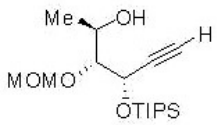
$^1$H NMR of compound **20c** ($CDCl_3$, 400 MHz)




**20 c**

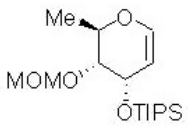



$^{13}$C NMR of compound **20 c** ($CDCl_3$, 100 MHz)




**20 c**

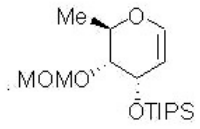
$^{1}$H NMR of compound **21c** ($CDCl_3$, 400 MHz)




**21c**

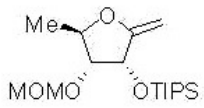



$^{13}$C NMR of compound **21c** ($CDCl_3$, 100 MHz)




**21c**

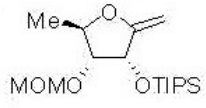
$^1$H NMR of compound **22c** ($CDCl_3$, 400 MHz)




**22c**

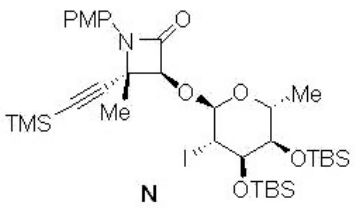



$^{13}$C NMR of compound **22c** ($CDCl_3$, 100 MHz)




**22c**

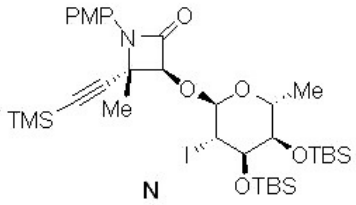
$^1$H NMR of compound **N** ($CDCl_3$, 400 MHz)




**N**

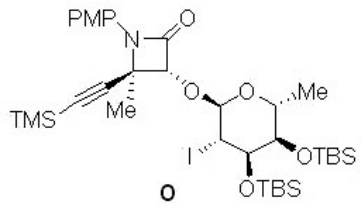



$^{13}$C NMR of compound **N** ($CDCl_3$, 100 MHz)




**N**

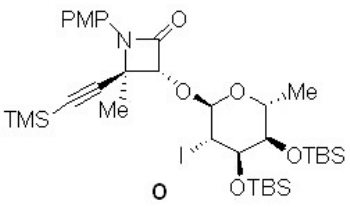
$^1$H NMR of compound **O** ($CDCl_3$, 400 MHz)




**O**

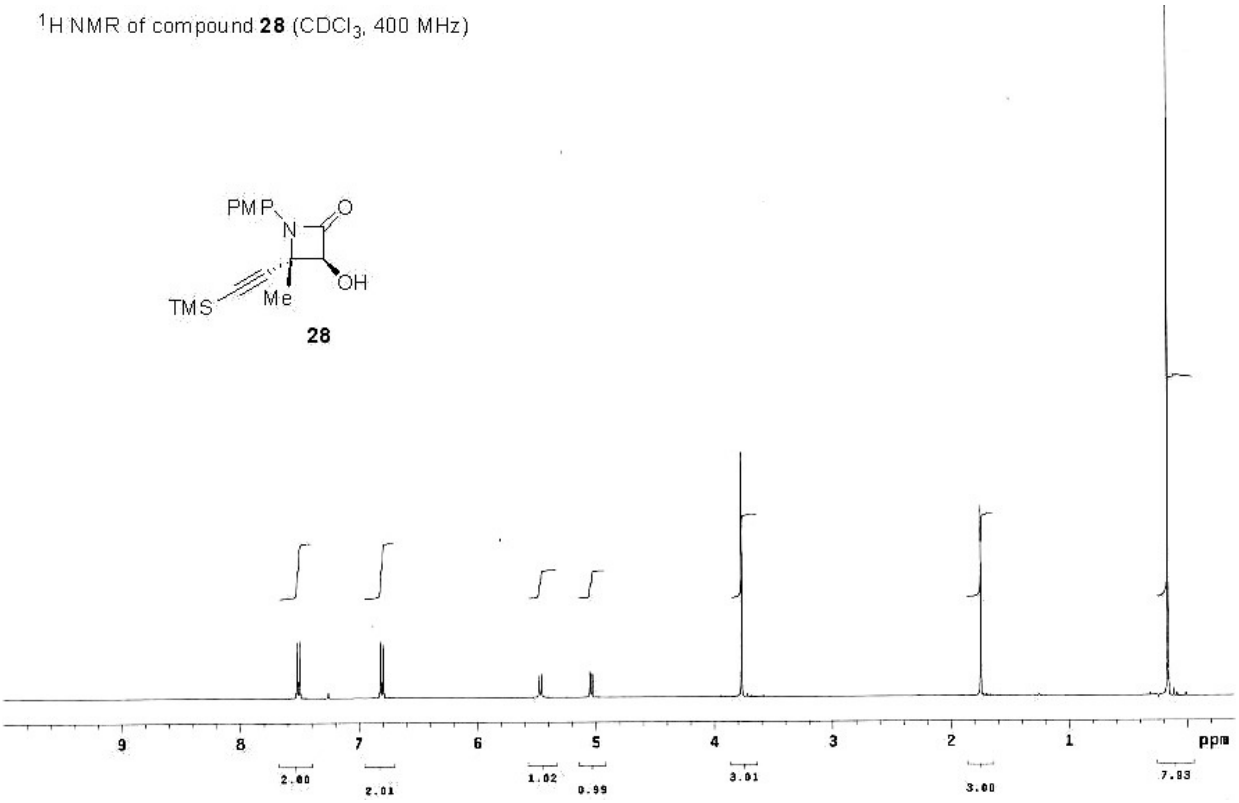



$^{13}$C NMR of compound **O** ($CDCl_3$, 100 MHz)

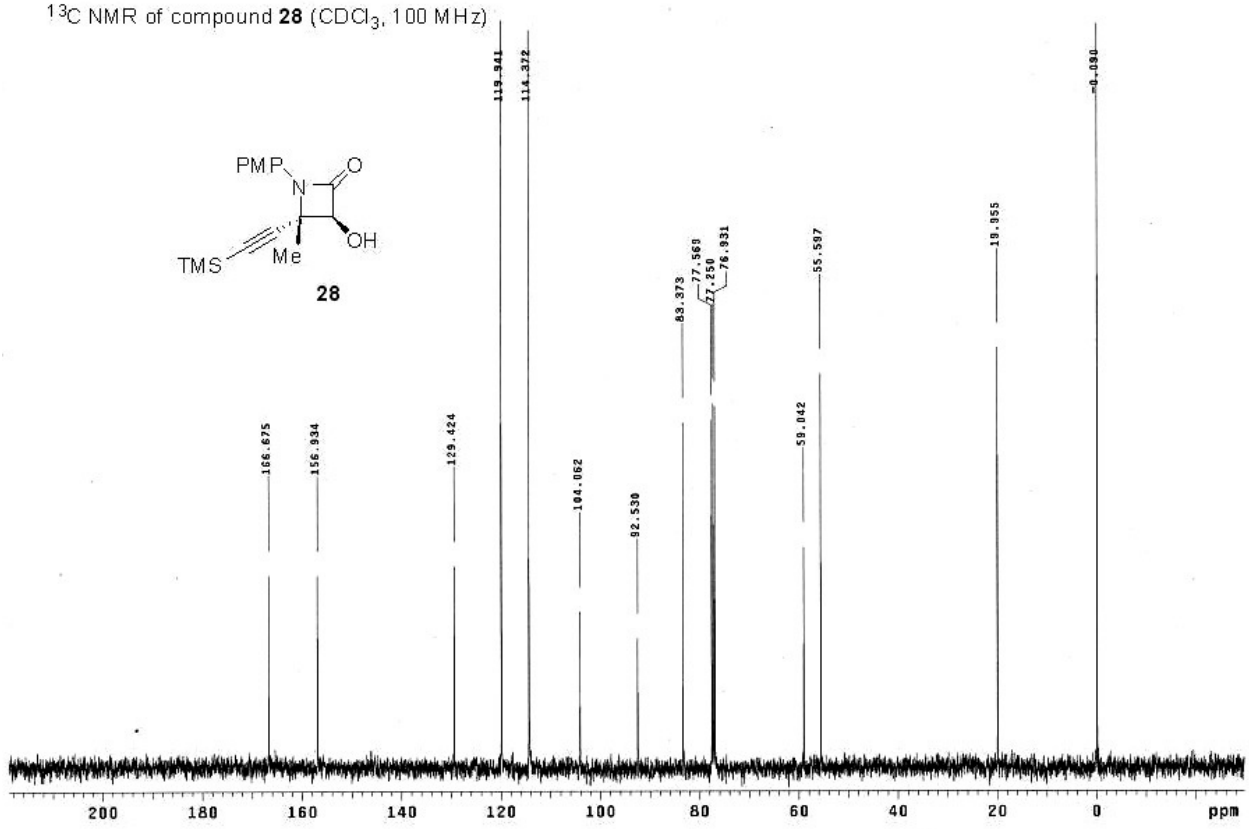



**O**

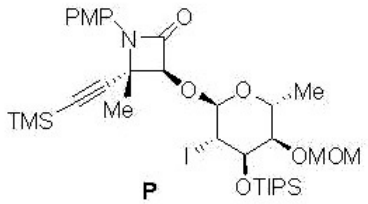
$^1$H NMR of compound **28** ($CDCl_3$, 400 MHz)




$^{13}$C NMR of compound **28** ($CDCl_3$, 100 MHz)



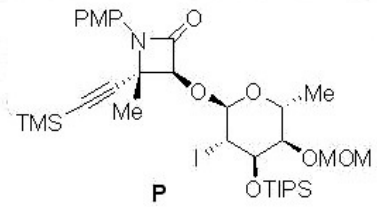
$^1$H NMR of compound **P** ($CDCl_3$, 400 MHz)




**P**

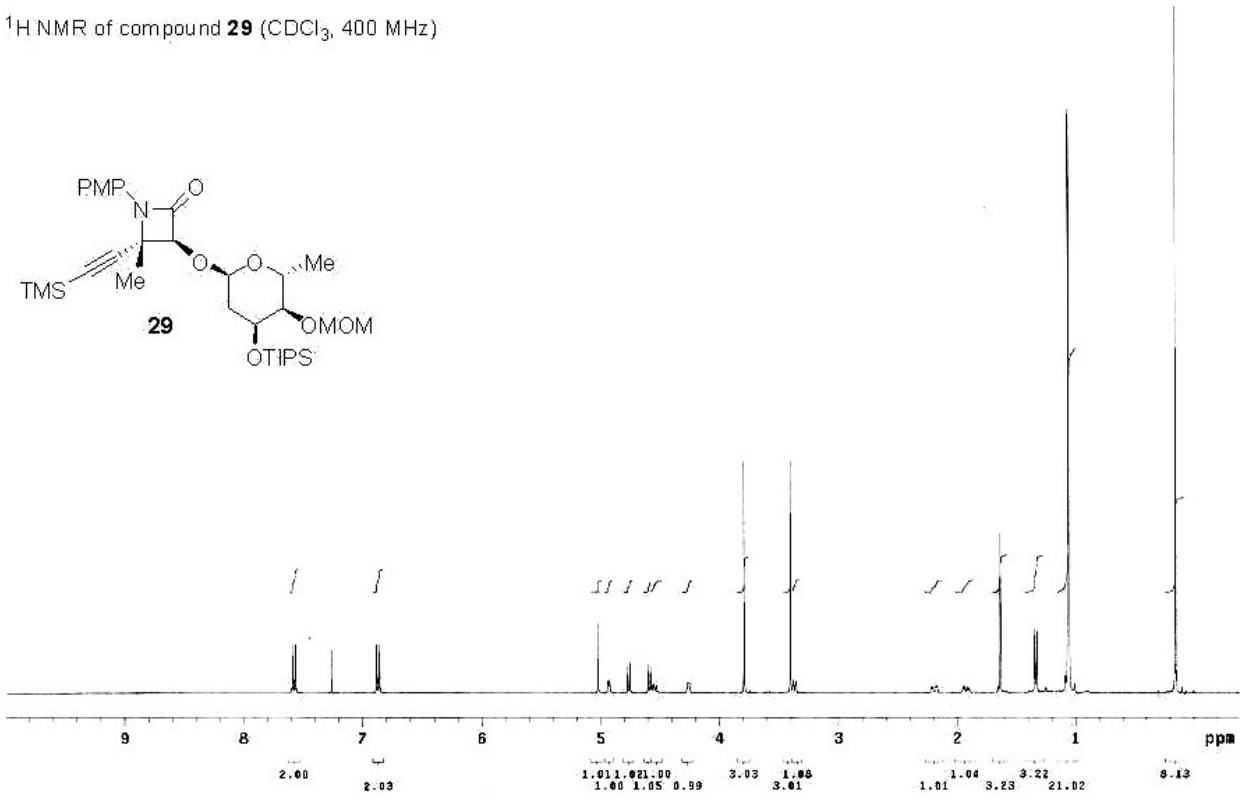



$^{13}$C NMR of compound **P** ($CDCl_3$, 100 MHz)

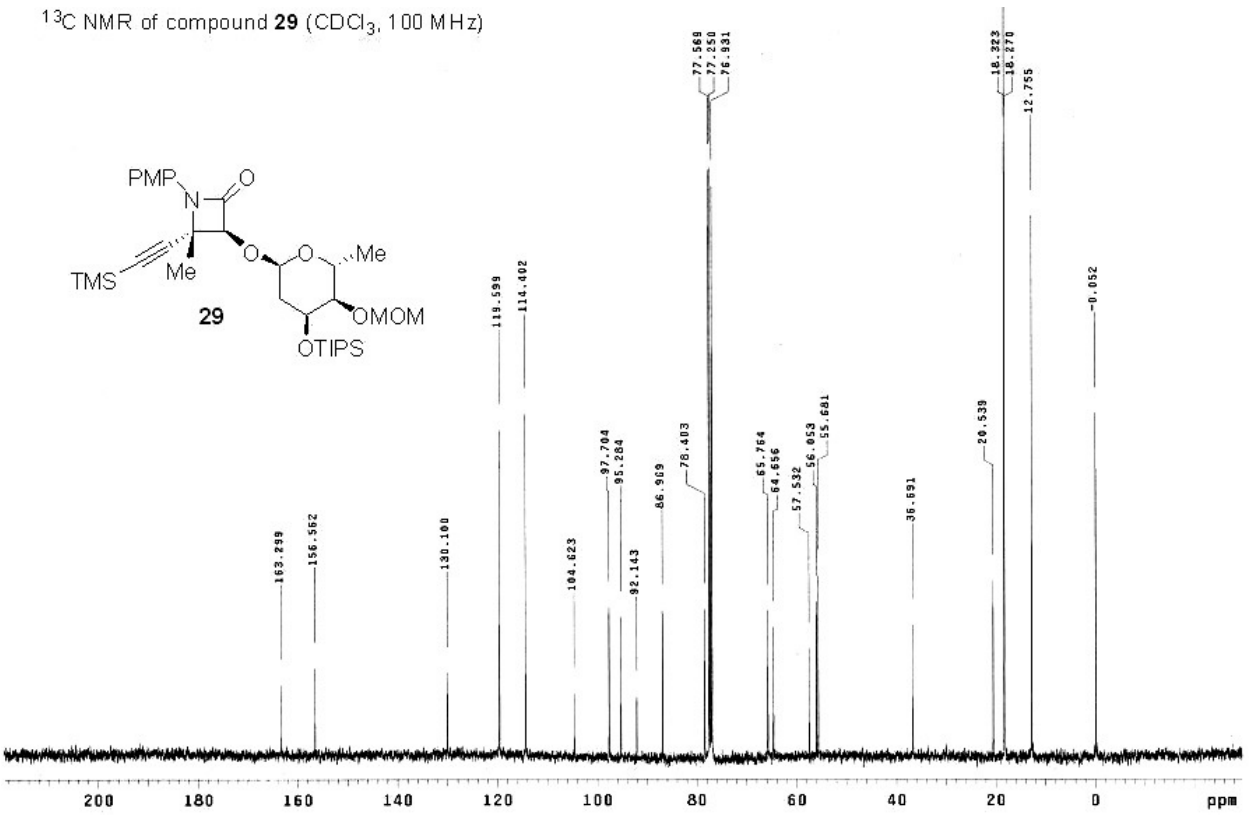



**P**

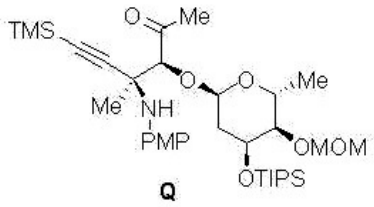
$^1$H NMR of compound **29** ($CDCl_3$, 400 MHz)




$^{13}$C NMR of compound **29** ($CDCl_3$, 100 MHz)



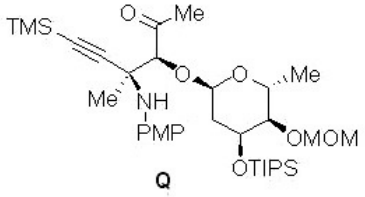
$^1$H NMR of compound **Q** ($CDCl_3$, 400 MHz)




**Q**

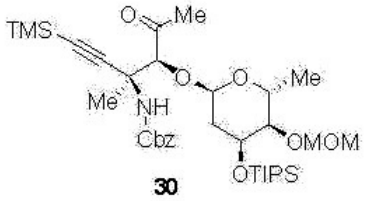



$^{13}$C NMR of compound **Q** ($CDCl_3$, 100 MHz)




**Q**

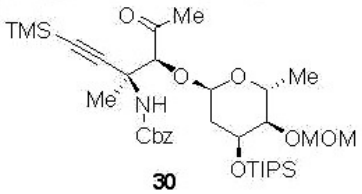
$^1$H NMR of compound **30** ($CDCl_3$, 400 MHz)




**30**

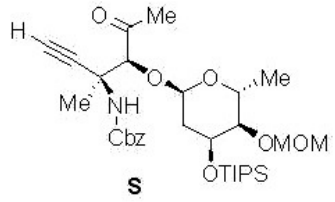



$^{13}$C NMR of compound **30** ($CDCl_3$, 100 MHz)




**30**

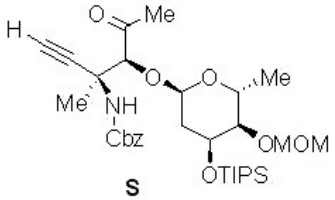
$^1$H NMR of compound **S** ($CDCl_3$, 400 MHz)




**S**

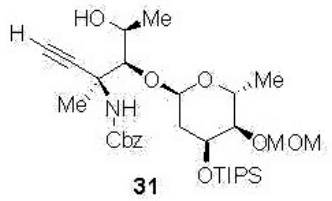



$^{13}$C NMR of compound **S** ($CDCl_3$, 100 MHz)




**S**

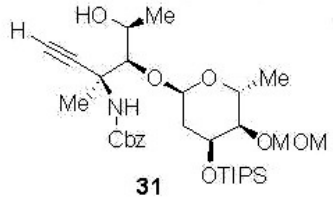
$^1$H NMR of compound **31** ($CDCl_3$, 400 MHz)




**31**

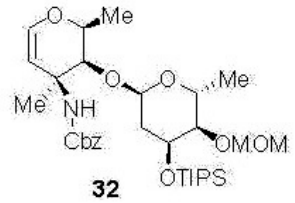



$^{13}$C NMR of compound **31** ($CDCl_3$, 100 MHz)




**31**

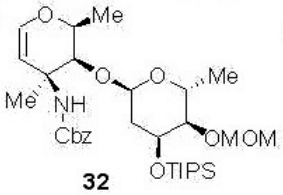
$^1$H NMR of compound **32** ($CDCl_3$, 400 MHz)




**32**

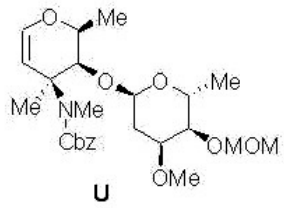



$^{13}$C NMR of compound **32** ($CDCl_3$, 100 MHz)




**32**

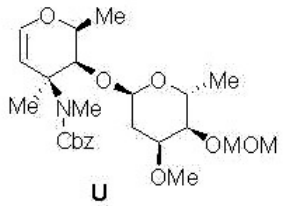
$^1$H NMR of compound **U** ($CDCl_3$, 400 MHz)




**U**

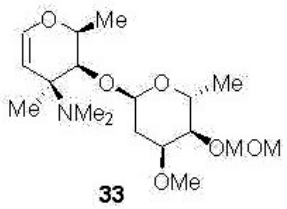



$^{13}$C NMR of compound **U** ($CDCl_3$, 100 MHz)




**U**

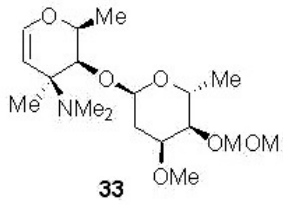
$^1$H NMR of compound **33** ($CDCl_3$, 400 MHz)




**33**




$^{13}$C NMR of compound **33** ($CDCl_3$, 100 MHz)




**33**