Paths of analysis*

L5_DIA

Synthia

October 11, 2022

1 Analysis parameters

Analysis type: Automatic Retrosynthesis

Rules: none selected

Filters: 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

Strategies: none selected

*The results stated herein were generated using the proprietary platform owned and maintained by Grzybowski Scientific Inventions, Inc., a subsidiary of Merck KGaA, Darmstadt Germany. The results are provided on an as is basis, and shall be used solely in connection with the rights afforded in the license agreement and for no other purpose.

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: 76.25

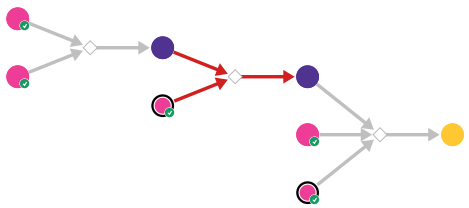
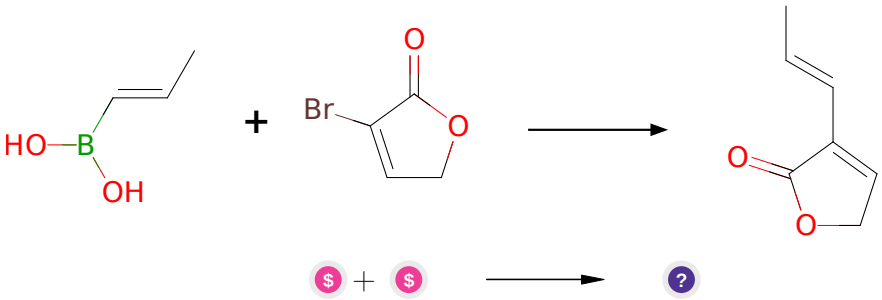


Figure 1: Outline of path 1

2.1.1 Suzuki coupling of vinyl bromides with alkenyl boronic acids



Substrates:

1. trans-Propenylboronic acid - *available at Sigma-Aldrich*
2. 3-bromo-2,5-dihydrofuran-2-one - *available at Sigma-Aldrich*

Products:

1. C/C=C/C1=CCOC1=O

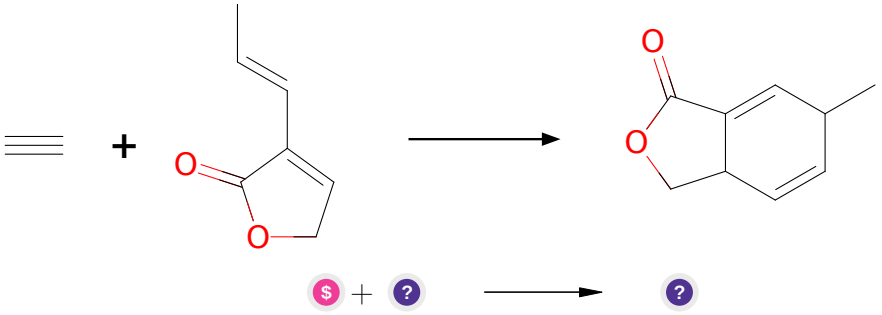
Typical conditions: Pd catalyst.base.solvent

Protections: none

Reference: *10.1021/cr00039a007* and *10.1007/3418_2012_32* and *10.1021/cr0505268* and *10.1016/j.jfluchem.2016.01.018* and *10.1039/C3CS60197H*

Retrosynthesis ID: 24937

2.1.2 Diels-Alder



Substrates:

1. Calcium carbide - *available at Sigma-Aldrich*
2. C/C=C/C1=CCOC1=O

Products:

1. CC1C=CC2COC(=O)C2=C1

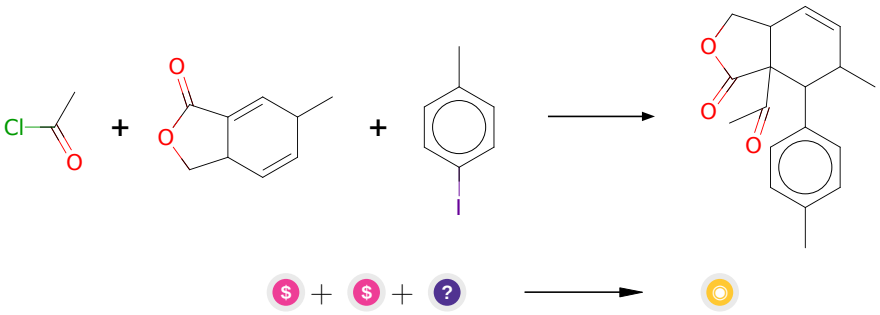
Typical conditions: H2O.MeOH.EtOH.isooctane

Protections: none

Reference: *10.1002/1521-3773(20020517)41:10<1668::AID-ANIE1668>3.0.CO;2-Z*

Retrosynthesis ID: 10557

2.1.3 Conjugated addition of organocuprate-acylation of enones and enoate esters



Substrates:

1. 4-Iodotoluene - *available at Sigma-Aldrich*
2. Acetyl chloride - *available at Sigma-Aldrich*
3. CC1C=CC2COC(=O)C2=C1

Products:

1. CC(=O)C12C(=O)OCC1C=CC(C)C2c1ccc(C)cc1

Typical conditions: 1.RCuLi.2.AcCl.HMPA

Protections: none

Reference: *10.3987/COM-99-S143* AND *10.1021/ja00148a023* AND *10.1016/S0040-4039(01)80891-1*

Retrosynthesis ID: 12521

2.2 Path 2

Score: 76.25

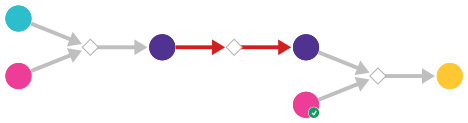
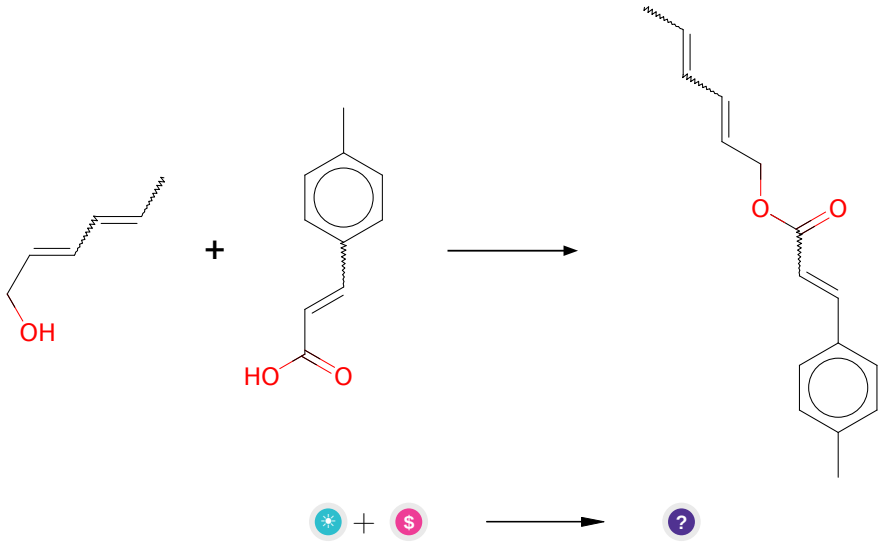


Figure 2: Outline of path 2

2.2.1 Steglich Esterification



Substrates:

1. sorbic alcohol
2. 3-p-tolylacrylic acid - *SYNTHONIXCORPORATION*

Products:

1. CC=CC=CCOC(=O)C=Cc1ccc(C)cc1

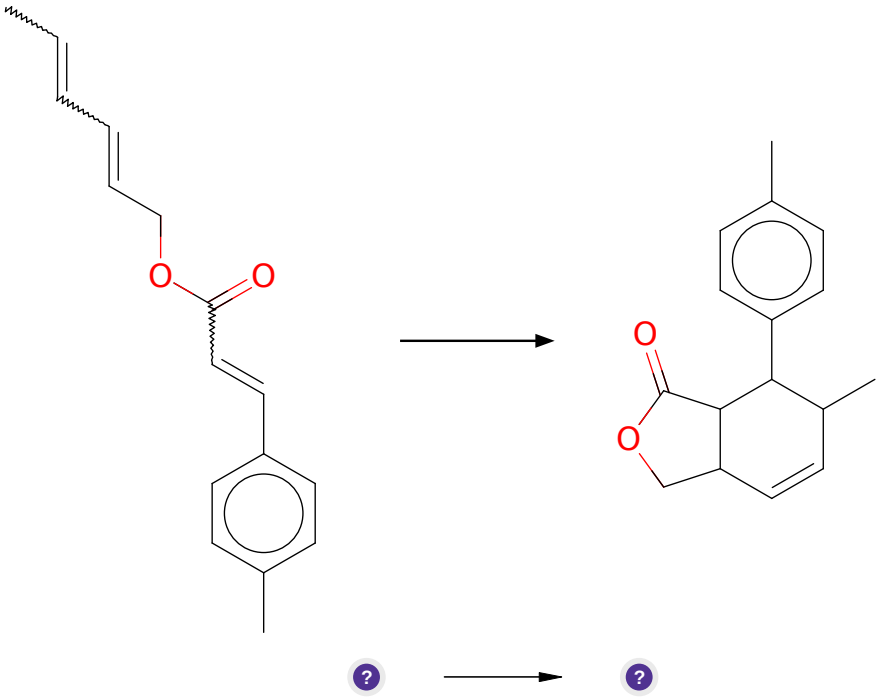
Typical conditions: alcohol.DCC.DMAP.DCM or thiol.DCC.DMAP.DCM

Protections: none

Reference: *10.1002/anie.197805221*

Retrosynthesis ID: 10171

2.2.2 Diels-Alder



Substrates:

1. CC=CC=CCOC(=O)C=Cc1ccc(C)cc1

Products:

1. Cc1ccc(C2C(C)C=CC3COC(=O)C32)cc1

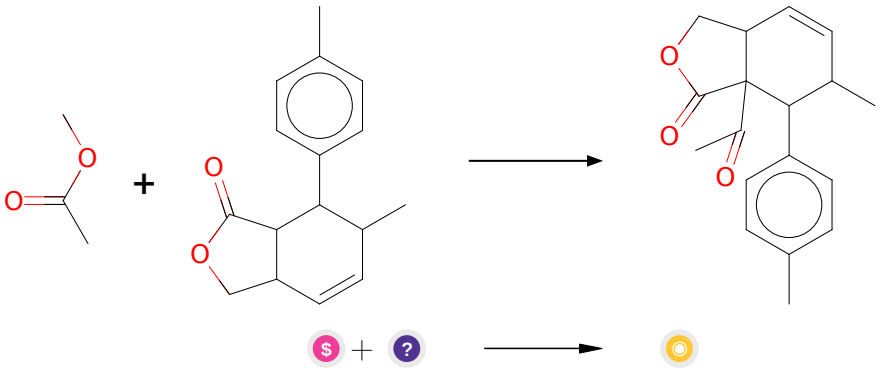
Typical conditions: Lewis acid or chiral Lewis acid. Solvent.

Protections: none

Reference: DOI: *10.1002/1521-3773(20020517)41:10<1668::AID-ANIE1668>3.0.CO;2-Z* AND *10.1021/ja062508t*

Retrosynthesis ID: 18116

2.2.3 Claisen Condensation



Substrates:

1. Methyl acetate - *available at Sigma-Aldrich*
2. Cc1ccc(C2C(C)C=CC3COC(=O)C32)cc1

Products:

1. CC(=O)C12C(=O)OCC1C=CC(C)C2c1ccc(C)cc1

Typical conditions: Base.Solvent

Protections: none

Reference: *10.1021/cr020703u* and *10.1021/cr60088a002*

Retrosynthesis ID: 5015

2.3 Path 3

Score: 76.25

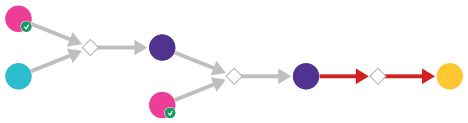
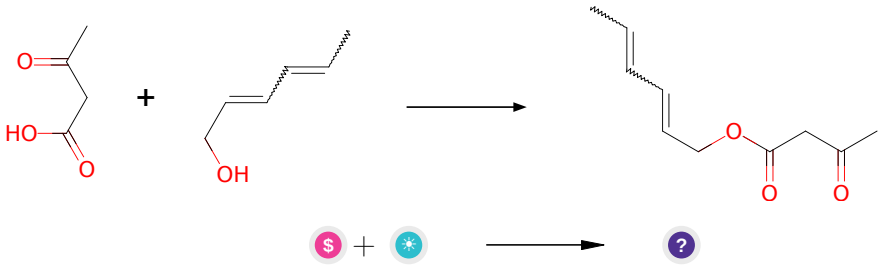


Figure 3: Outline of path 3

2.3.1 Steglich Esterification



Substrates:

1. Lithium acetoacetate - *available at Sigma-Aldrich*
2. sorbic alcohol

Products:

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

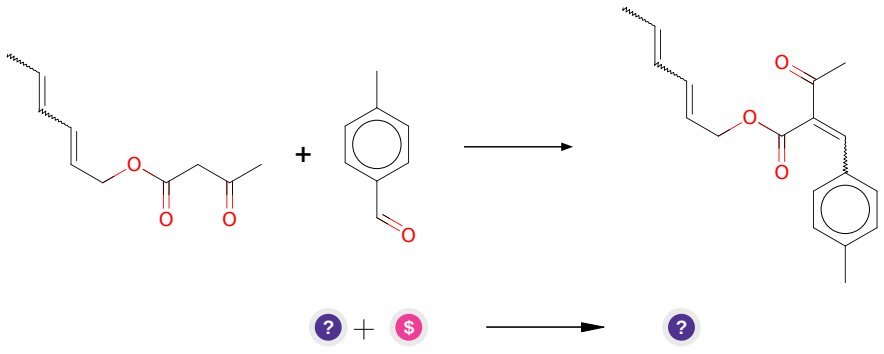
Typical conditions: alcohol.DCC.DMAP.DCM or thiol.DCC.DMAP.DCM

Protections: none

Reference: *10.1002/anie.197805221*

Retrosynthesis ID: 10171

2.3.2 Knoevenagel Condensation



Substrates:

1. CC=CC=CCOC(=O)CC(C)=O
2. p-Tolualdehyde - *available at Sigma-Aldrich*

Products:

1. CC=CC=CCOC(=O)C(=Cc1ccc(C)cc1)C(C)=O

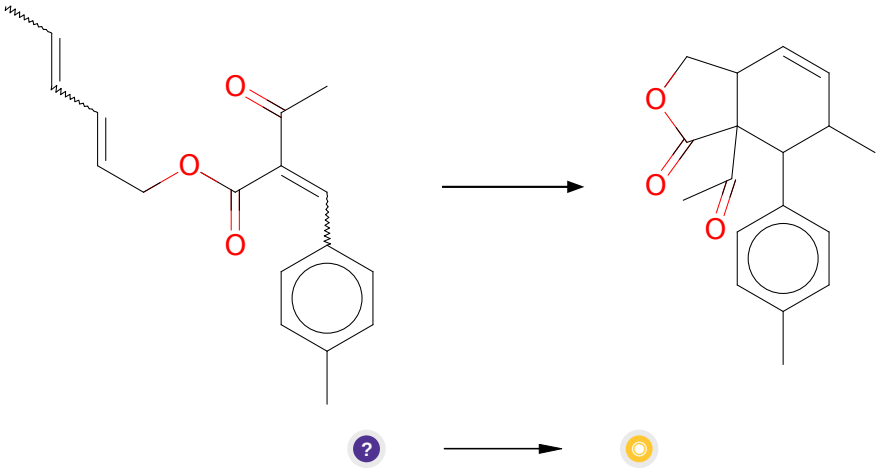
Typical conditions: base e.g.piperidine. solvent

Protections: none

Reference: *10.1002/0471264180.or015.02* and *10.13005/ojc/350154*

Retrosynthesis ID: 252

2.3.3 Diels-Alder



Substrates:

1. CC=CC=CCOC(=O)C(=Cc1ccc(C)cc1)C(C)=O

Products:

1. CC(=O)C12C(=O)OCC1C=CC(C)C2c1ccc(C)cc1

Typical conditions: Lewis acid or chiral Lewis acid. Solvent.

Protections: none

Reference: DOI: *10.1002/1521-3773(20020517)41:10<1668::AID-ANIE1668>3.0.CO;2-Z* AND *10.1021/ja062508t*

Retrosynthesis ID: 18116

2.4 Path 4

Score: 76.25

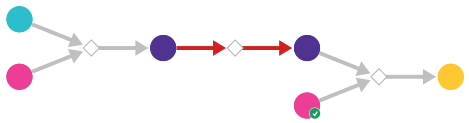
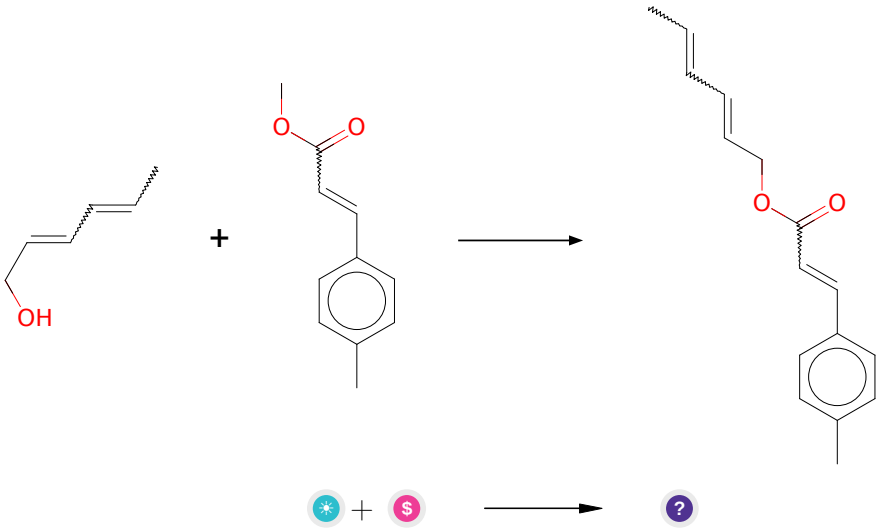


Figure 4: Outline of path 4

2.4.1 Acid catalyzed transesterification



Substrates:

1. sorbic alcohol
2. methyl 3-(p-tolyl)acrylate - *SYNTHONIXCORPORATION*

Products:

1. CC=CC=CCOC(=O)C=Cc1ccc(C)cc1

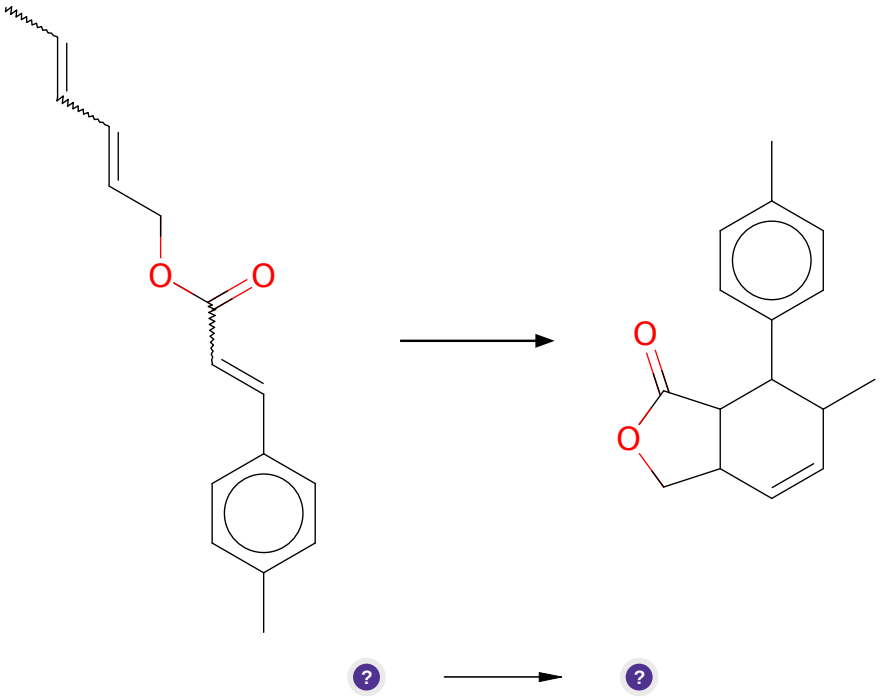
Typical conditions: H+

Protections: none

Reference: *10.1021/cr00020a004*

Retrosynthesis ID: 50438

2.4.2 Diels-Alder



Substrates:

1. CC=CC=CCOC(=O)C=Cc1ccc(C)cc1

Products:

1. Cc1ccc(C2C(C)C=CC3COC(=O)C32)cc1

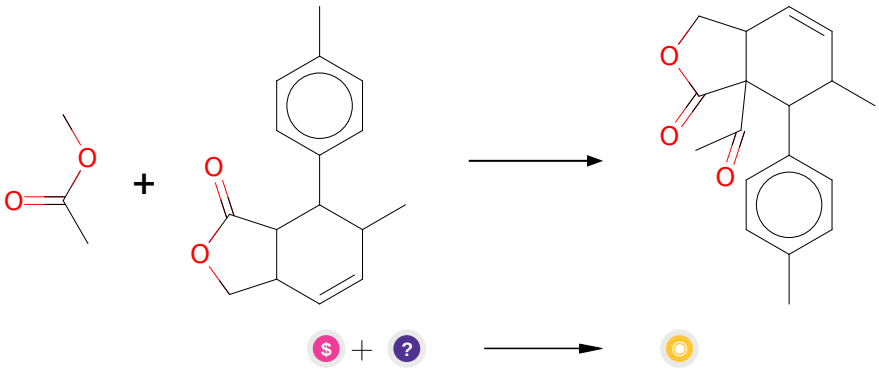
Typical conditions: Lewis acid or chiral Lewis acid. Solvent.

Protections: none

Reference: DOI: *10.1002/1521-3773(20020517)41:10<1668::AID-ANIE1668>3.0.CO;2-Z* AND *10.1021/ja062508t*

Retrosynthesis ID: 18116

2.4.3 Claisen Condensation



Substrates:

1. Methyl acetate - *available at Sigma-Aldrich*
2. Cc1ccc(C2C(C)C=CC3COC(=O)C32)cc1

Products:

1. CC(=O)C12C(=O)OCC1C=CC(C)C2c1ccc(C)cc1

Typical conditions: Base.Solvent

Protections: none

Reference: *10.1021/cr020703u* and *10.1021/cr60088a002*

Retrosynthesis ID: 5015

2.5 Path 5

Score: `84.06`

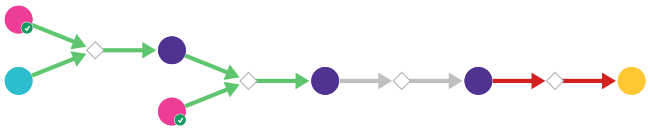
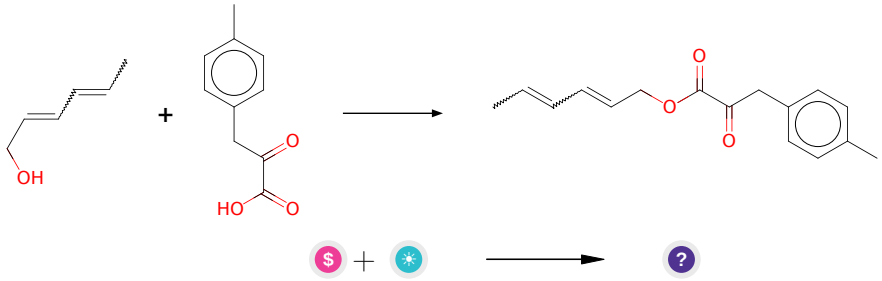


Figure 5: Outline of path 5

2.5.1 Steglich Esterification



Substrates:

1. 3-(4-methylphenyl)-2-oxopropanoic acid - *available at Sigma-Aldrich*
2. sorbic alcohol

Products:

1. CC=CC=CCOC(=O)C(=O)Cc1ccc(C)cc1

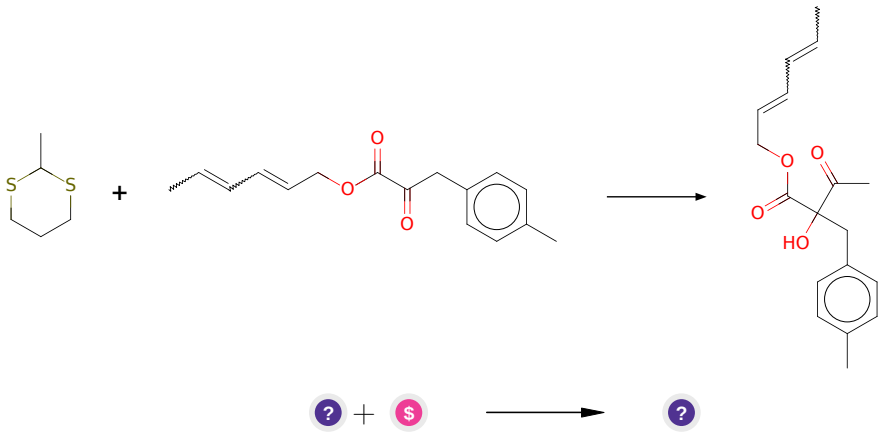
Typical conditions: alcohol.DCC.DMAP.DCM or thiol.DCC.DMAP.DCM

Protections: none

Reference: *10.1002/anie.197805221*

Retrosynthesis ID: 10171

2.5.2 Corey-Seebach



Substrates:

1. CC=CC=CCOC(=O)C(=O)Cc1ccc(C)cc1

2. 2-Methyl-1,3-dithiane - *available at Sigma-Aldrich*

Products:

1. CC=CC=CCOC(=O)C(O)(Cc1ccc(C)cc1)C(C)=O

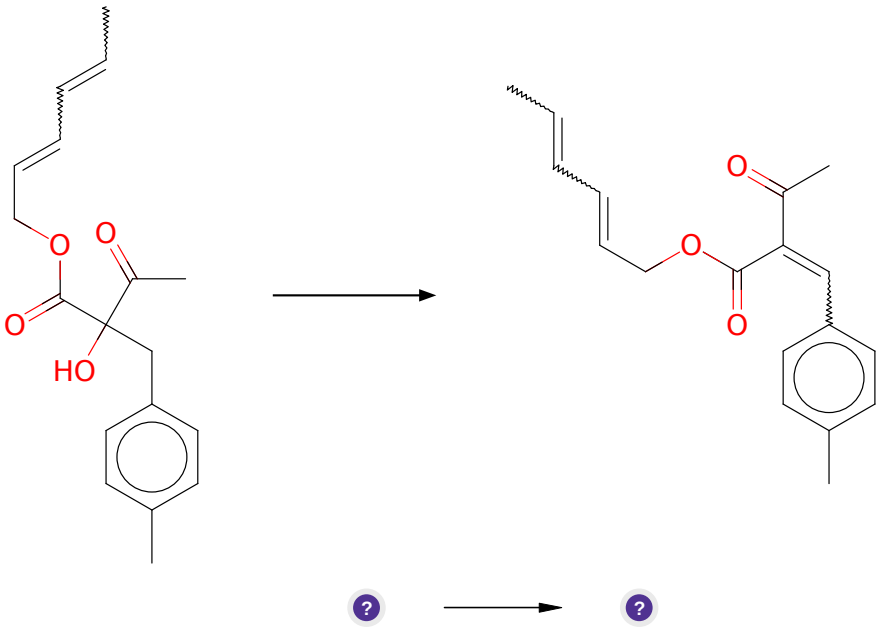
Typical conditions: BuLi.THF.-30C.HgO.H2O.THF

Protections: none

Reference: *10.1055/s-1977-24412*

Retrosynthesis ID: 11199

2.5.3 Elimination of tertiary alcohols



Substrates:

1. CC=CC=CCOC(=O)C(O)(Cc1ccc(C)cc1)C(C)=O

Products:

1. CC=CC=CCOC(=O)C(=Cc1ccc(C)cc1)C(C)=O

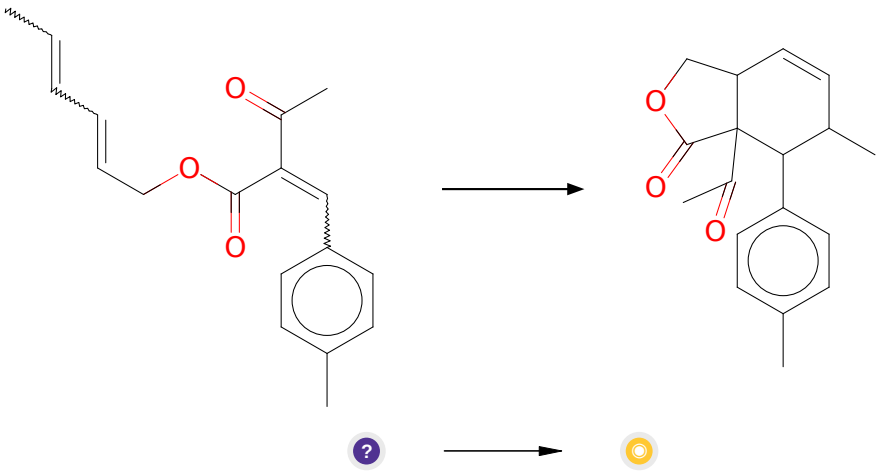
Typical conditions: TsOH.toluene.reflux

Protections: none

Reference: *10.1016/j.bmc.2008.07.050* and *10.1155/2010/604549* and *10.1016/j.steroids.2004.11.008*

Retrosynthesis ID: 24119

2.5.4 Diels-Alder



Substrates:

1. CC=CC=CCOC(=O)C(=Cc1ccc(C)cc1)C(C)=O

Products:

1. CC(=O)C12C(=O)OCC1C=CC(C)C2c1ccc(C)cc1

Typical conditions: Lewis acid or chiral Lewis acid. Solvent.

Protections: none

Reference: DOI: *10.1002/1521-3773(20020517)41:10<1668::AID-ANIE1668>3.0.CO;2-Z* AND *10.1021/ja062508t*

Retrosynthesis ID: 18116