Synthesis of Suffranidine B

Gyumin Kang and Sunkyu Han*

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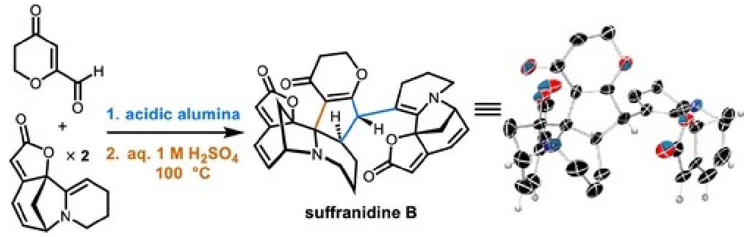
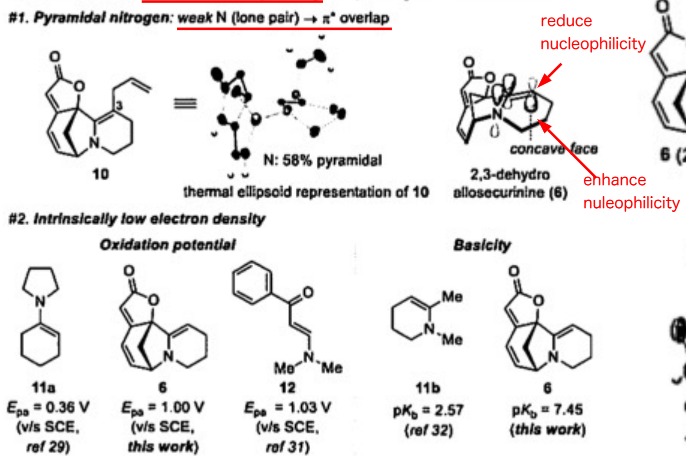
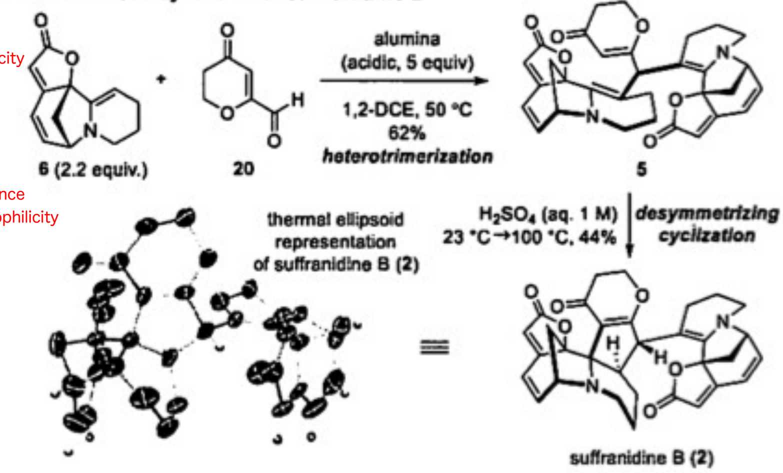


B. Rationale for the weak nucleophilicity of 2,3-dehydroallosecurinine

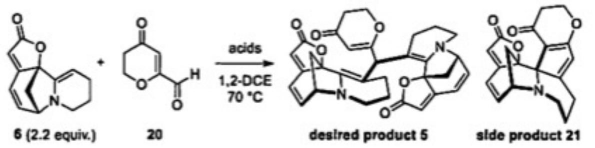


B. Biomimetic synthesis of suffranidine B



Scheme 4. Optimization and Mechanistic Considerations of the Heterotrimerization Step

A. Optimization of the heterotrimerization step

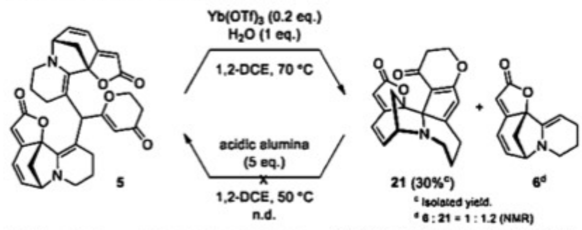


Entry	Acids	Yield[a] (5	: 21)
1	-	9%	n.d.
2	p-TsOH H_2O (0.2 equiv)	n.d.	13%[b]
3	$Yb(OTf)_3$ (0.2 equiv)	15%	45%
4	$Yb(OTf)_3$ (0.2 eq.), collidine (2 equiv)	31%	8%
5	alumina (acidic, 2.5 equiv)	43%	n.d.
6	alumina (acidic, 5 equiv), 50 °C	62%[b]	n.d.
7	Amberlyst 15 (dry, 2.5 equiv)	n.d.	3%

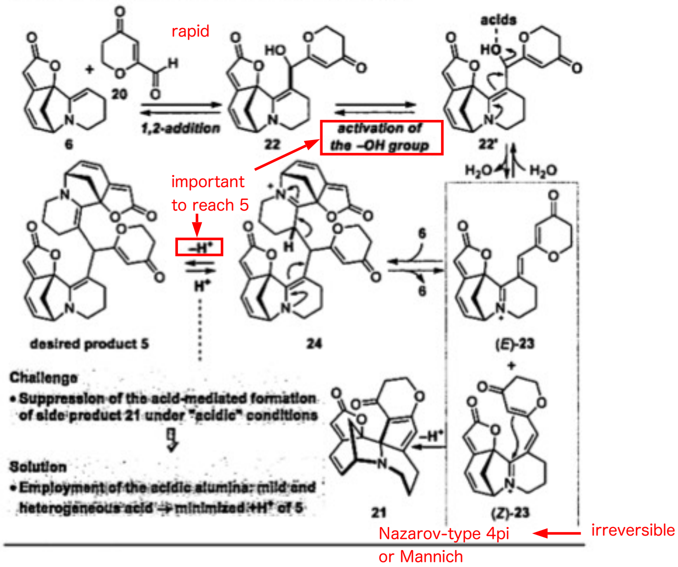
[a] Yield was determined by the NMR analysis of the crude reaction mixture. [b] Isolated yield.

mild acidity and heterogeneous nature

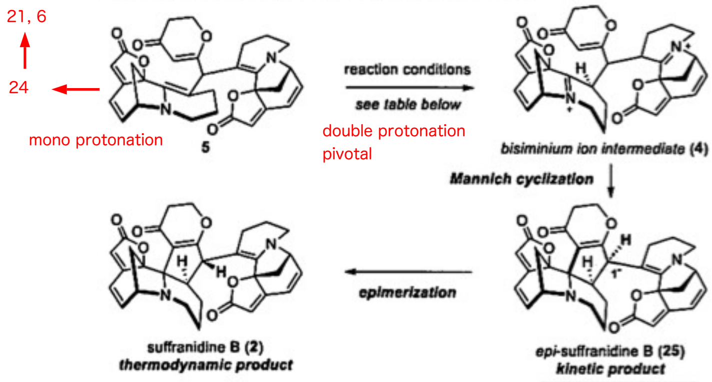
B. Chemical reactivities of 5 and 21



C. Plausible mechanisms for the formation of 5 and 21

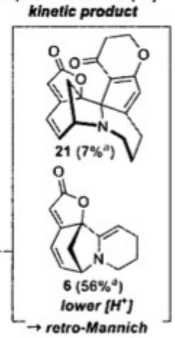


A. Optimization of the desymmetrizing cyclization step

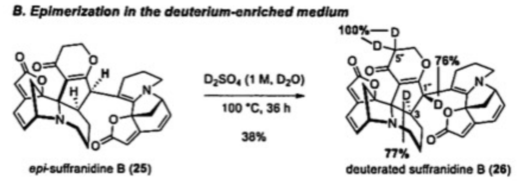


Entry	Reaction conditions	Yield[a] (25	: 2)
1	MsOH (10 eq.) 1,2-DCE, 23 °C	no reaction	
2	TFA (neat), 23 °C	decomposition	
3[d]	H_2SO_4 (aq. 1 M), 23 °C, 2 h	59%[b]	9%[b]
4[c,d]	H_2SO_4 (aq. 1 M), 60 °C, 36 h	28%	27%
5[c,d]	H_2SO_4 (aq. 1 M), 80 °C, 36 h	9%	39%
6[c,d]	H_2SO_4 (aq. 1 M), 100 °C, 36 h	2%[b]	44%[b]
7[c]	H_2SO_4 (aq. 0.1 M), 60 °C, 36 h	11%	6%

[a] Yield was determined by the NMR analysis of the crude reaction mixture.
[b] Isolated yield. [c] The reaction mixture was heated after reacting 2 h in 23 °C.
[d] 4–8% of 2,3-dehydroallosecurinine (6) was observed.



B. Epimerization in the deuterium-enriched medium



C. Plausible mechanistic pathways of the epimerization step