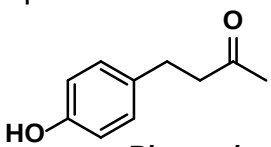
CHEM 8410_6410_4410 – Organic Synthesis

THE UNIVERSITY OF TOLEDO 1872

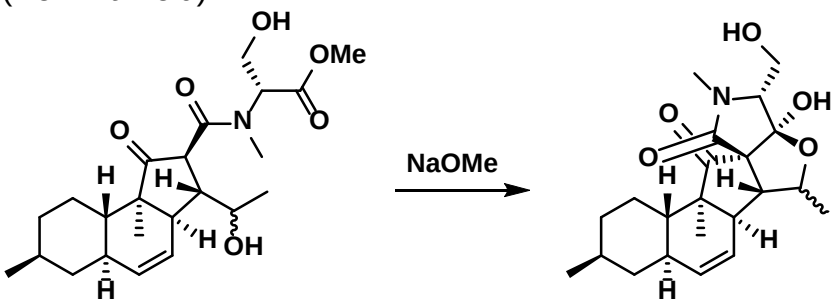
Problem Set 1: This problem set is now available at (www.blackboard.utoledo.edu). It will be due in class 21 days (02/09/16) from today (01/19/16) in class. Grades will be administered as follows: 10 (exceptional effort), 8 (complete), 5 (incomplete or inadequate effort), 2 (poor effort), 0 (nonexistent) per question (3 questions total). ***No late problem sets will be accepted.***

1. **Problem:** The product of an aldol condensation is an α,β-unsaturated ketone which is capable of undergoing hydrogenation to yield a saturated ketone. Using this technique, identify the reagents that you would need in order to prepare rheosmin *via* a crossed aldol reaction. Rheosmin is isolated from raspberries and is often used in perfume formulations for its pleasant odor. Hint: The presence of a phenolic proton will be problematic during an aldol reaction. (Can you explain why using mechanistic insight?) Consider using a protecting group on the phenol. Please make sure to show the synthesis of starting reagents that are beyond three carbons except for the phenolic portion…if need be.

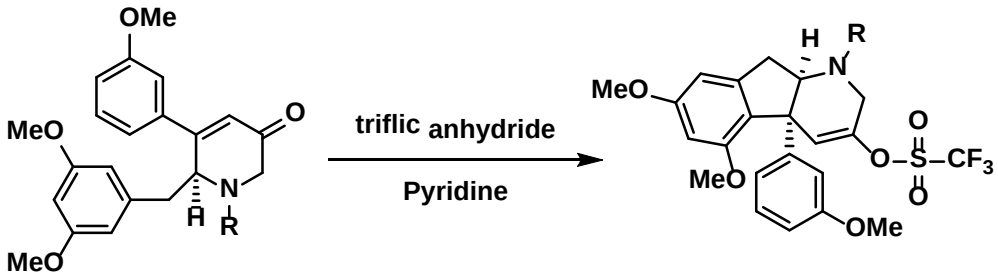


Rheosmin

2. **Problem:** The compound fusarisetin A (isolated from a soil fungus) displays significant anticancer activity without detectable cytotoxicity. A key step in a reported synthesis of the enantiomer of fusarisetin A involves a Dieckmann cyclization followed by the intramolecular formation of a hemiacetal under basic conditions. Provide a mechanism consistent with this transformation. (Ref. withheld)



3. **Problem:** The following synthetic step was utilized as part of a recent synthesis of the polycyclic natural product haouamine B (Ref. withheld). In this reaction, the function of the first reagent (triflic anhydride) is to activate the Michael acceptor that is present in the starting compound (rendering it even more electrophilic), so that it can undergo an intramolecular Michael reaction. Draw a mechanism for this reaction and explain the observed stereochemistry of the newly formed chiral center.


OMe
MeO
MeO
O
N
H
R
triflic anhydride
Pyridine
H
R
N
MeO
MeO
OMe
O
O–S–CF3
O