Paths of analysis*

PG3

Synthia

October 10, 2022

1 Analysis parameters

Analysis type: Automatic Retrosynthesis

Rules: none selected

Filters: Exclude Diastereoselecitve reactions, Tunnels, FGI, FGI with protections

Max. paths returned: 50

Max. iterations: 2000

Commercial:

1. Max. molecular weight - 1000 g/mol
2. Max. price - 1500 $/g

Published:

1. Max. molecular weight - 1000 g/mol
2. Popularity - 5

My Stockroom:

1. Max. molecular weight - 1000 g/mol

Reaction scoring formula: TUNNEL_COEF*FGI_COEF*STEP*20+1000000*(CONFLICT+NON_SELECTIVITY+FILTERS+PROTECT)

Chemical scoring formula: SMALLER^ 3,SMALLER^ 1.5

Min. search width: 400

Max. reactions per product: 60

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Strategies: none selected

FGI Coeff: 0

Tunnels Coeff: 0

JSON Parameters: {}

2 Paths

5 paths found. *Paths are sorted by score. Reactions are sorted in appearance order for each path.*

2.1 Path 1

Score: 56.25

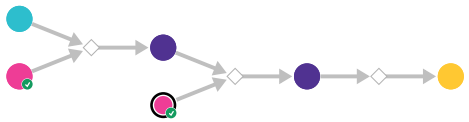
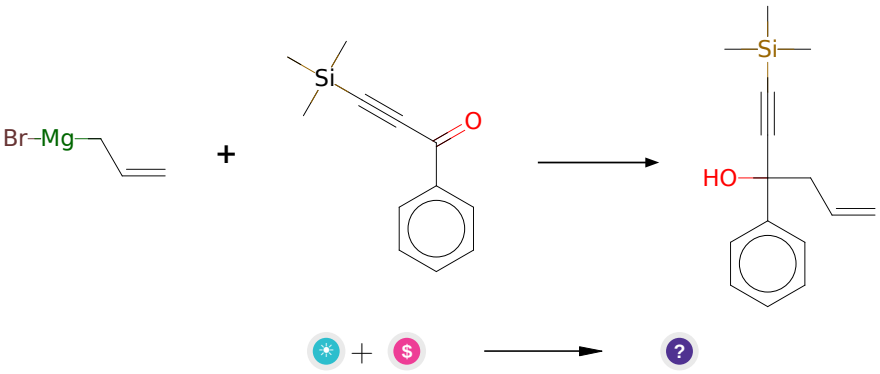


Figure 1: Outline of path 1

2.1.1 Grignard-Type Reaction



Substrates:

1. phenyltrimethylsilylaethinylketon
2. Allylmagnesium bromide solution - *available at Sigma-Aldrich*

Products:

1. C=CCC(O)(C#C[Si](C)(C)C)c1ccccc1

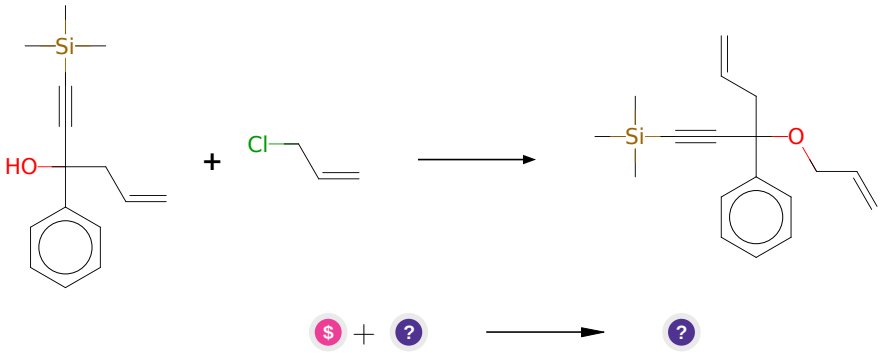
Typical conditions: Mg or Li.ether

Protections: none

Reference: *10.1021/jo010494y* or *10.1016/j.steroids.2015.09.009* or *10.1021/jo061349t* or *10.1021/ja056165v* (SI page 19)

Retrosynthesis ID: 25134

2.1.2 Alkylation of tertiary alcohols



Substrates:

1. Chlorallylene - *available at Sigma-Aldrich*
2. C=CCC(O)(C#C[Si](C)(C)C)c1ccccc1

Products:

1. C=CCOC(C#C[Si](C)(C)C)(CC=C)c1ccccc1

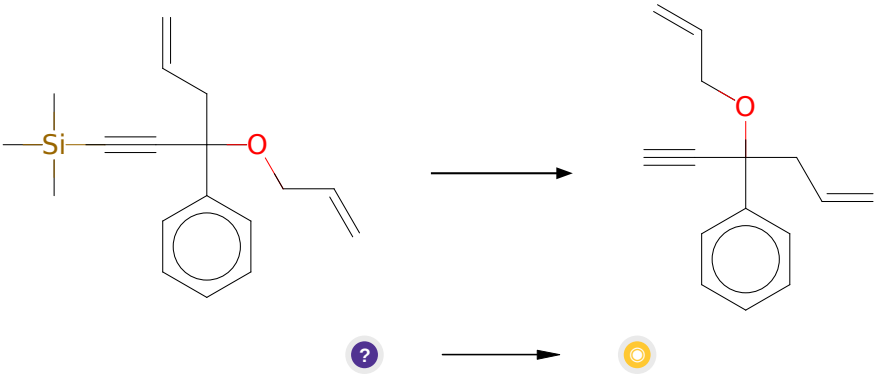
Typical conditions: K2CO3.acetone.heat

Protections: none

Reference: *10.1016/S0022-1139(00)85021-6* and

Retrosynthesis ID: 31010936

2.1.3 Desilylation of terminal triple bond



Substrates:

1. C=CCOC(C#C[Si](C)(C)C)(CC=C)c1ccccc1

Products:

1. C#CC(CC=C)(OCC=C)c1ccccc1

Typical conditions: NaOMe. MeOH

Protections: none

Reference: DOI: *10.1021/jf00052a037*

Retrosynthesis ID: 2248

2.2 Path 2

Score: `70.31`

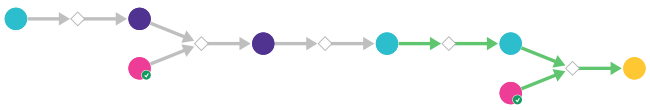
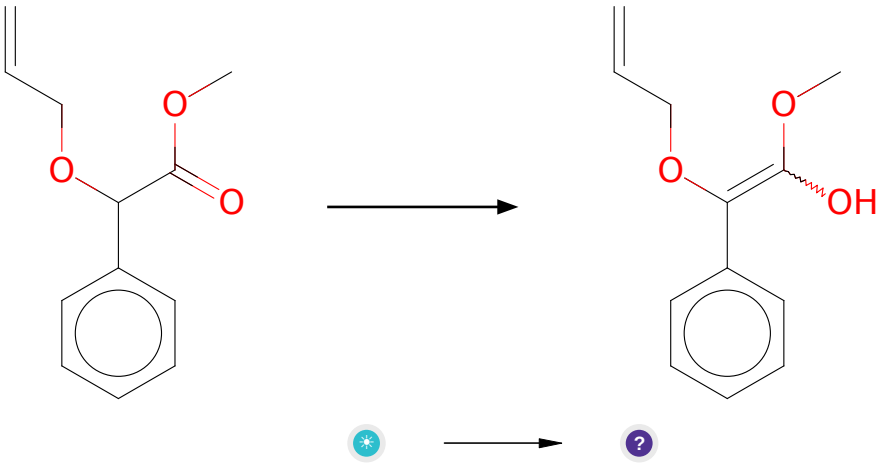


Figure 2: Outline of path 2

2.2.1 Keto-Enol Tautomerism



Substrates:

1. (1-allyloxy-1-methoxymethyl-but-3-enyl)-benzene

Products:

1. C=CCOC(=C(O)OC)c1ccccc1

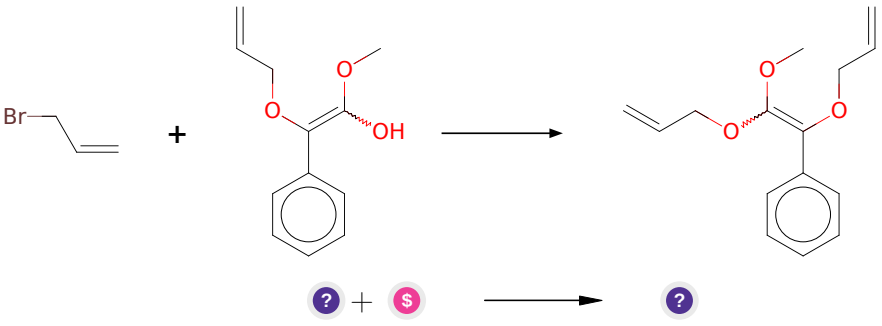
Typical conditions: solvent

Protections: none

Reference: *10.1021/jo8012385 10.1021/ja01065a003*

Retrosynthesis ID: 8720

2.2.2 Enolate O-Alkylation



Substrates:

1. C=CCOC(=C(O)OC)c1ccccc1

2. Allyl bromide - *available at Sigma-Aldrich*

Products:

1. C=CCOC(OC)=C(OCC=C)c1ccccc1

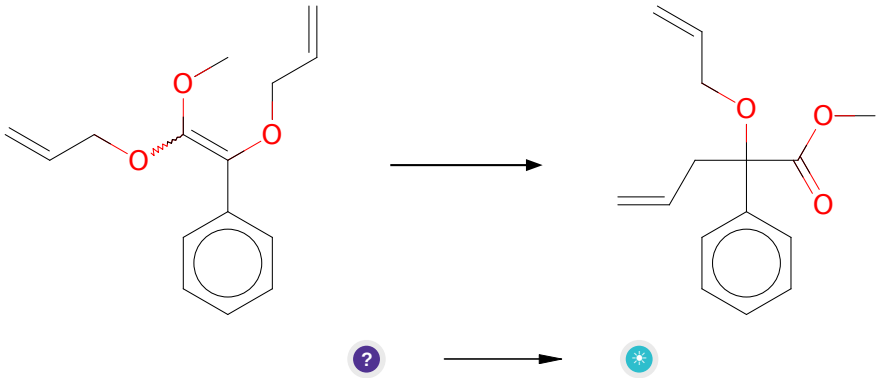
Typical conditions: Cs2CO3.DMF

Protections: none

Reference: *10.1016/j.bmcl.2012.05.070* and *10.1039/b612336h*

Retrosynthesis ID: 14841

2.2.3 Claisen Rearrangement



Substrates:

1. C=CCOC(OC)=C(OCC=C)c1ccccc1

Products:

1. 2-allyloxy-2-phenyl-pent-4-enoic acid methyl ester

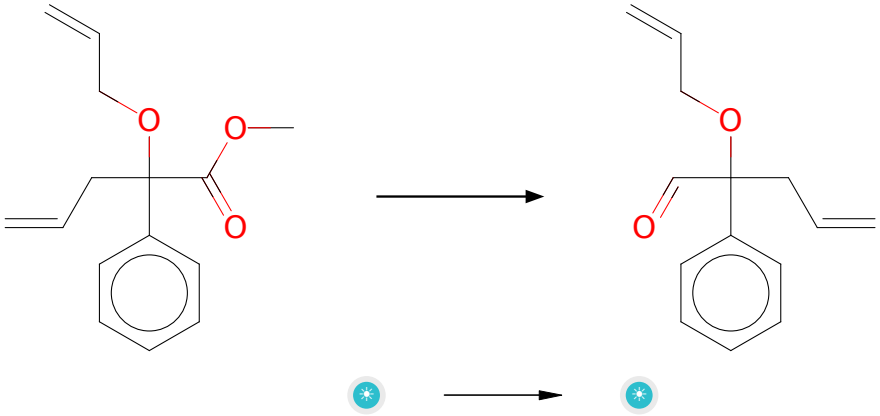
Typical conditions: heat

Protections: none

Reference: DOI: *10.1021/ja00206a017* and *10.1016/S0022-1139(98)00313-3*

Retrosynthesis ID: 1226

2.2.4 Aldehyde Formation



Substrates:

1. 2-allyloxy-2-phenyl-pent-4-enoic acid methyl ester

Products:

1. rac-2-allyloxy-2-phenylpent-4-enal

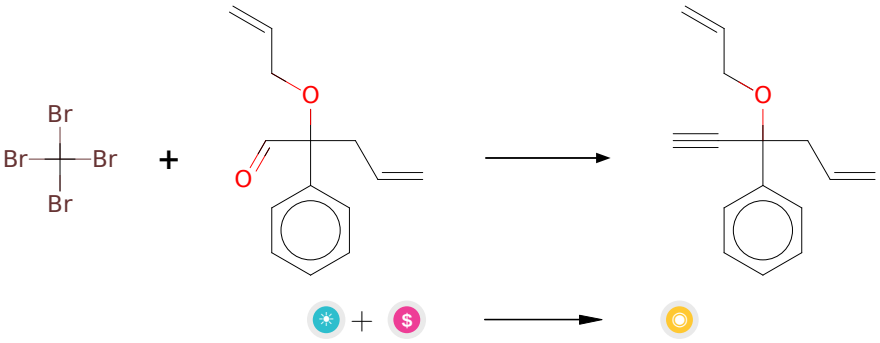
Typical conditions: DIBAL.solvent e.g. DCM

Protections: none

Reference: *10.1039/C39940000483* and *10.1039/C3CC47867J* and *10.1021/jo00222a054* and *10.1021/ja9934908* and *10.1021/jo902426z*

Retrosynthesis ID: 28551

2.2.5 Corey-Fuchs reaction



Substrates:

1. rac-2-allyloxy-2-phenylpent-4-enal

2. Tetrabromomethane - *available at Sigma-Aldrich*

Products:

1. C#CC(CC=C)(OCC=C)c1ccccc1

Typical conditions: PPh3.BuLi.CBr4

Protections: none

Reference: *10.1002/ejoc.200601137* and *10.1016/S0040-4039(01)94157-7*

Retrosynthesis ID: 10912

2.3 Path 3

Score: 87.89

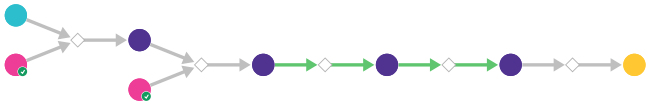
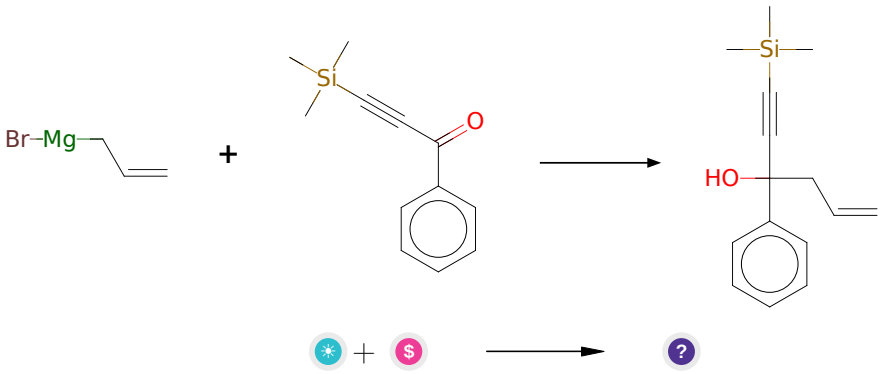


Figure 3: Outline of path 3

2.3.1 Grignard-Type Reaction



Substrates:

1. phenyltrimethylsilylaethinylketon
2. Allylmagnesium bromide solution - *available at Sigma-Aldrich*

Products:

1. C=CCC(O)(C#C[Si](C)(C)C)c1ccccc1

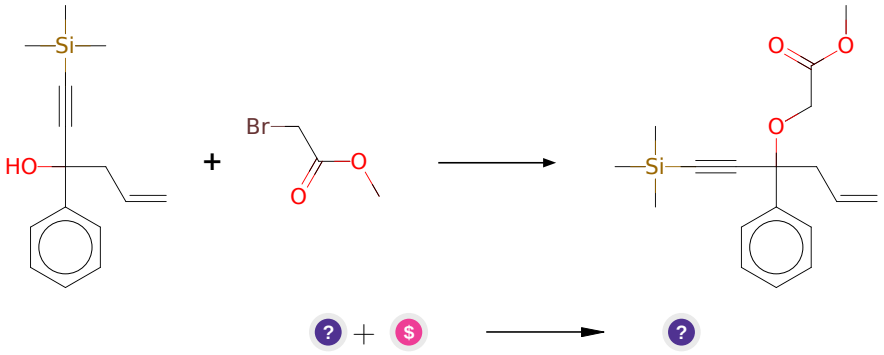
Typical conditions: Mg or Li.ether

Protections: none

Reference: *10.1021/jo010494y* or *10.1016/j.steroids.2015.09.009* or *10.1021/jo061349t* or *10.1021/ja056165v* (SI page 19)

Retrosynthesis ID: 25134

2.3.2 Reaction of alpha-bromo carbonyl compounds with alcohols or phenols



Substrates:

1. C=CCC(O)(C#C[Si](C)(C)C)c1ccccc1
2. Methyl bromoacetate - *available at Sigma-Aldrich*

Products:

1. C=CCC(C#C[Si](C)(C)C)(OCC(=O)OC)c1ccccc1

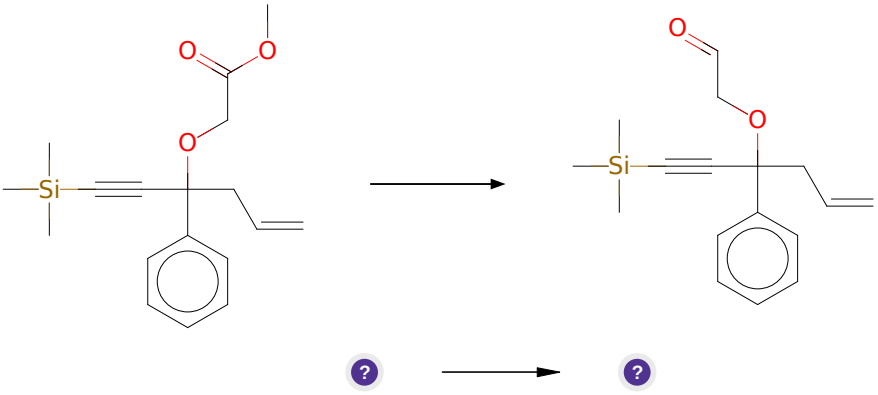
Typical conditions: NaOH.EtOH

Protections: none

Reference: *10.1021/jm070511x* AND *10.1021/op1002038* AND *10.1007/BF00758669* AND *10.1021/ja01117a054*

Retrosynthesis ID: 14804

2.3.3 Aldehyde Formation



Substrates:

1. C=CCC(C#C[Si](C)(C)C)(OCC(=O)OC)c1ccccc1

Products:

1. C=CCC(C#C[Si](C)(C)C)(OCC=O)c1ccccc1

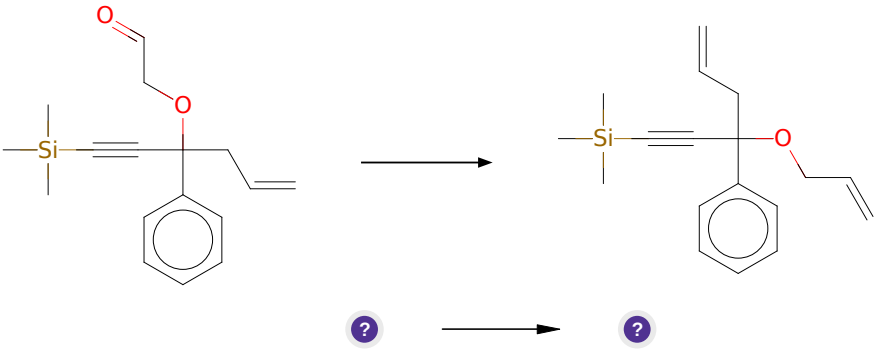
Typical conditions: DIBAL.solvent e.g. DCM

Protections: none

Reference: *10.1039/C39940000483* and *10.1039/C3CC47867J* and *10.1021/jo00222a054* and *10.1021/ja9934908* and *10.1021/jo902426z*

Retrosynthesis ID: 28551

2.3.4 Tebbe Olefination



Substrates:

1. C=CCC(C#C[Si](C)(C)C)(OCC=O)c1ccccc1

Products:

1. C=CCOC(C#C[Si](C)(C)C)(CC=C)c1ccccc1

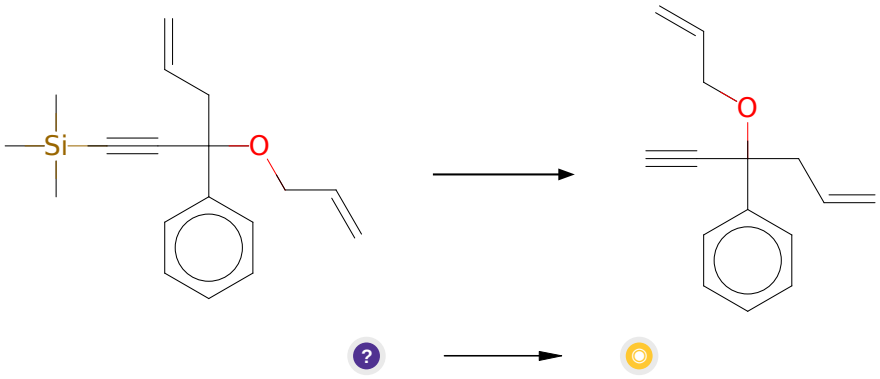
Typical conditions: Cp2TiCl2.AlMe3.toluene

Protections: none

Reference: *10.1016/j.tet.2007.03.015* and *10.1002/9780470638859.conrr617*

Retrosynthesis ID: 11714

2.3.5 Desilylation of terminal triple bond



Substrates:

1. C=CCOC(C#C[Si](C)(C)C)(CC=C)c1ccccc1

Products:

1. C#CC(CC=C)(OCC=C)c1ccccc1

Typical conditions: NaOMe. MeOH

Protections: none

Reference: DOI: *10.1021/jf00052a037*

Retrosynthesis ID: 2248

2.4 Path 4

Score: `90.31`

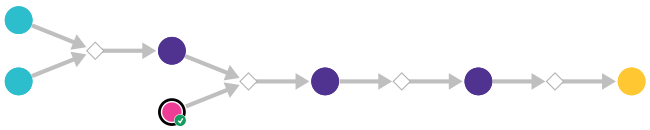
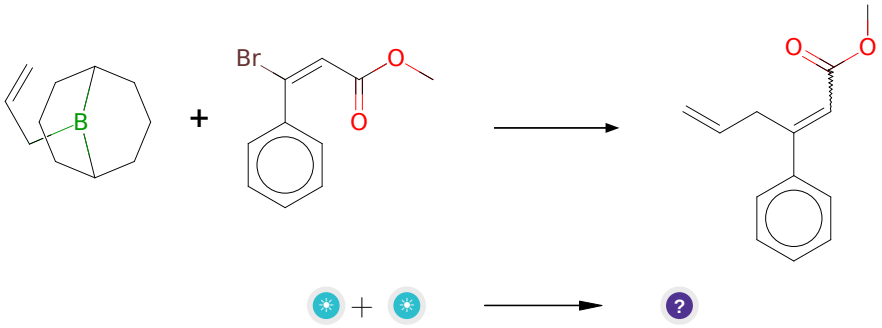


Figure 4: Outline of path 4

2.4.1 Suzuki coupling of alkyl-9-BBNs with vinyl bromides



Substrates:

1. b-bromo-cis-cinnamic acid methyl ester
2. 9-allyl-9-bora-bicyclo[3.3.1]nonane

Products:

1. C=CCC(=CC(=O)OC)c1ccccc1

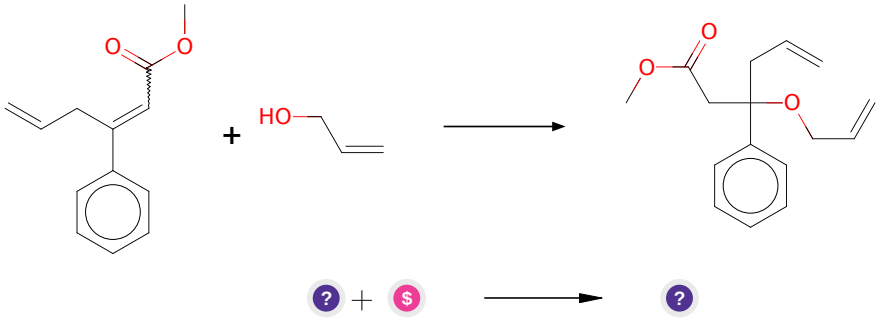
Typical conditions: Pd catalyst.base.solvent

Protections: none

Reference: *10.1021/ja00183a048* and *10.1039/b707338k* and *10.1016/j.tet.2015.05.039* and *10.1021/jo991064z* and *10.1021/ol060290+* and *10.1246/bcsj.65.2863*

Retrosynthesis ID: 25175

2.4.2 Addition of alcohols or phenols to Michael acceptors



Substrates:

1. C=CCC(=CC(=O)OC)c1ccccc1
2. 2-Propen-1-ol - *available at Sigma-Aldrich*

Products:

1. C=CCOC(CC=C)(CC(=O)OC)c1ccccc1

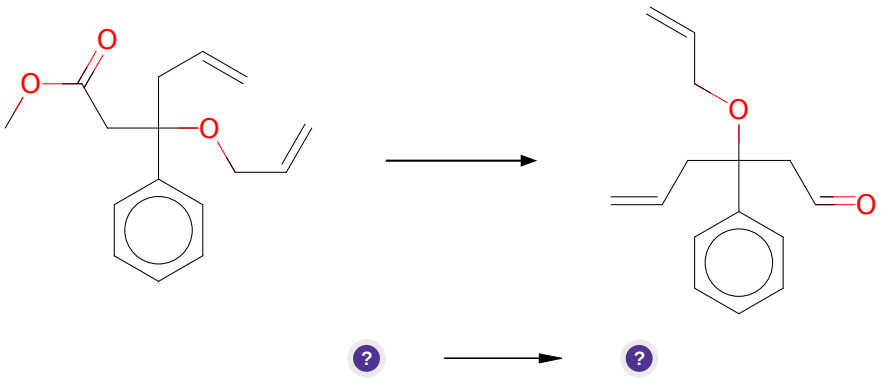
Typical conditions: cat.Na.DMF

Protections: none

Reference: *10.1016/S0957-4166(97)00479-5* AND *10.1016/S0040-4020(98)00817-5* AND *10.1021/np970346w* AND *10.1021/ol049820x*

Retrosynthesis ID: 20266

2.4.3 Aldehyde Formation



Substrates:

1. C=CCOC(CC=C)(CC(=O)OC)c1ccccc1

Products:

1. C=CCOC(CC=C)(CC=O)c1ccccc1

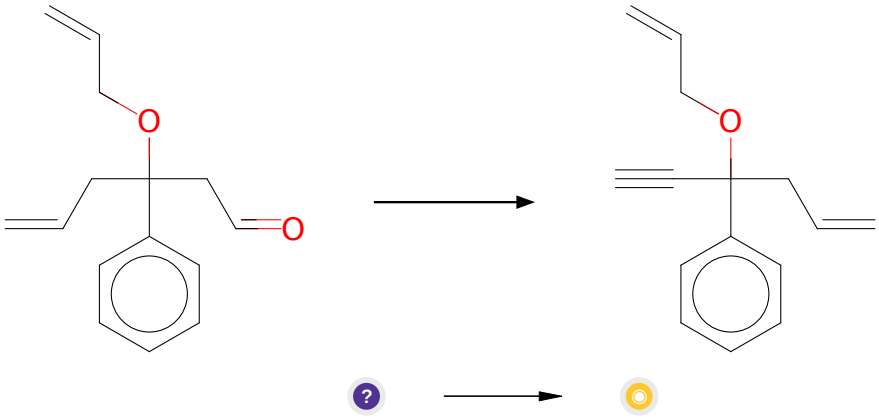
Typical conditions: DIBAL.solvent e.g. DCM

Protections: none

Reference: *10.1039/C39940000483* and *10.1039/C3CC47867J* and *10.1021/jo00222a054* and *10.1021/ja9934908* and *10.1021/jo902426z*

Retrosynthesis ID: 28551

2.4.4 Synthesis of alkynes from aldehydes



Substrates:

1. C=CCOC(CC=C)(CC=O)c1ccccc1

Products:

1. C#CC(CC=C)(OCC=C)c1ccccc1

Typical conditions: P1-base.DMF

Protections: none

Reference: *10.1055/s-0028-1087919*

Retrosynthesis ID: 15028

2.5 Path 5

Score: `90.31`

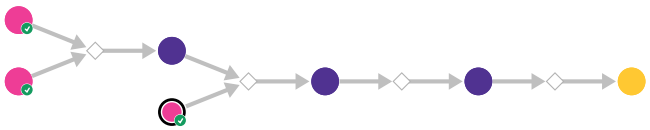
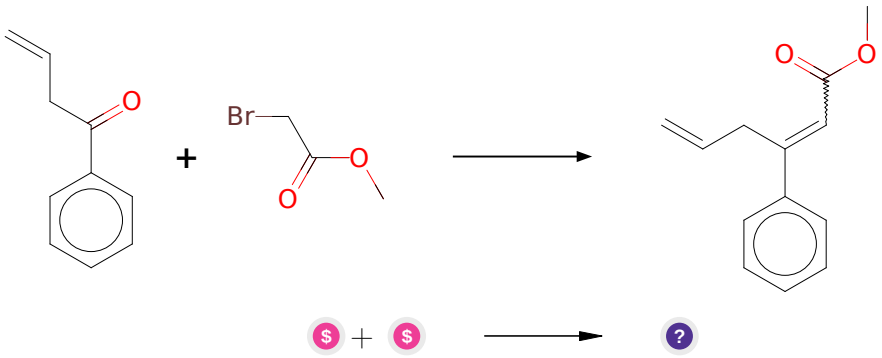


Figure 5: Outline of path 5

2.5.1 HWE/Wittig Olefination



Substrates:

1. 1-phenylbut-3-en-1-one - *available at Sigma-Aldrich*
2. Methyl bromoacetate - *available at Sigma-Aldrich*

Products:

1. C=CCC(=CC(=O)OC)c1ccccc1

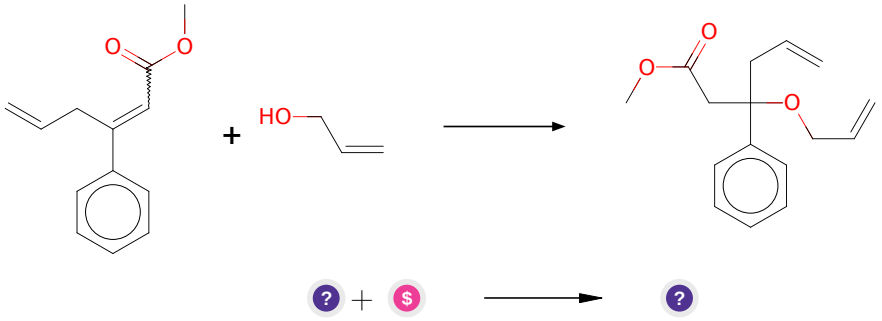
Typical conditions: 1.PPh3 or trialkylphosphite.2.base.aldehyde

Protections: none

Reference: *10.1002/anie.200705005* and *10.1021/ol052106a* and *10.1021/jo00075a064* and *10.1021/ol3027297*

Retrosynthesis ID: 9550

2.5.2 Addition of alcohols or phenols to Michael acceptors



Substrates:

1. C=CCC(=CC(=O)OC)c1ccccc1
2. 2-Propen-1-ol - *available at Sigma-Aldrich*

Products:

1. C=CCOC(CC=C)(CC(=O)OC)c1ccccc1

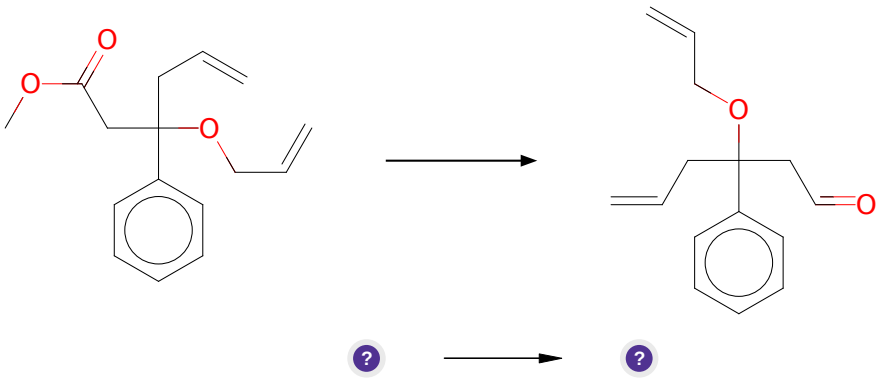
Typical conditions: cat.Na.DMF

Protections: none

Reference: *10.1016/S0957-4166(97)00479-5* AND *10.1016/S0040-4020(98)00817-5* AND *10.1021/np970346w* AND *10.1021/ol049820x*

Retrosynthesis ID: 20266

2.5.3 Aldehyde Formation



Substrates:

1. C=CCOC(CC=C)(CC(=O)OC)c1ccccc1

Products:

1. C=CCOC(CC=C)(CC=O)c1ccccc1

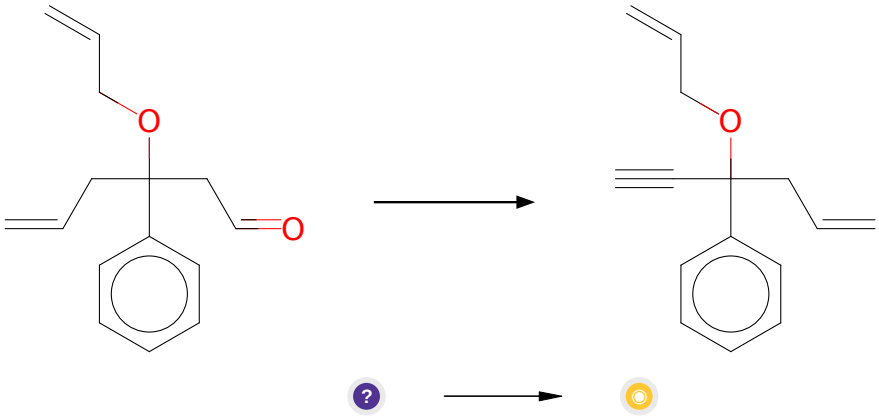
Typical conditions: DIBAL.solvent e.g. DCM

Protections: none

Reference: *10.1039/C39940000483* and *10.1039/C3CC47867J* and *10.1021/jo00222a054* and *10.1021/ja9934908* and *10.1021/jo902426z*

Retrosynthesis ID: 28551

2.5.4 Synthesis of alkynes from aldehydes



Substrates:

1. C=CCOC(CC=C)(CC=O)c1ccccc1

Products:

1. C#CC(CC=C)(OCC=C)c1ccccc1

Typical conditions: P1-base.DMF

Protections: none

Reference: *10.1055/s-0028-1087919*

Retrosynthesis ID: 15028