

Paths of analysis*

OP_Exp

Synthia

February 13, 2024

1 Analysis parameters

Analysis type: Automatic Retrosynthesis

Rules: Expert-Coded Rules

Published Reactions: none selected

Filters: Exclude Diastereoselective 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

Shorter paths: no

Pathway linearity: COMBO

Protecting groups: BALANCED

*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.

Reaction scoring formula: $\text{TUNNEL_COEF} * \text{FGI_COEF} * \text{STEP} * 20 + 100000 * (\text{FILTERS} + \text{CONFLICT} + \text{NON_SELECTIVITY}) + 40 * \text{PROTECT}$

Chemical scoring formula: $\text{SMALLER}^3, \text{SMALLER}^{1.5}$

Min. search width: 400

Max. reactions per product: 60

Strategies: none selected

FGI Coeff: 1

Tunnels Coeff: 1

JSON Parameters: {}

2 Paths

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

2.1 Path 1

Score: 180.60

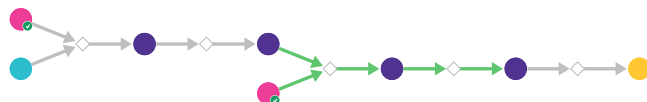
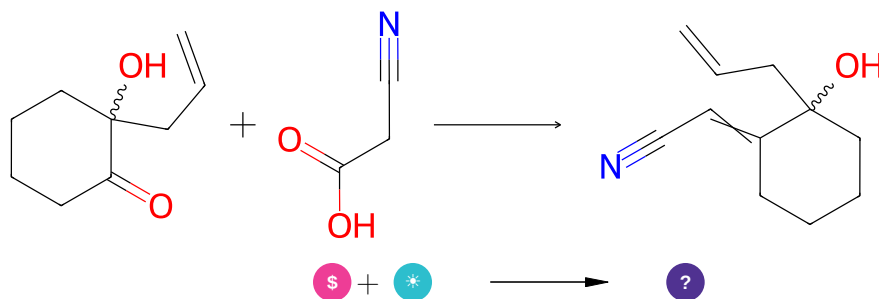


Figure 1: Outline of path 1

2.1.1 Knoevenagel condensation



Substrates:

1. Cyanoacetic acid - *available at Sigma-Aldrich*

2. 2-Allyl-2-hydroxycyclohexanone

Products:

1. C=CCC1(O)CCCCC1=CC#N

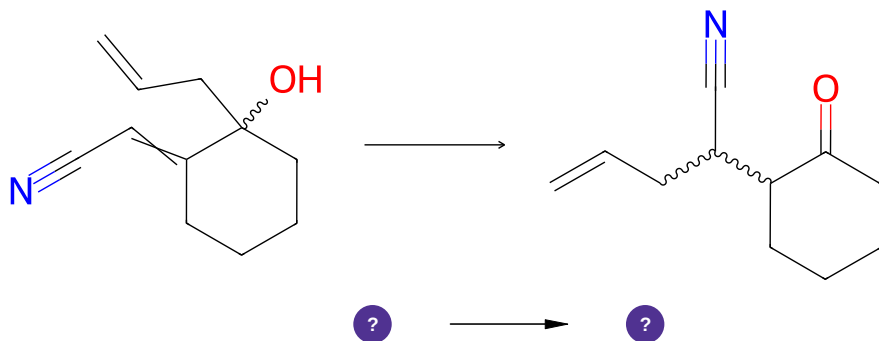
Typical conditions: NH₄OAc.AcOH.heat

Protections: none

Reference: WO2005/44008 p.96 and [10.1002/hlca.201200162](#) and [10.1002/chem.200903053](#) and WO2005/44008 p.90 and US4012377 p.

Retrosynthesis ID: 32838

2.1.2 Oxy-Cope rearrangement



Substrates:

1. C=CCC1(O)CCCCC1=CC#N

Products:

1. C=CCC(C#N)C1CCCCC1=O

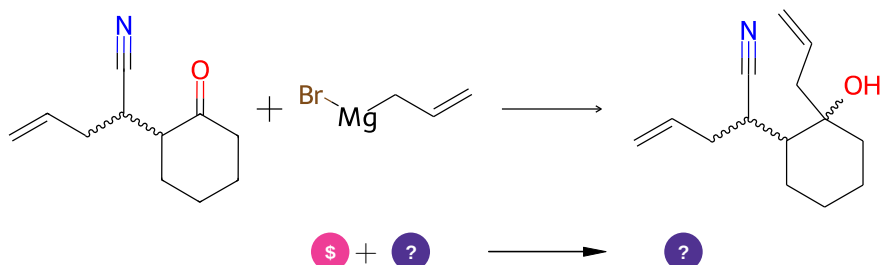
Typical conditions: KH.THF.or.heat

Protections: none

Reference: [10.1021/jo2013753](#) AND [10.1021/ja00849a054](#) AND [10.1039/C0CC05215A](#) AND [10.1016/B978-0-08-095167-6.00213-5](#)

Retrosynthesis ID: 19821

2.1.3 Addition of Grignard reagents



Substrates:

1. Allylbromomagnesium - *available at Sigma-Aldrich*
2. C=CCC(C#N)C1CCCCC1=O

Products:

1. C=CCC(C#N)C1CCCCC1(O)CC=C

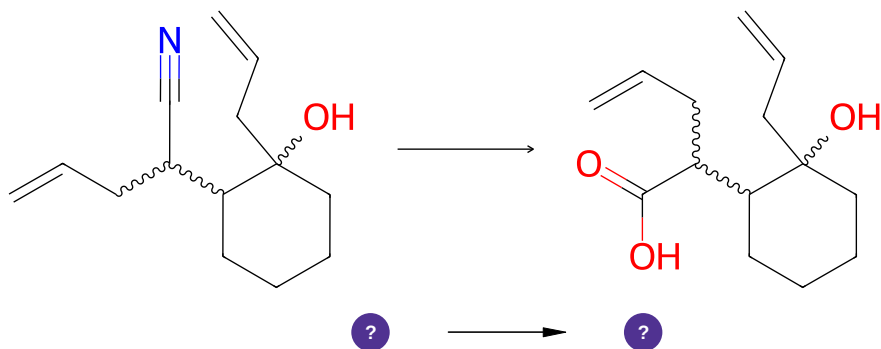
Typical conditions: THF.cooling

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

2.1.4 Hydrolysis of nitriles



Substrates:

1. C=CCC(C#N)C1CCCCC1(O)CC=C

Products:

1. C=CCC(C(=O)O)C1CCCCC1(O)CC=C

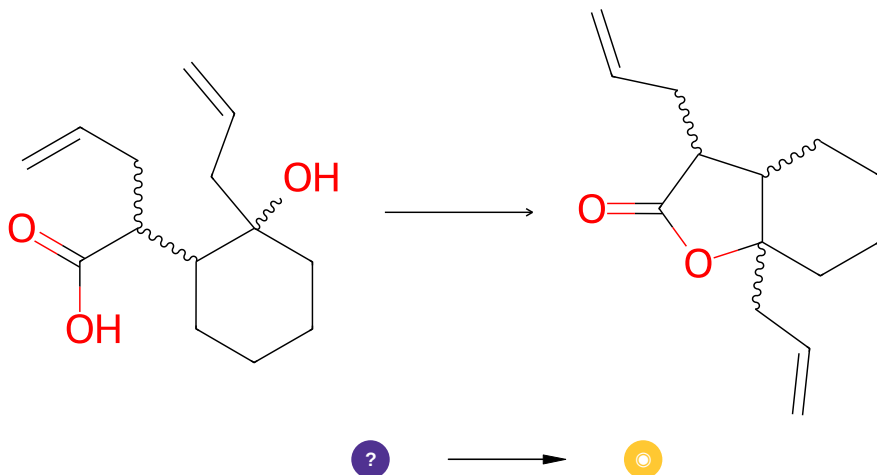
Typical conditions: NaOH.heating.H2O

Protections: none

Reference: [10.1002/1099-0690\(200111\)2001:22<4207::AID-EJOC4207>3.0.CO;2-3](#) and [10.1021/acs.jmedchem.5b00702](#) and [10.1016/j.bmc.2011.07.045](#)

Retrosynthesis ID: 15107

2.1.5 Intramolecular Nucleophilic Acyl Addition



Substrates:

1. C=CCC(C(=O)O)C1CCCCC1(O)CC=C

Products:

1. C=CCC1C(=O)OC2(CC=C)CCCCC12

Typical conditions: DCC.4-PPY.DCM or MNBA.DMAP.DCM

Protections: none

Reference: [10.1016/S0040-4020\(01\)85848-8](#) p. 613, 615 and US2015322051A1 p. 0088

Retrosynthesis ID: 10164