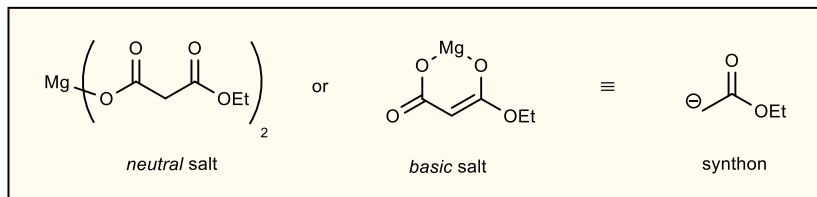


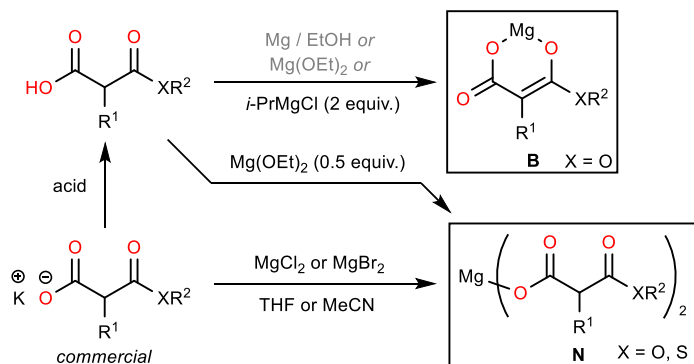
Reagent



- A powerful mild synthon of ester and thioester enolates.
- Used in 1,3 and 1,5-ketoester syntheses

Preparation

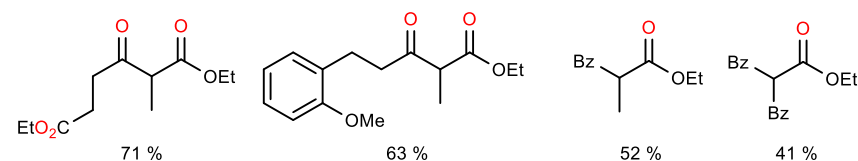
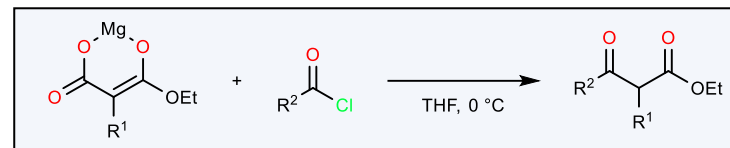
- *i*-PrMgCl is preferred for basic salt formation (basic salt needs to be devoid of ethanol for many applications)
- Mg(OEt)₂ is convenient base for neutral salts (moderately air-stable)
- Cation metathesis is a common procedure with commercial salts



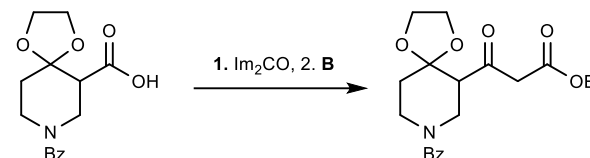
- (1) Andrus, A. Magnesium Ethyl Malonate. In *Encyclopedia of Reagents for Organic Synthesis*; American Cancer Society, 2001. <https://doi.org/10.1002/047084289X.rm004>.
- (2) Ireland, R. E.; Marshall, J. A. *J. Am. Chem. Soc.* **1959**, *81* (11), 2907–2908. <https://doi.org/10.1021/ja01520a073>.
- (3) Brooks, D. W.; Lu, L. D.-L.; Masamune, S. *Angew. Chem. Int. Ed.* **1979**, *18* (1), 72–74. <https://doi.org/10.1002/anie.197900722>.
- (4) Ouellet, S. G.; Gauvreau, D.; Cameron, M.; Dolman, S.; Campeau, L.-C.; Hughes, G.; O'Shea, P. D.; Davies, I. W. *Org. Process Res. Dev.* **2012**, *16* (2), 214–219. <https://doi.org/10.1021/op200299p>.
- (5) Nagao, Y.; Matsunaga, H.; Kumagai, T.; Inoue, Y.; Miwa, Y.; Taga, T. *J. Chem. Soc., Chem. Commun.* **1992**, No. 5, 437–439. <https://doi.org/10.1039/C39920000437>.

Basic Salt (**B**) Reactivity

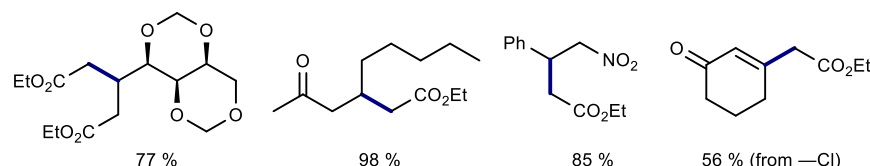
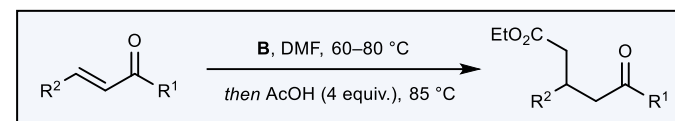
- Ireland 1,3-ketoester synthesis [2]



- Activated esters in ketoester synthesis [6]

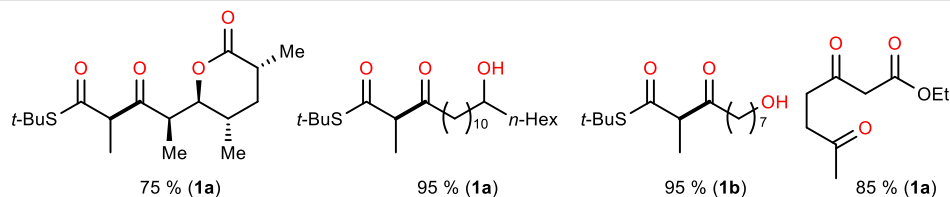
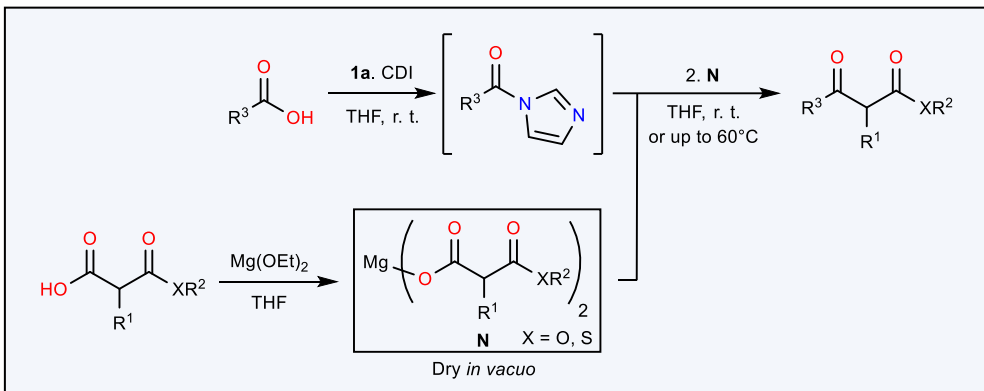


- Conjugate additions in 1,5-ketoester synthesis [7]

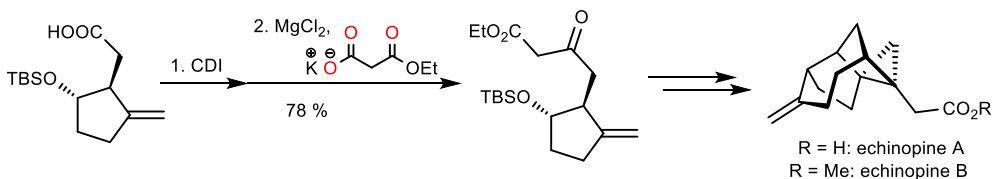


- (6) Houghten, R. A.; Simpson, R. A.; Hanson, R. N.; Rapoport, H. *J. Org. Chem.* **1979**, *44* (25), 4536–4543. <https://doi.org/10.1021/jo00393a017>.
- (7) Mcmurry, J. E.; Andrus, W. A.; Musser, J. H. *Synth. Commun.* **1978**, *8* (1), 53–57. <https://doi.org/10.1080/00397917808062183>.

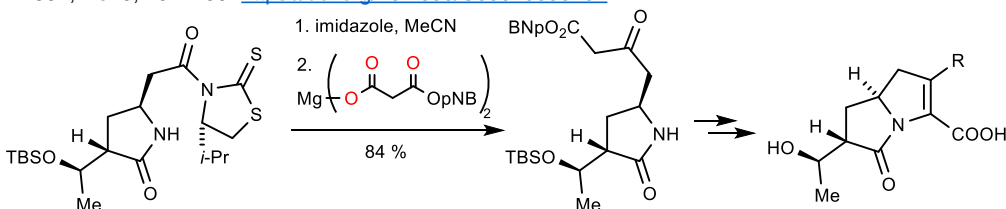
Masamune Ketoester Synthesis [3]



Nicolaou, K. C.; Ding, H.; Richard, J.-A.; Chen, D. Y.-K. *J. Am. Chem. Soc.* **2010**, *132* (11), 3815–3818. <https://doi.org/10.1021/ja9093988>.

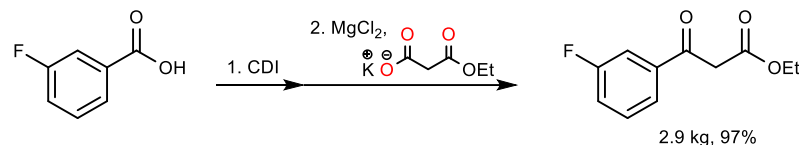


Nagao, Y.; Matsunaga, H.; Kumagai, T.; Inoue, Y.; Miwa, Y.; Taga, T. *J. Chem. Soc., Chem. Commun.* **1992**, No. 5, 437–439. <https://doi.org/10.1039/C39920000437>.



Process Scale

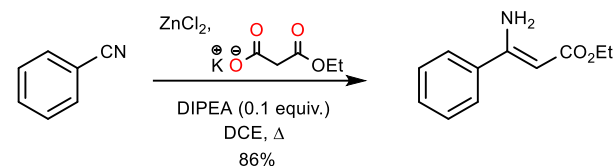
Ouellet, S. G.; Gauvreau, D.; Cameron, M.; Dolman, S.; Campeau, L.-C.; Hughes, G.; O'Shea, P. D.; Davies, I. W. *Org. Process Res. Dev.* **2012**, *16* (2), 214–219. <https://doi.org/10.1021/op200299p>.



Miscellaneous Related Reactions

Decarboxylative approach provides **very mild conditions** for aldol and related reactions. Soft enolization of chelated complex possible with many metals, not just with magnesium.

Lee, J. H.; Choi, B. S.; Chang, J. H.; Lee, H. B.; Yoon, J.-Y.; Lee, J.; Shin, H. *J. Org. Chem.* **2007**, *72* (26), 10261–10263. <https://doi.org/10.1021/jo701743m>.



Lalic, G.; Aloise, A. D.; Shair, M. D. *J. Am. Chem. Soc.* **2003**, *125* (10), 2852–2853. <https://doi.org/10.1021/ja029452x>.

