

Supporting Information

Discovery of novel 2-aryl-4-benzoyl-imidazoles targeting the colchicines binding site in tubulin as potential anticancer agents

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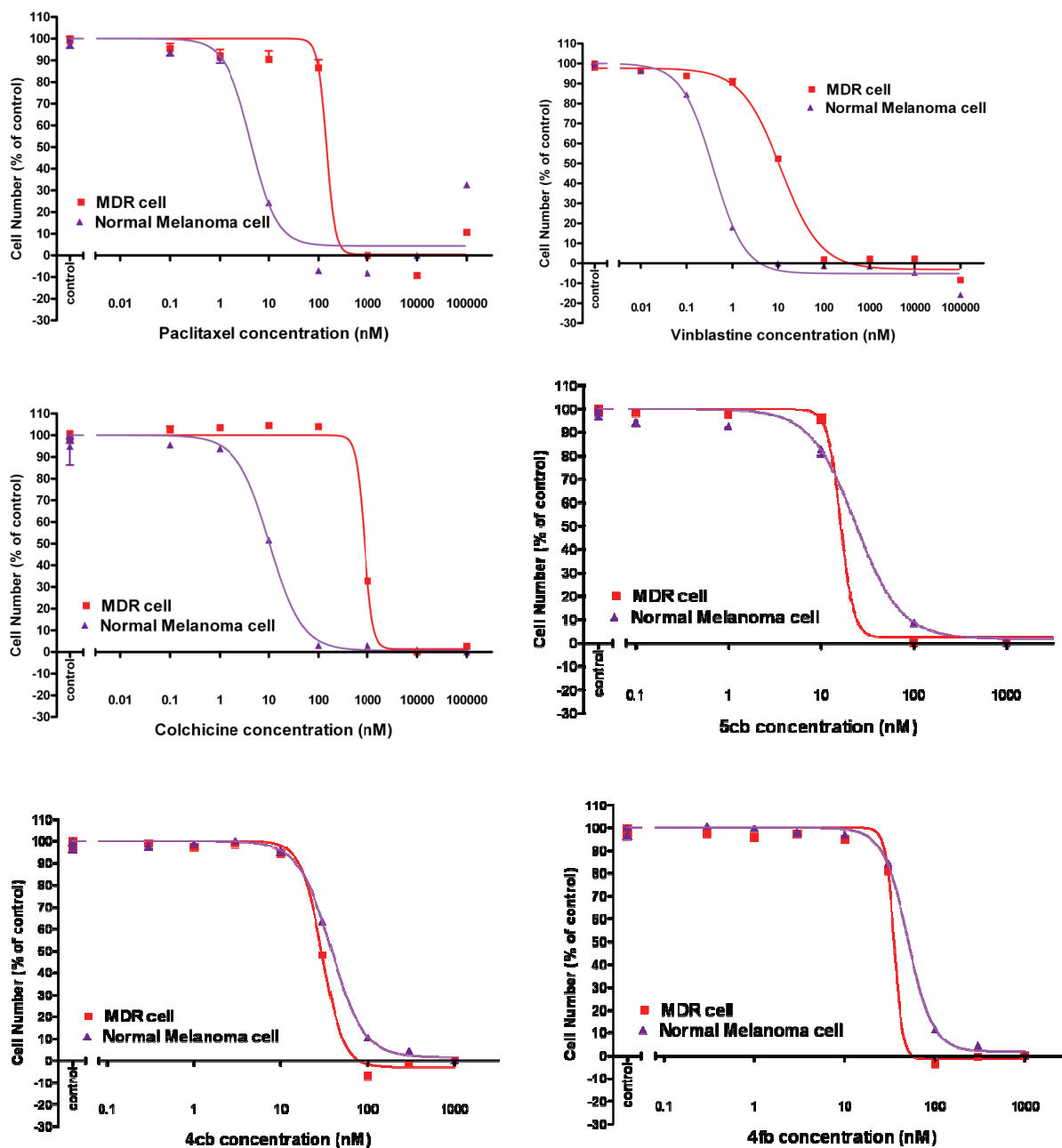


Figure S1. Dose-response curves of ABI compounds (5cb, 4cb, and 4fb) and comparison with other tubulin targeting agents (paclitaxel, vinblastine, and colchicine) on Pgp-mediated multidrug resistant melanoma cell line (MDR cell) and the match sensitive parent cell line (Normal Melanoma cell).

Compound	IC ₅₀ ± SEM (n=3)	
	Tubulin binding (μM)	A375 (nM)
5cb	3.4±1.5	31±5
Colchicine	1.8±0.5	20±3
Paclitaxel	N/A	12±3

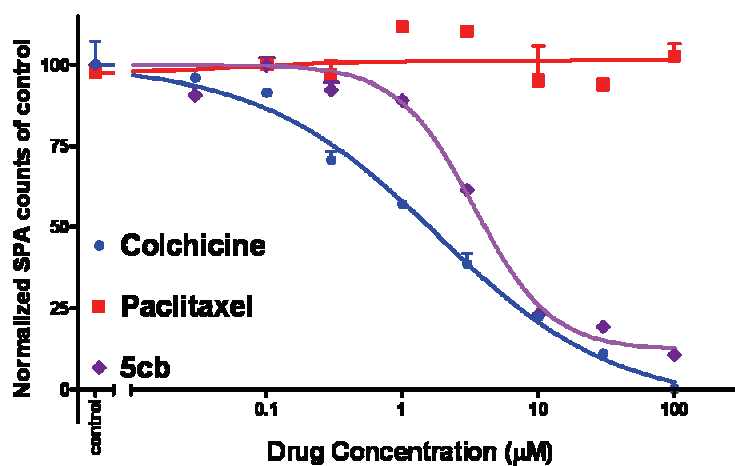
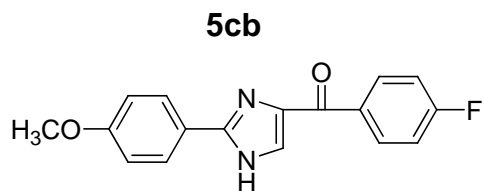


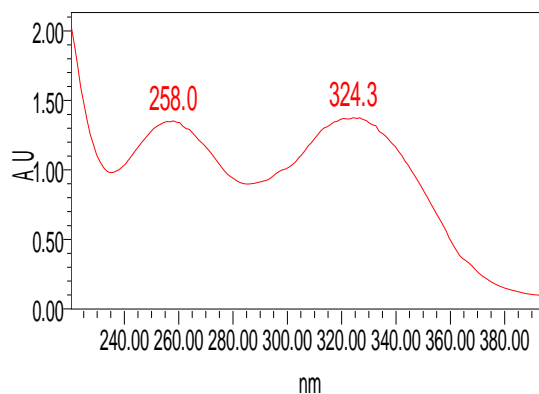
Figure S2. [³H]-colchicine competition-binding scintillation proximity assay showed that ABI compounds competitively bound to the colchicine binding site in tubulin.



Chemical Formula: $C_{17}H_{13}FN_2O_2$

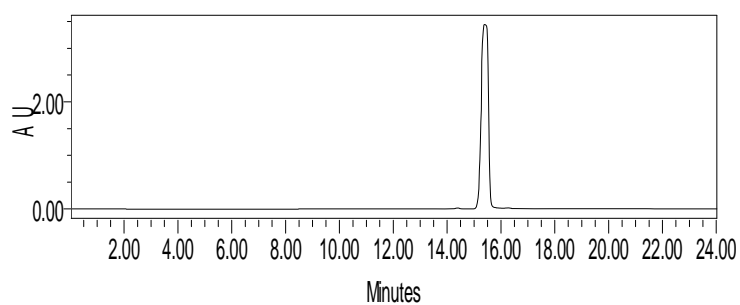
Exact Mass: 296.10

Molecular Weight: 296.30



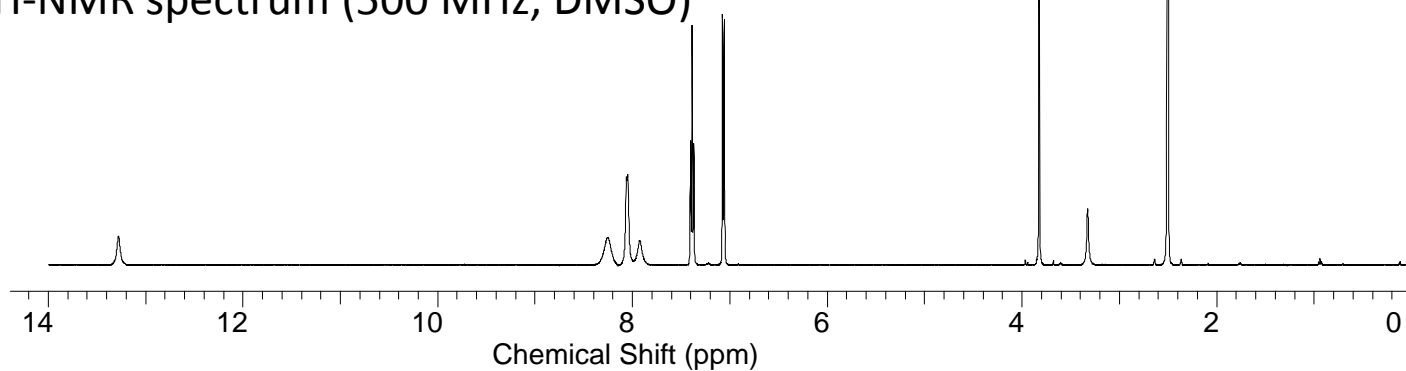
UV spectrum

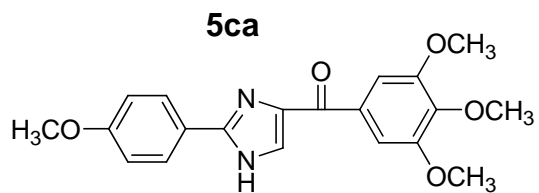
HPLC purity determination



Purity=98.8%, t_R =15.4 min

H-NMR spectrum (500 MHz, DMSO)

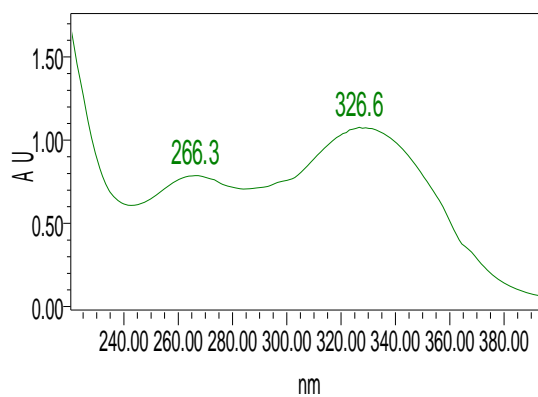




Chemical Formula: $C_{20}H_{20}N_2O_5$

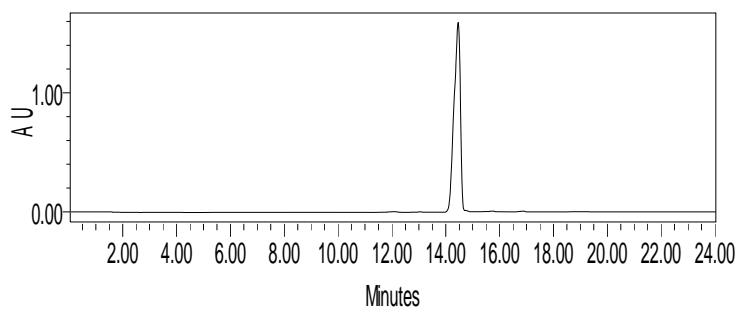
Exact Mass: 368.14

Molecular Weight: 368.38



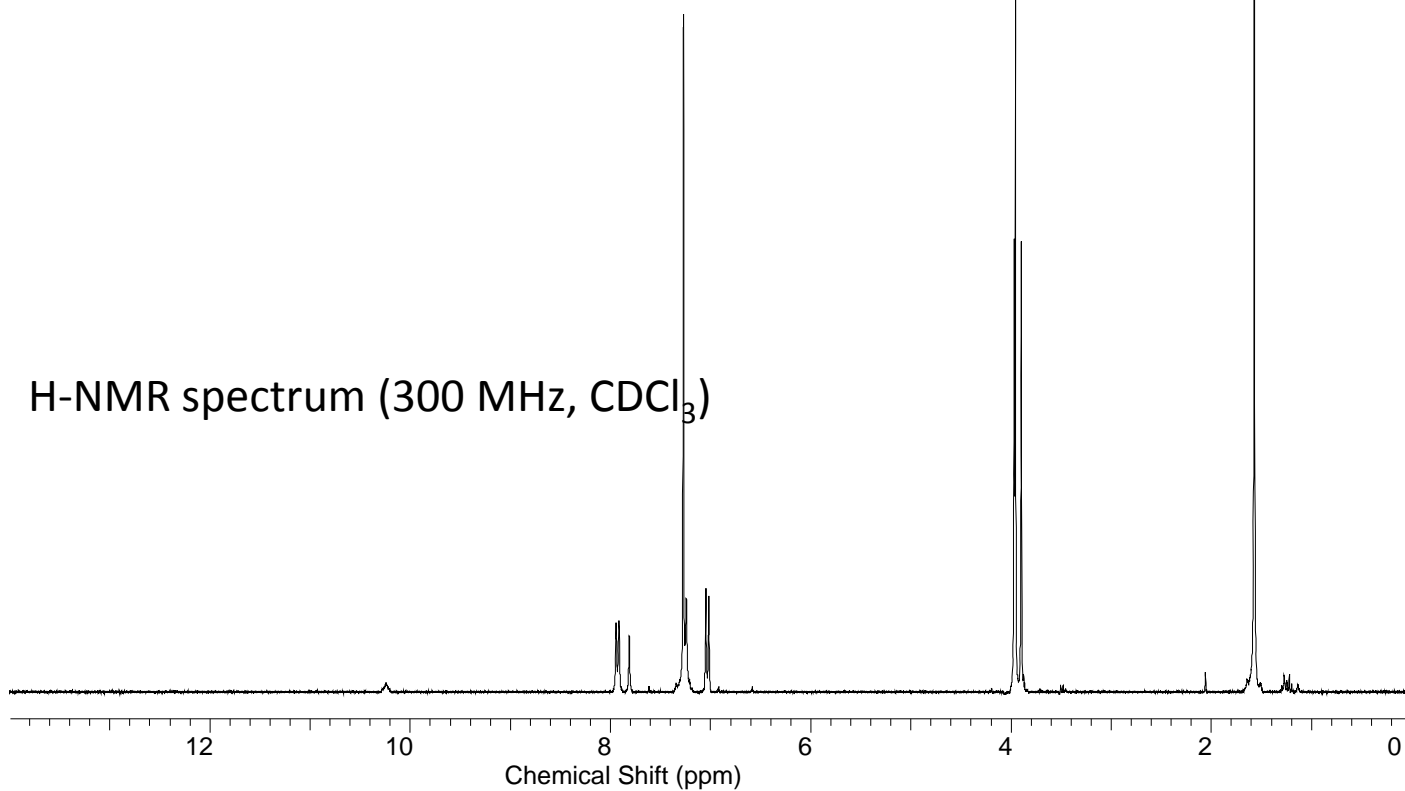
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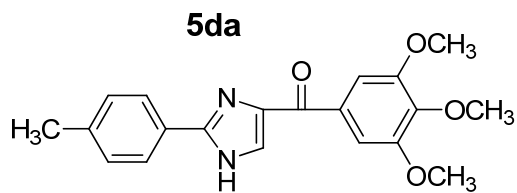
HPLC purity determination



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H-NMR spectrum (300 MHz, $CDCl_3$)

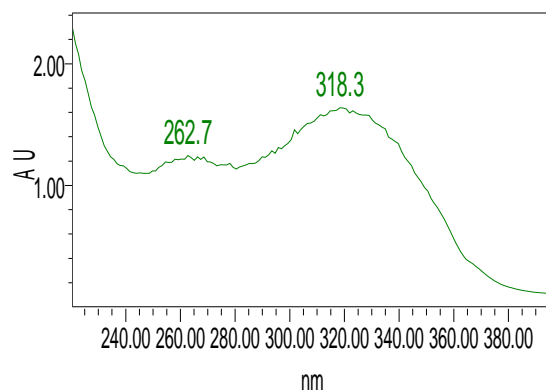




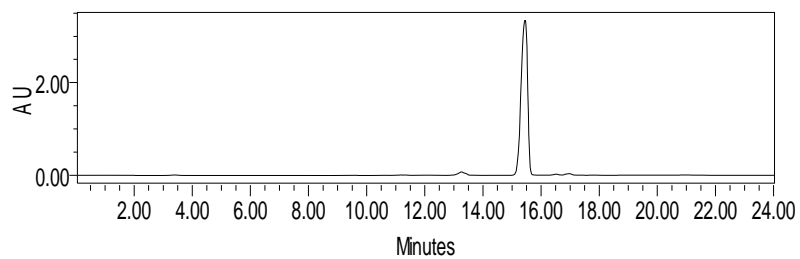
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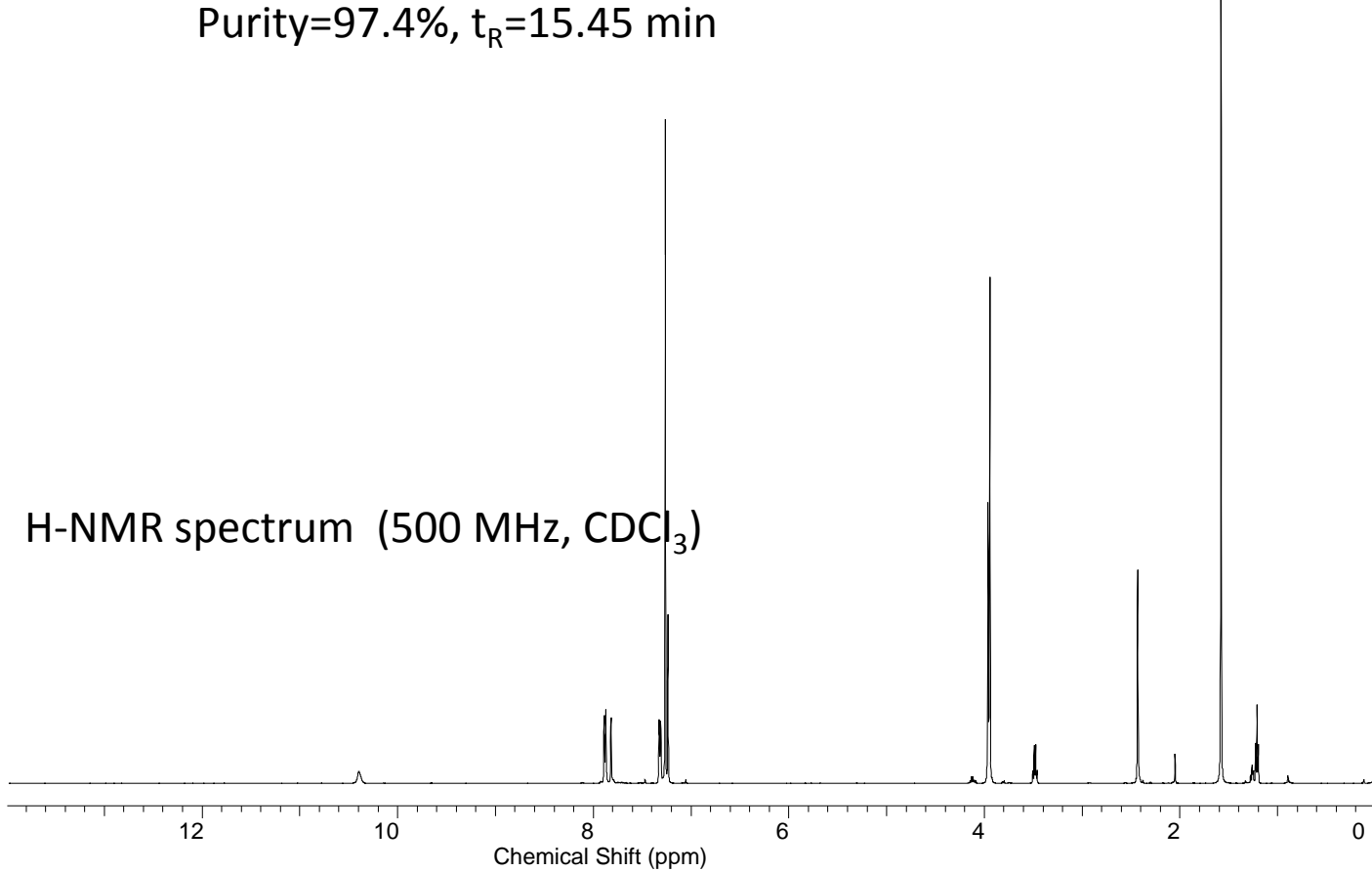
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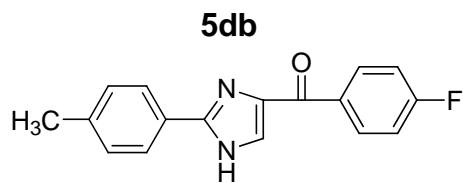


HPLC purity determination



H-NMR spectrum (500 MHz, $CDCl_3$)

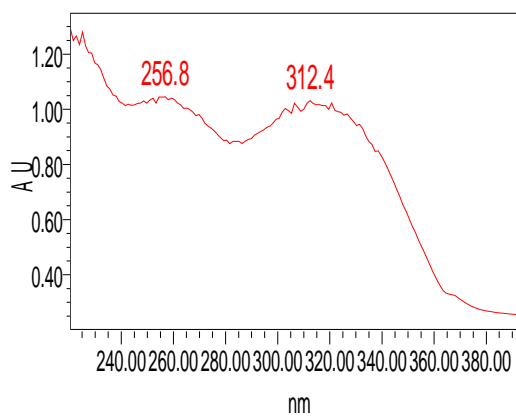




Chemical Formula: C₁₇H₁₃FN₂O

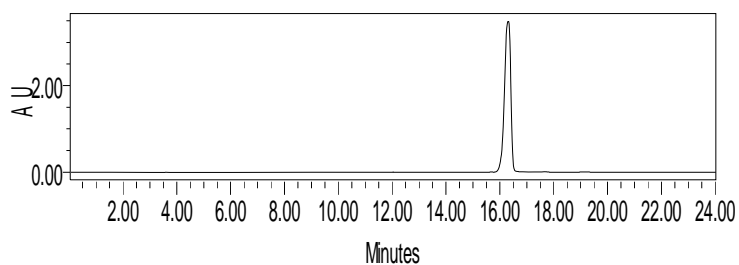
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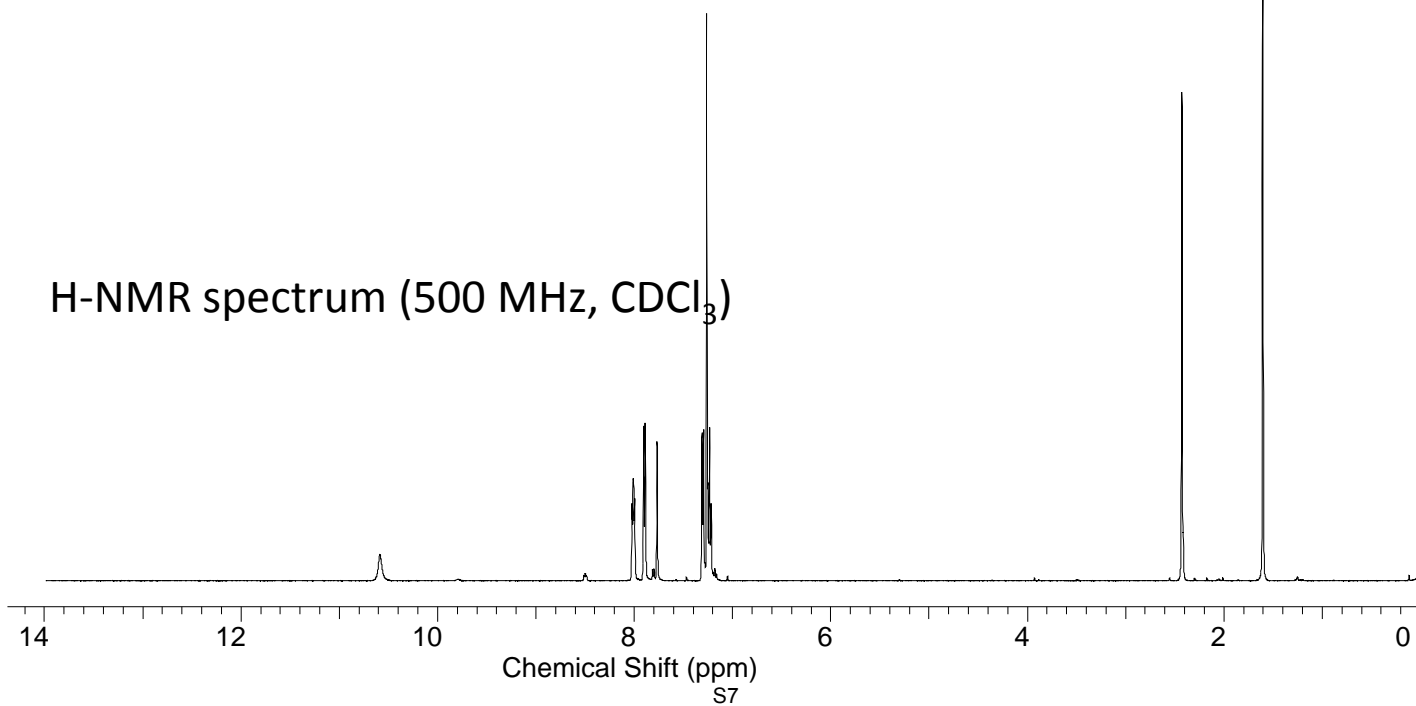


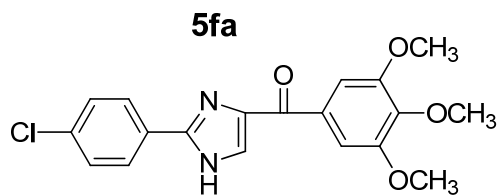
UV spectrum

HPLC purity determination



Purity >99%, t_R=16.31 min

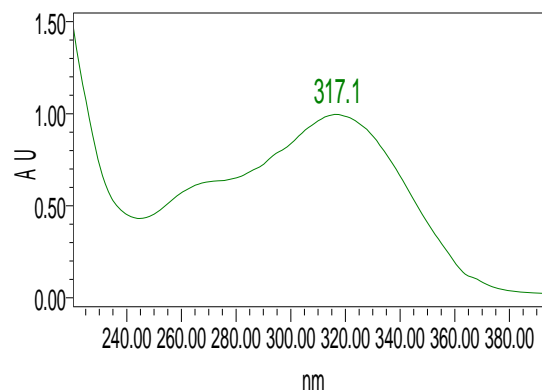




Chemical Formula: $C_{19}H_{17}ClN_2O_4$

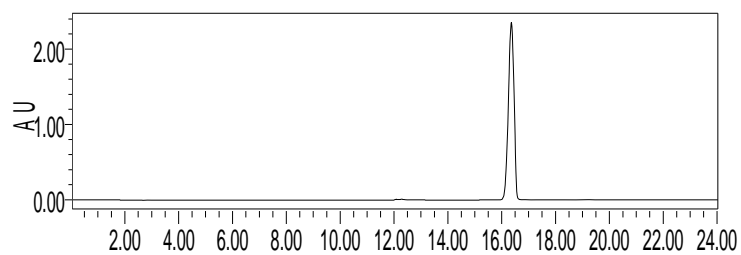
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Molecular Weight: 372.80



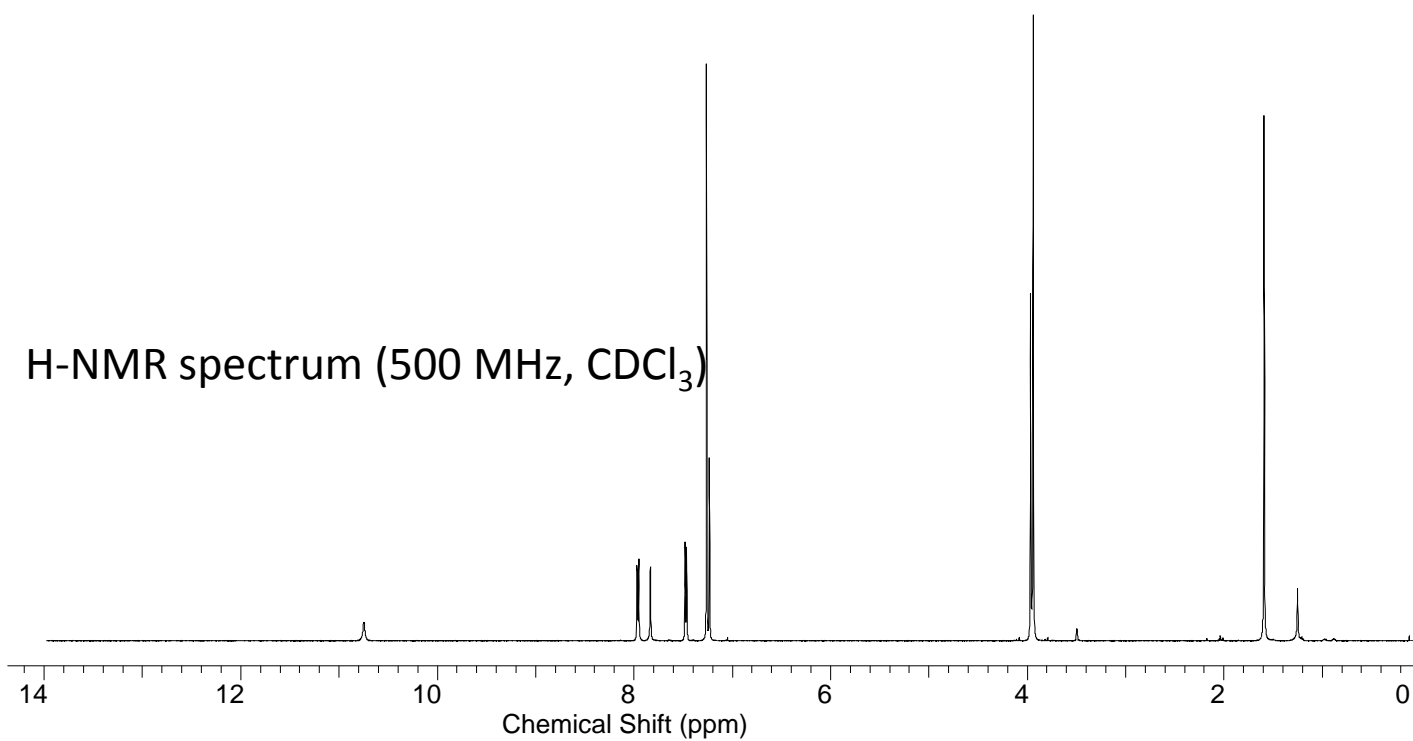
UV spectrum

HPLC purity determination

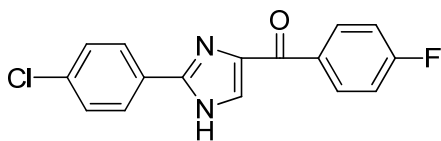


Purity >99%, $t_R = 16.36$ min

H-NMR spectrum (500 MHz, $CDCl_3$)



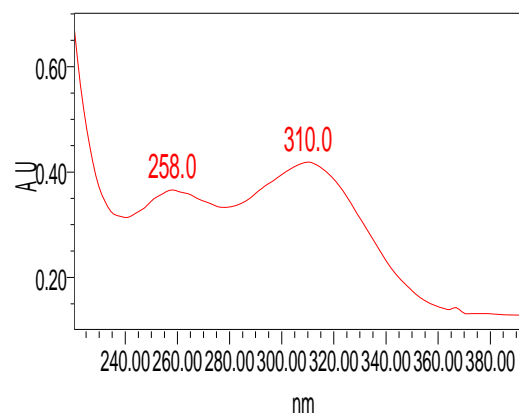
5fb



Chemical Formula: $C_{16}H_{10}ClFN_2O$

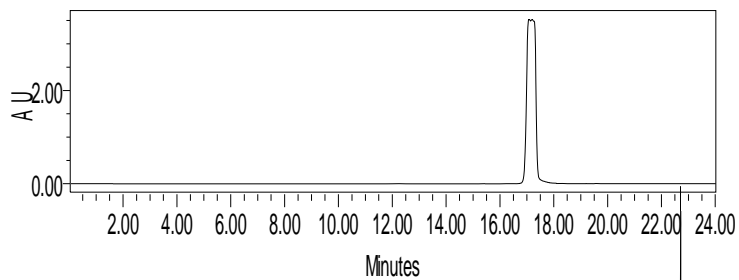
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Molecular Weight: 300.71



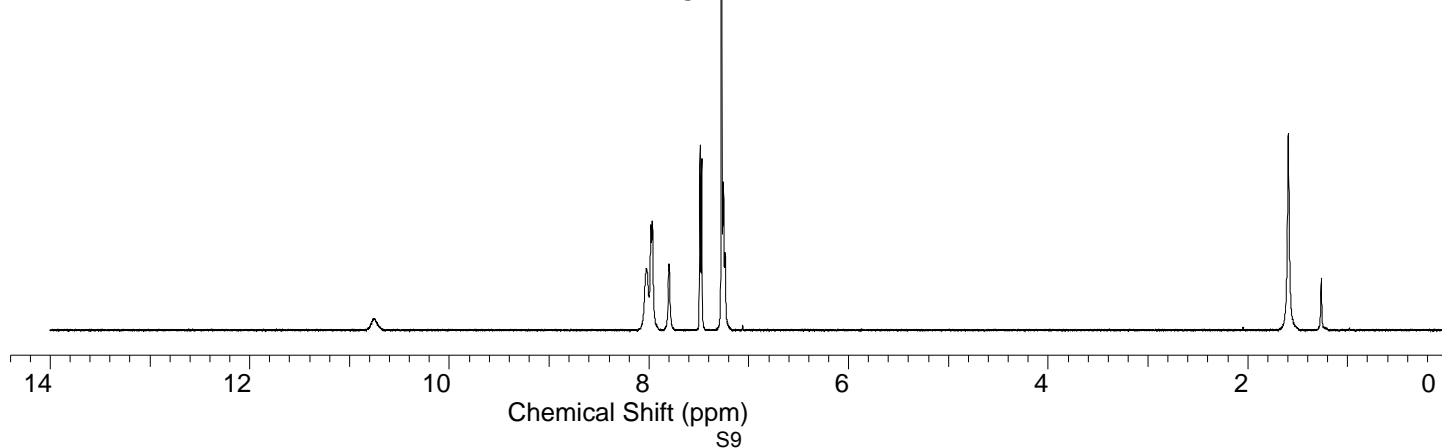
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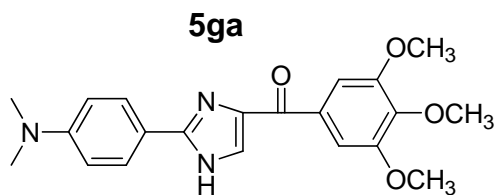
HPLC purity determination



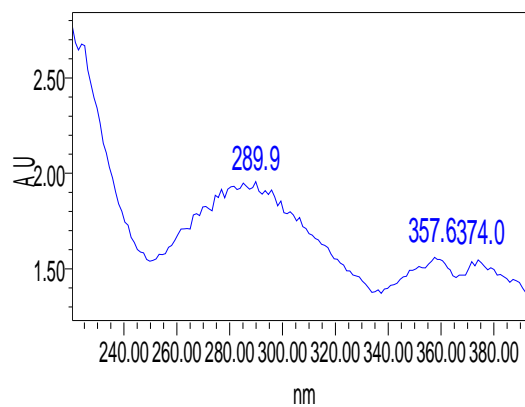
Purity >99%, $t_R=17.08$ min

H-NMR spectrum (500 MHz, $CDCl_3$)



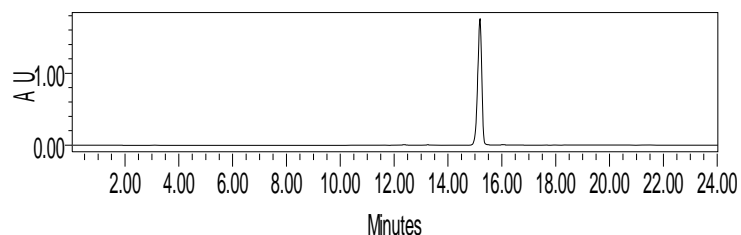


Chemical Formula: $C_{21}H_{23}N_3O_4$
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Molecular Weight: 381.43



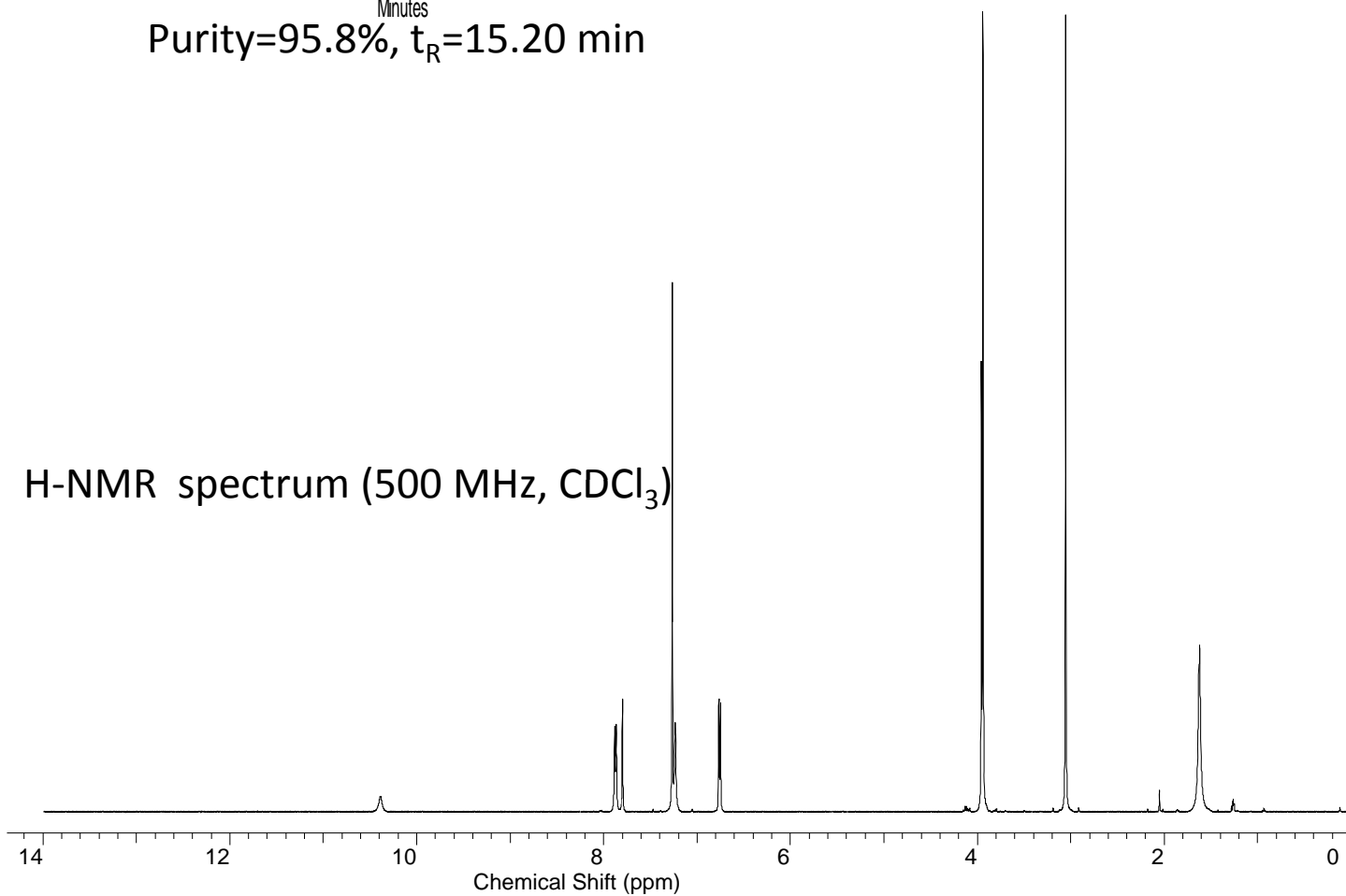
UV spectrum

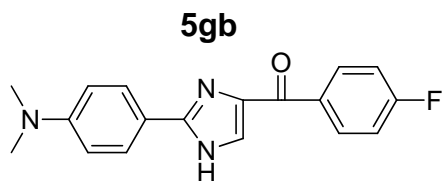
HPLC purity determination



Purity=95.8%, t_R =15.20 min

H-NMR spectrum (500 MHz, $CDCl_3$)

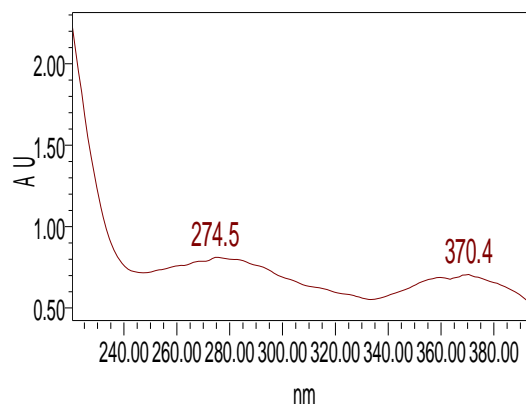




Chemical Formula: $C_{18}H_{16}FN_3O$

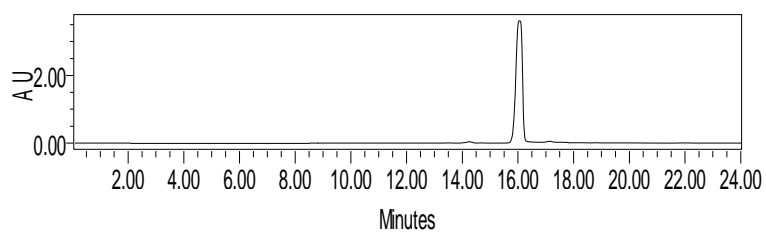
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Molecular Weight: 309.34



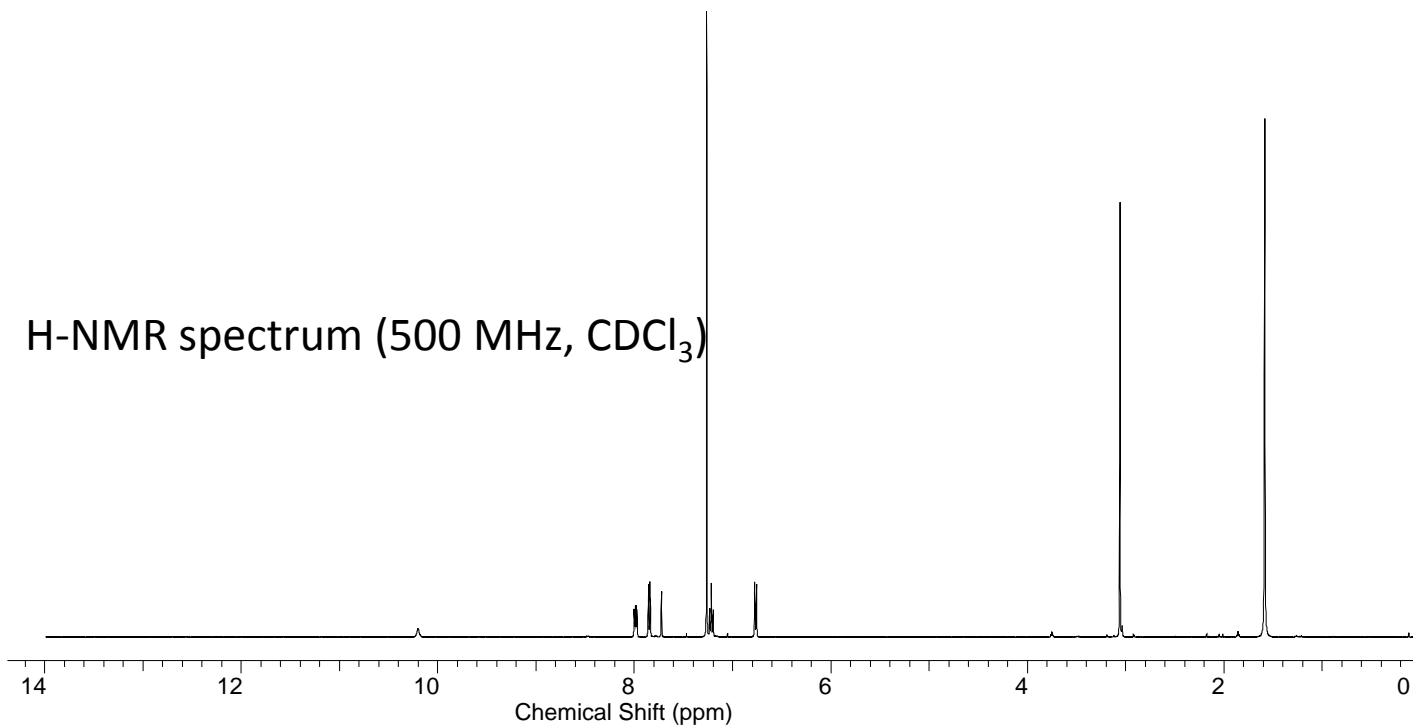
UV spectrum

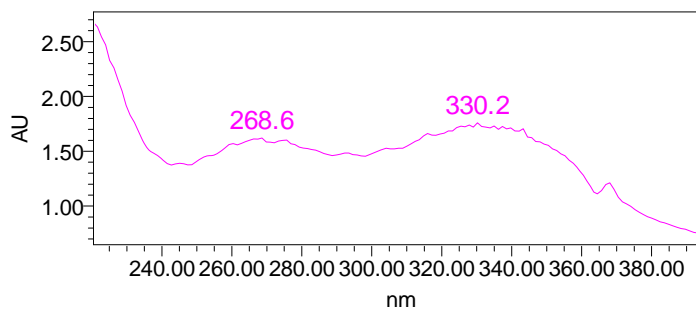
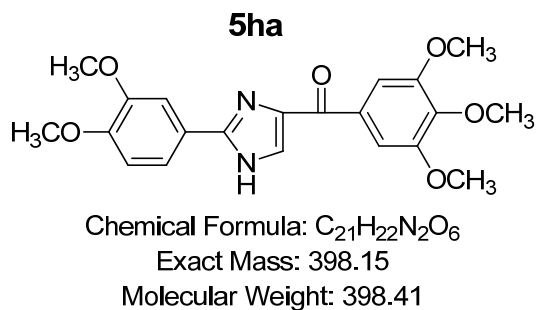
HPLC purity determination



Purity=95.6%, $t_R=16.06$ min

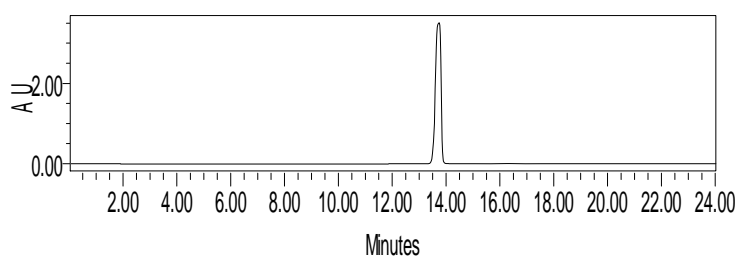
H-NMR spectrum (500 MHz, $CDCl_3$)





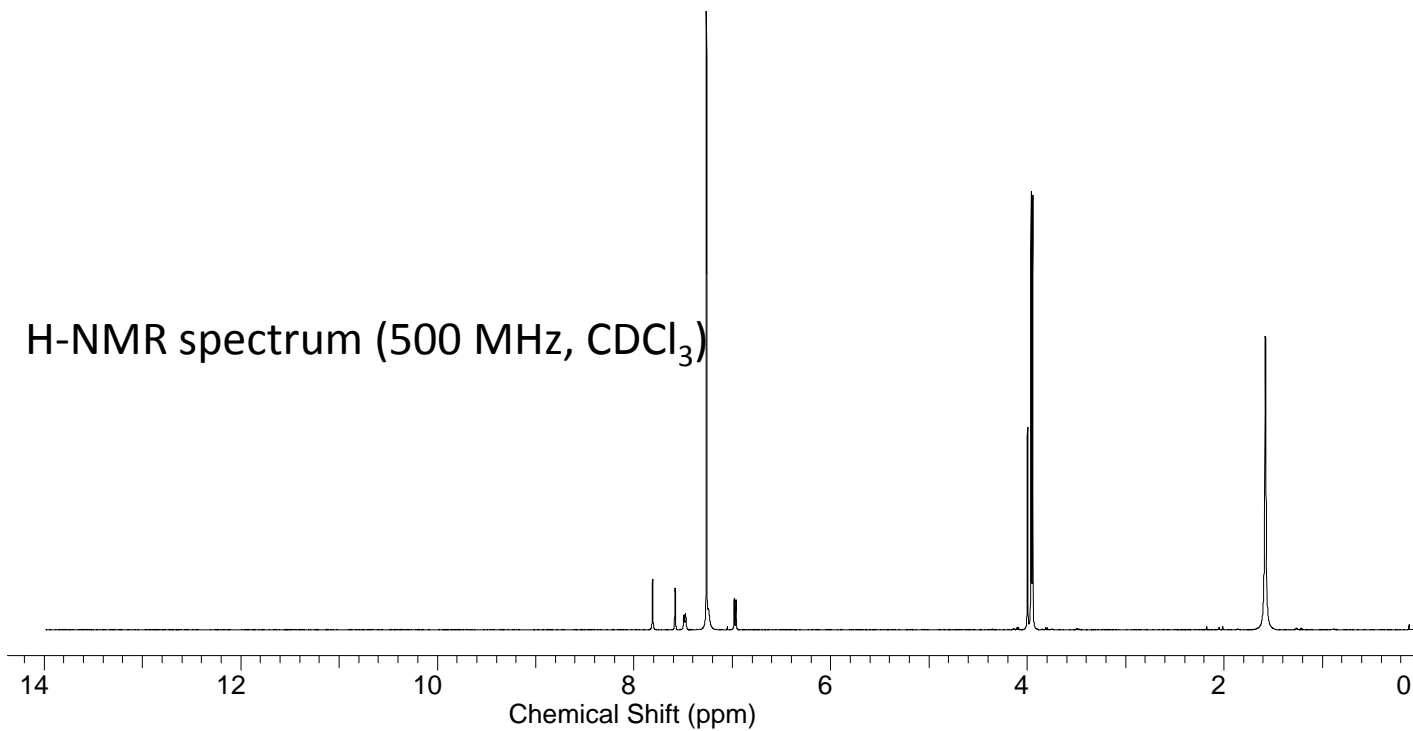
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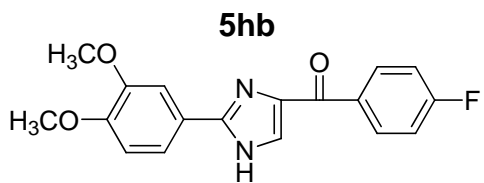
HPLC purity determination



Purity >99%, $t_R = 13.73$ min

H-NMR spectrum (500 MHz, $CDCl_3$)

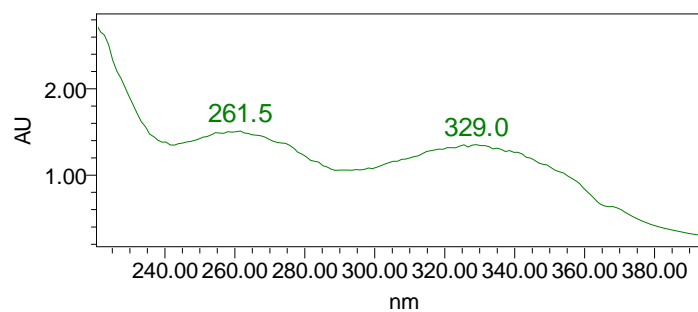




Chemical Formula: $C_{18}H_{15}FN_2O_3$

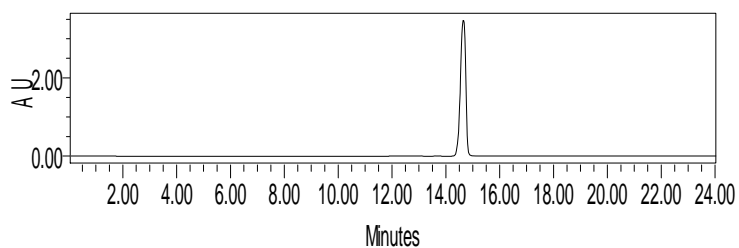
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Molecular Weight: 326.32



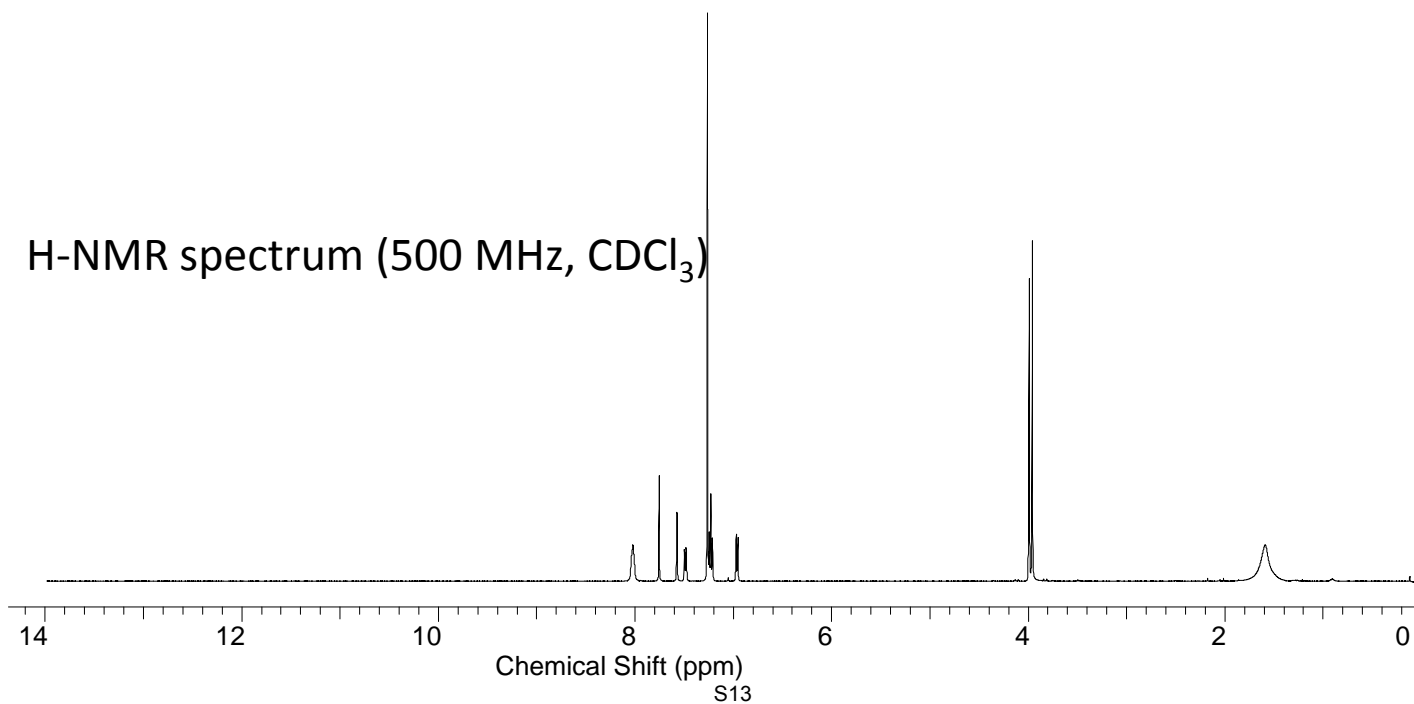
UV spectrum

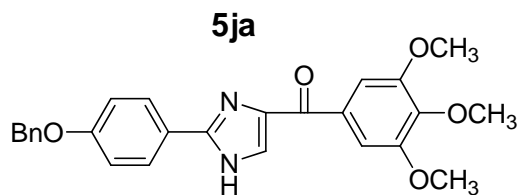
HPLC purity determination



Purity > 99%, $t_R = 14.65$ min

H-NMR spectrum (500 MHz, $CDCl_3$)

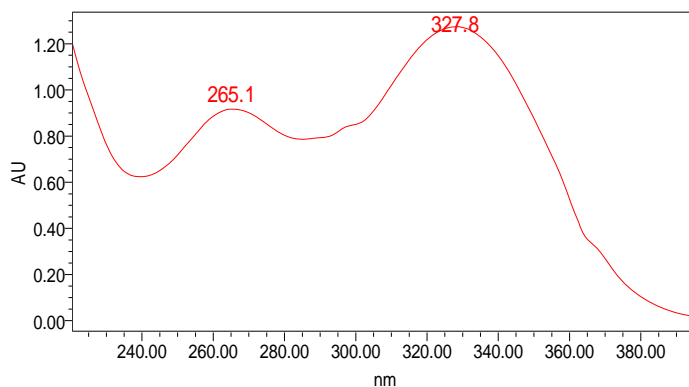




Chemical Formula: $C_{26}H_{24}N_2O_5$

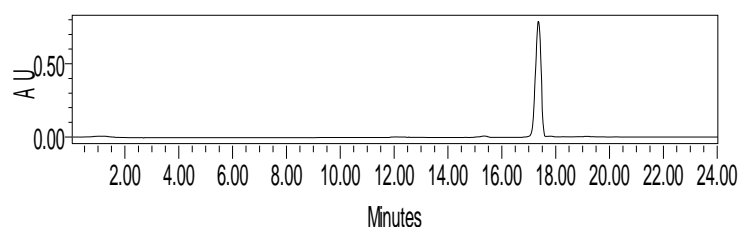
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Molecular Weight: 444.48



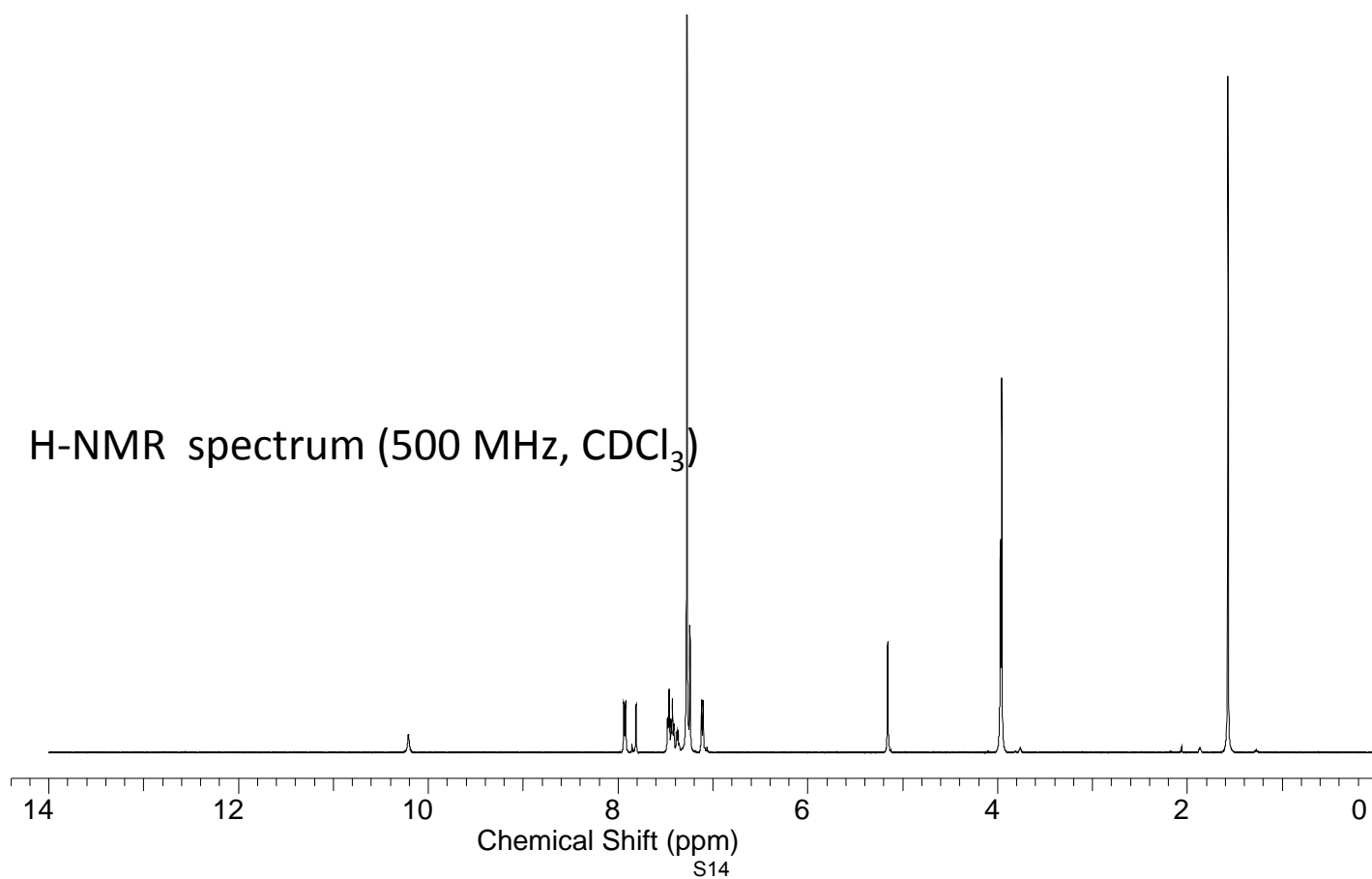
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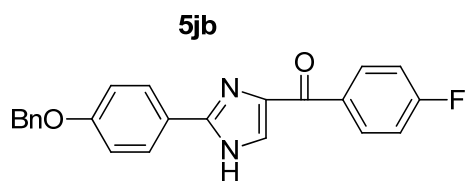
HPLC purity determination



Purity=95.5%, t_R =17.36 min

H-NMR spectrum (500 MHz, $CDCl_3$)

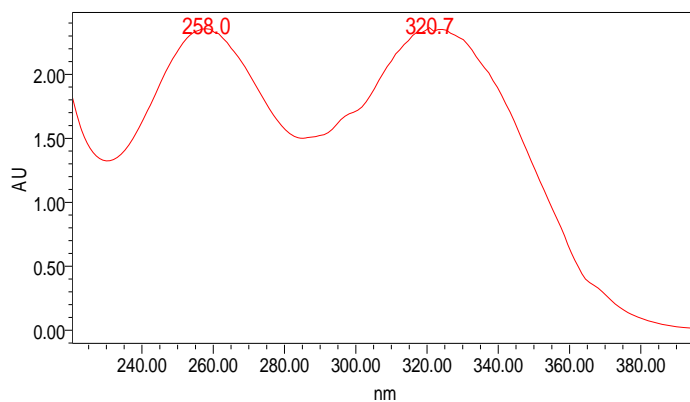




Chemical Formula: $C_{23}H_{17}N_2O_2$

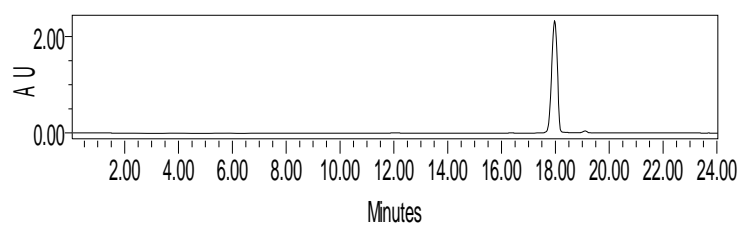
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Molecular Weight: 353.39



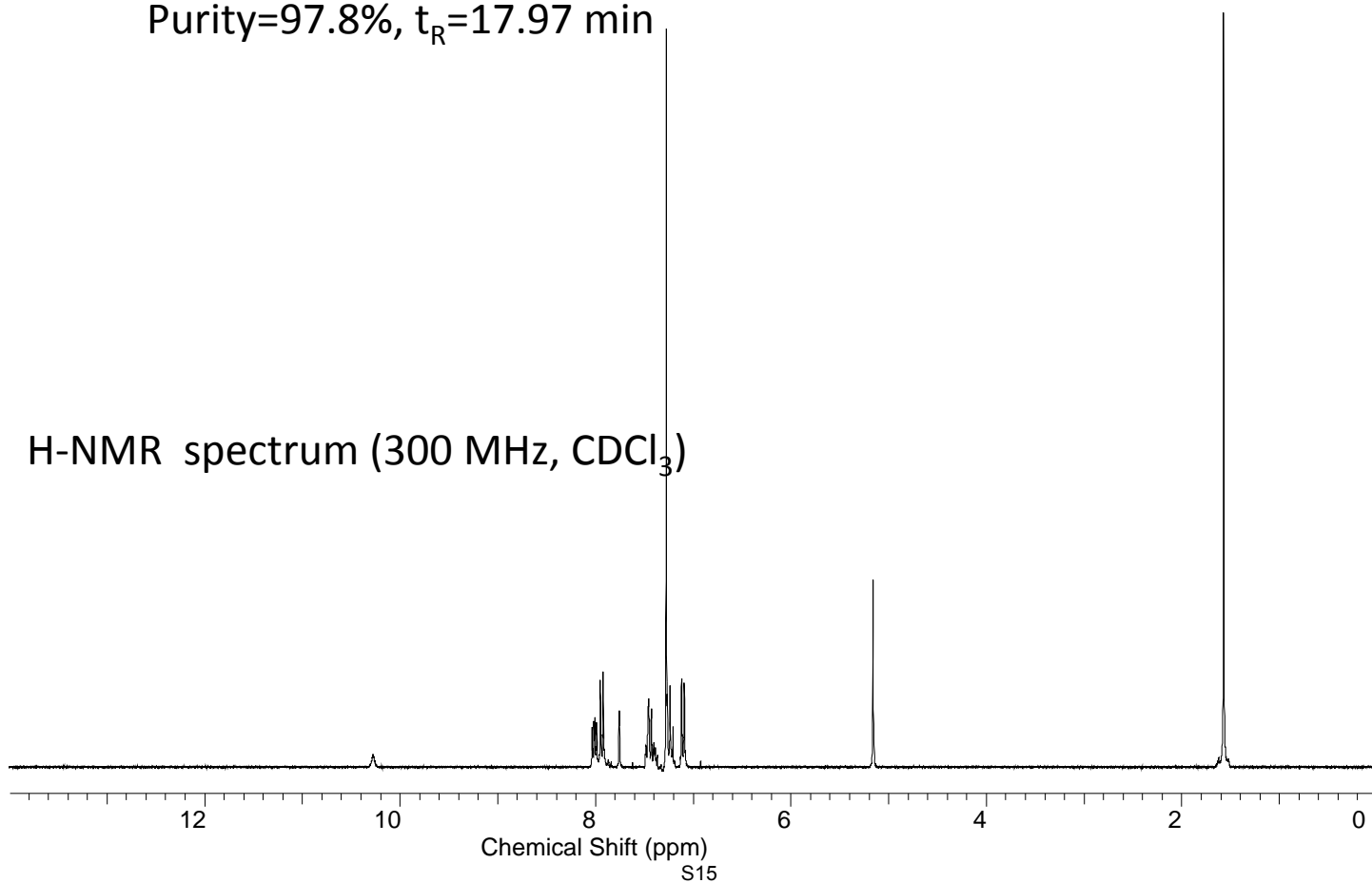
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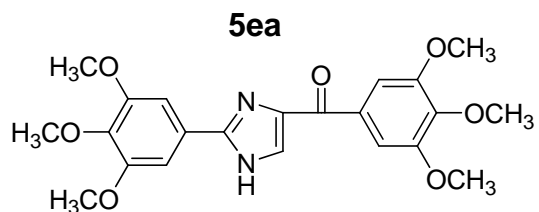
HPLC purity determination



Purity=97.8%, t_R =17.97 min

H-NMR spectrum (300 MHz, $CDCl_3$)

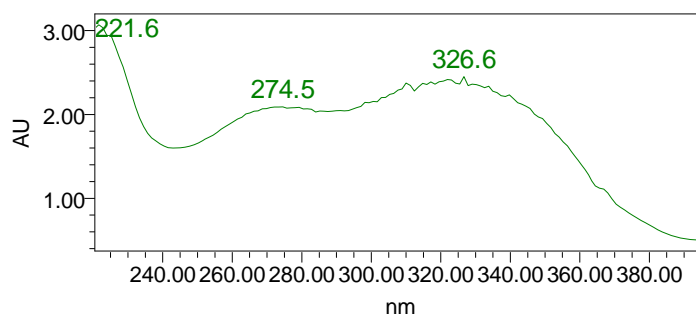




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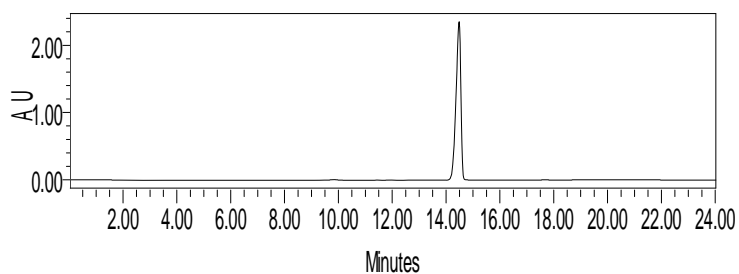
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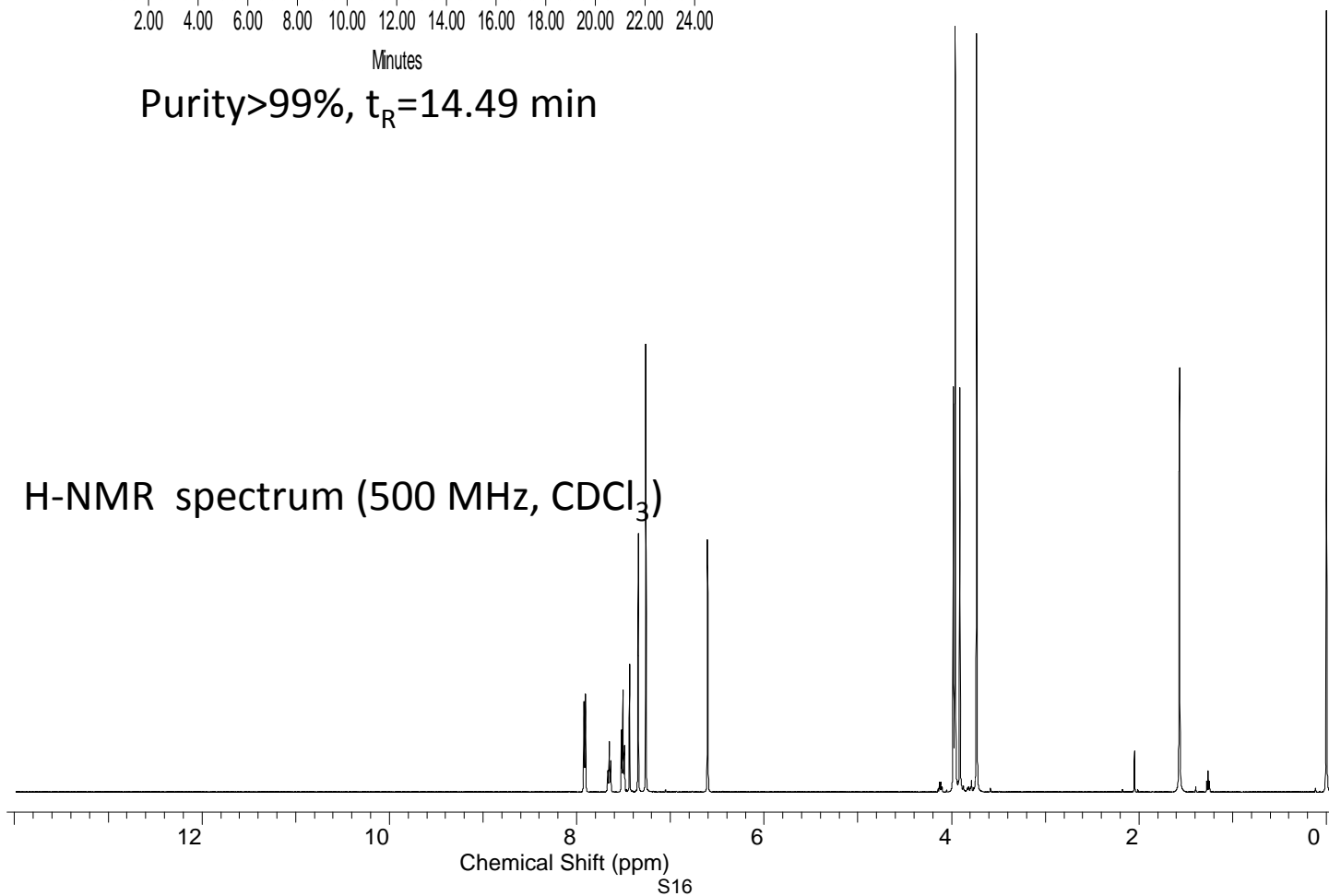
UV spectrum

HPLC purity determination

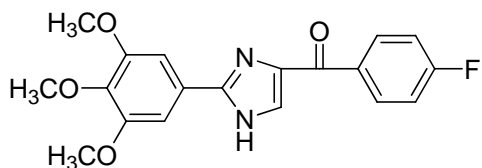


Purity >99%, $t_R = 14.49$ min

H-NMR spectrum (500 MHz, $CDCl_3$)



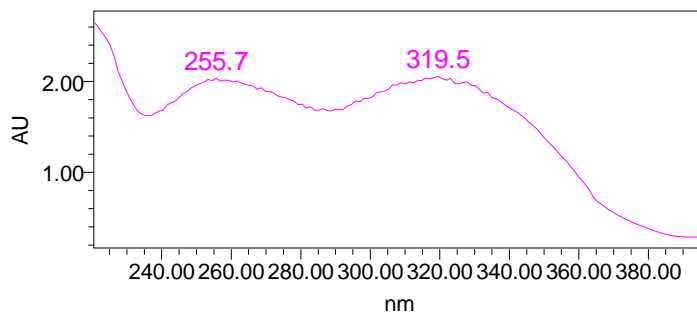
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Chemical Formula: $C_{19}H_{17}FN_2O_4$

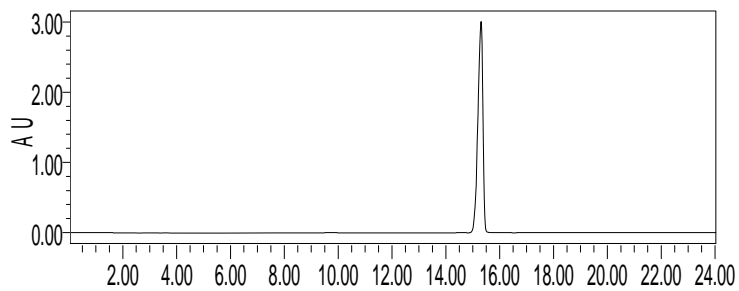
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Molecular Weight: 356.35



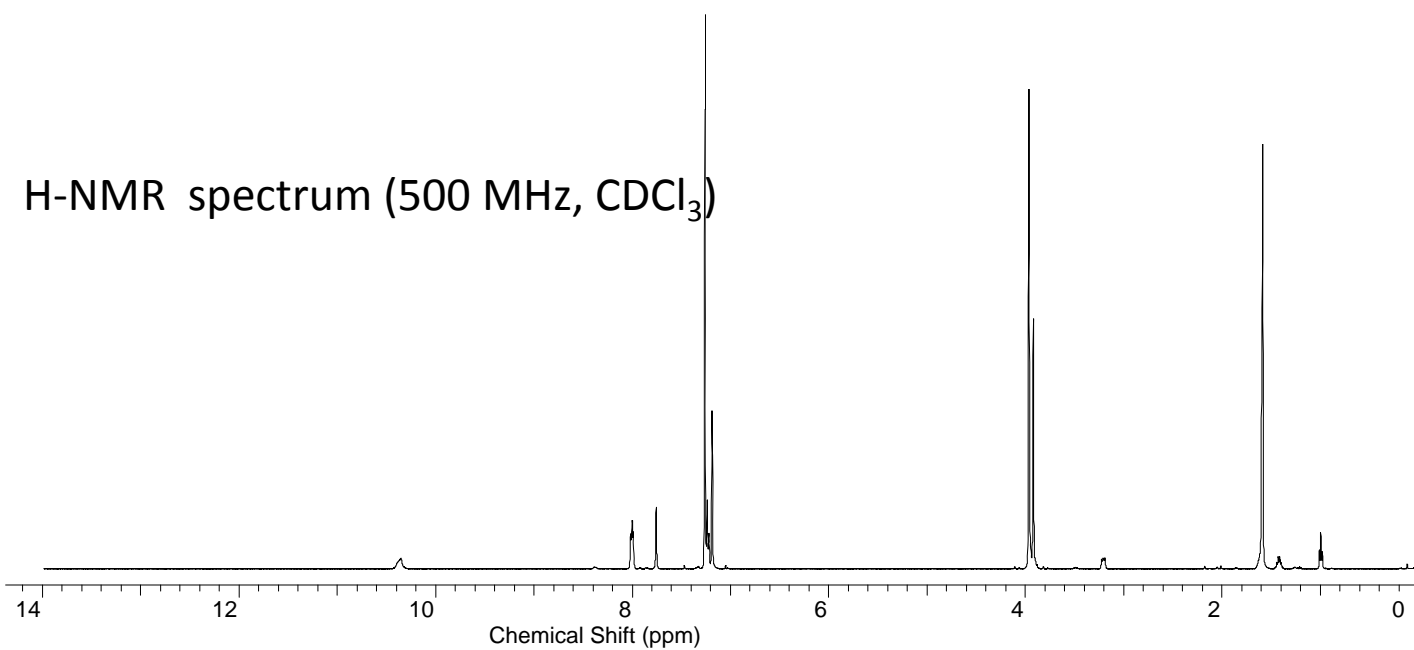
UV spectrum

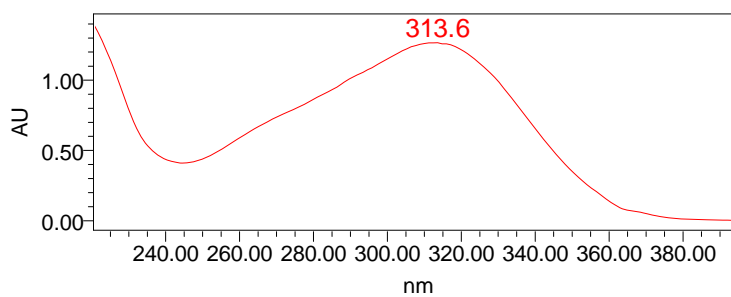
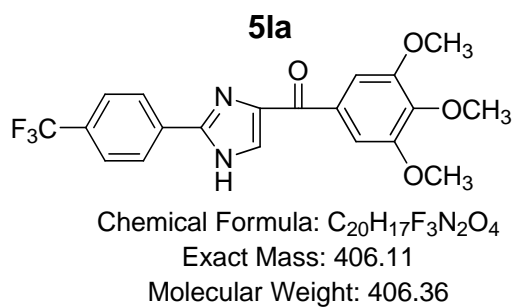
HPLC purity determination



Purity > 99%, $t_R = 15.31$ min

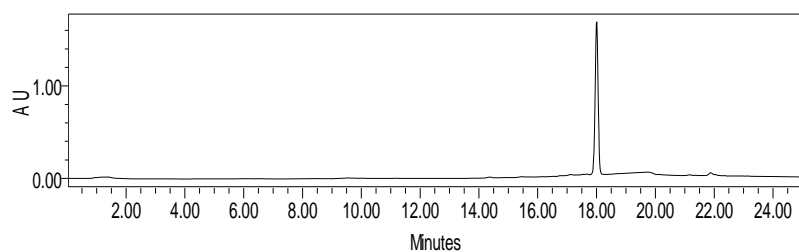
H-NMR spectrum (500 MHz, $CDCl_3$)





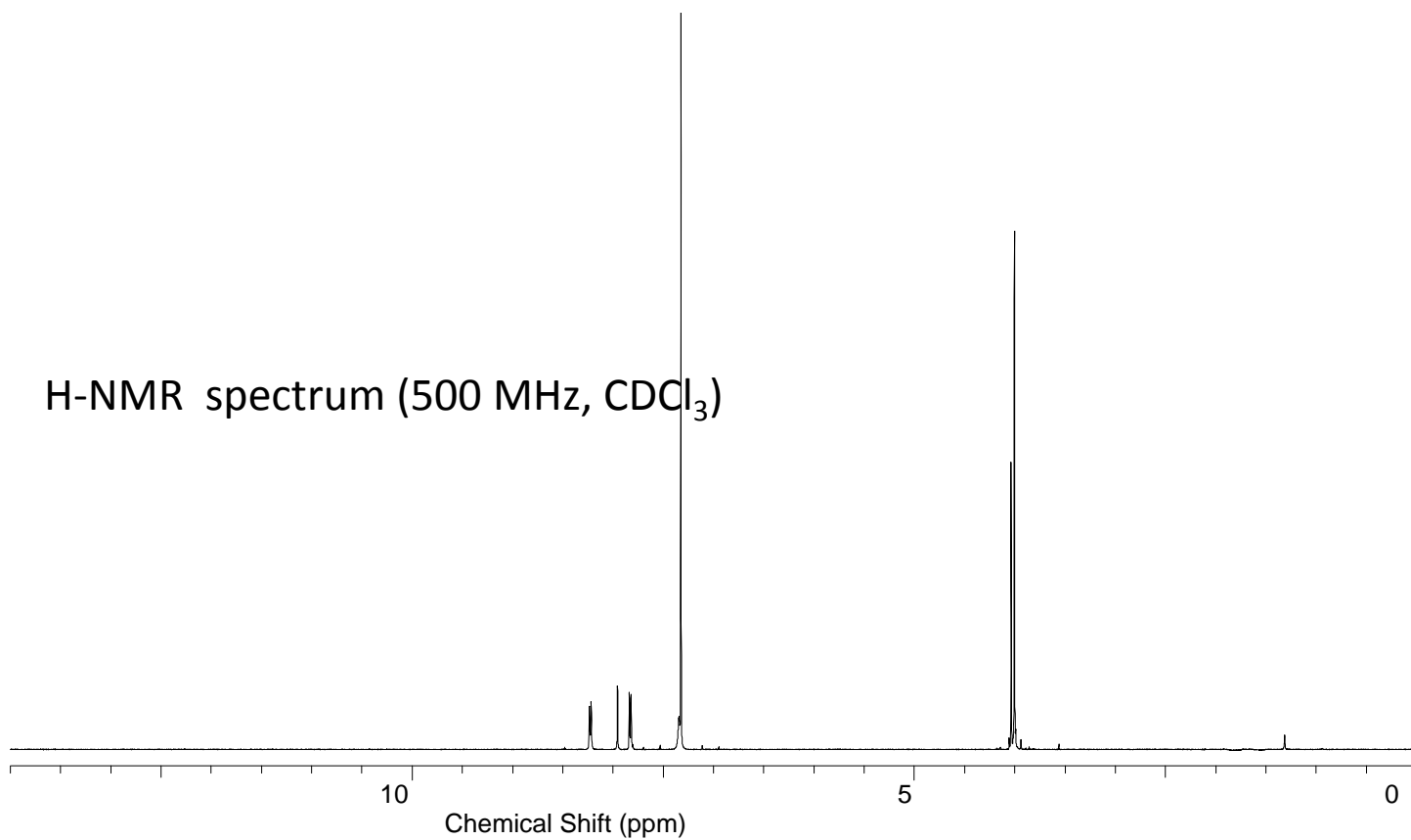
UV spectrum

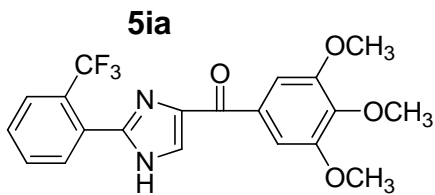
HPLC purity determination



Purity > 99%, $t_R = 18.00$ min

H-NMR spectrum (500 MHz, $CDCl_3$)

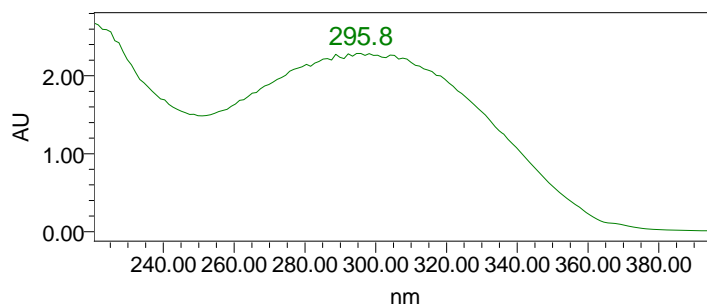




Chemical Formula: $C_{20}H_{17}F_3N_2O_4$

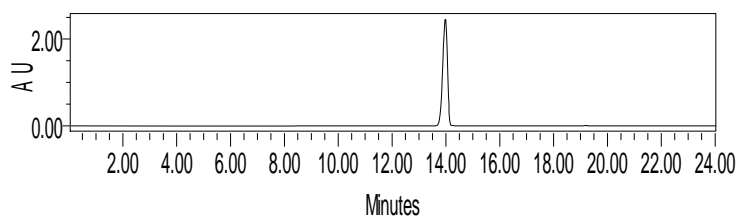
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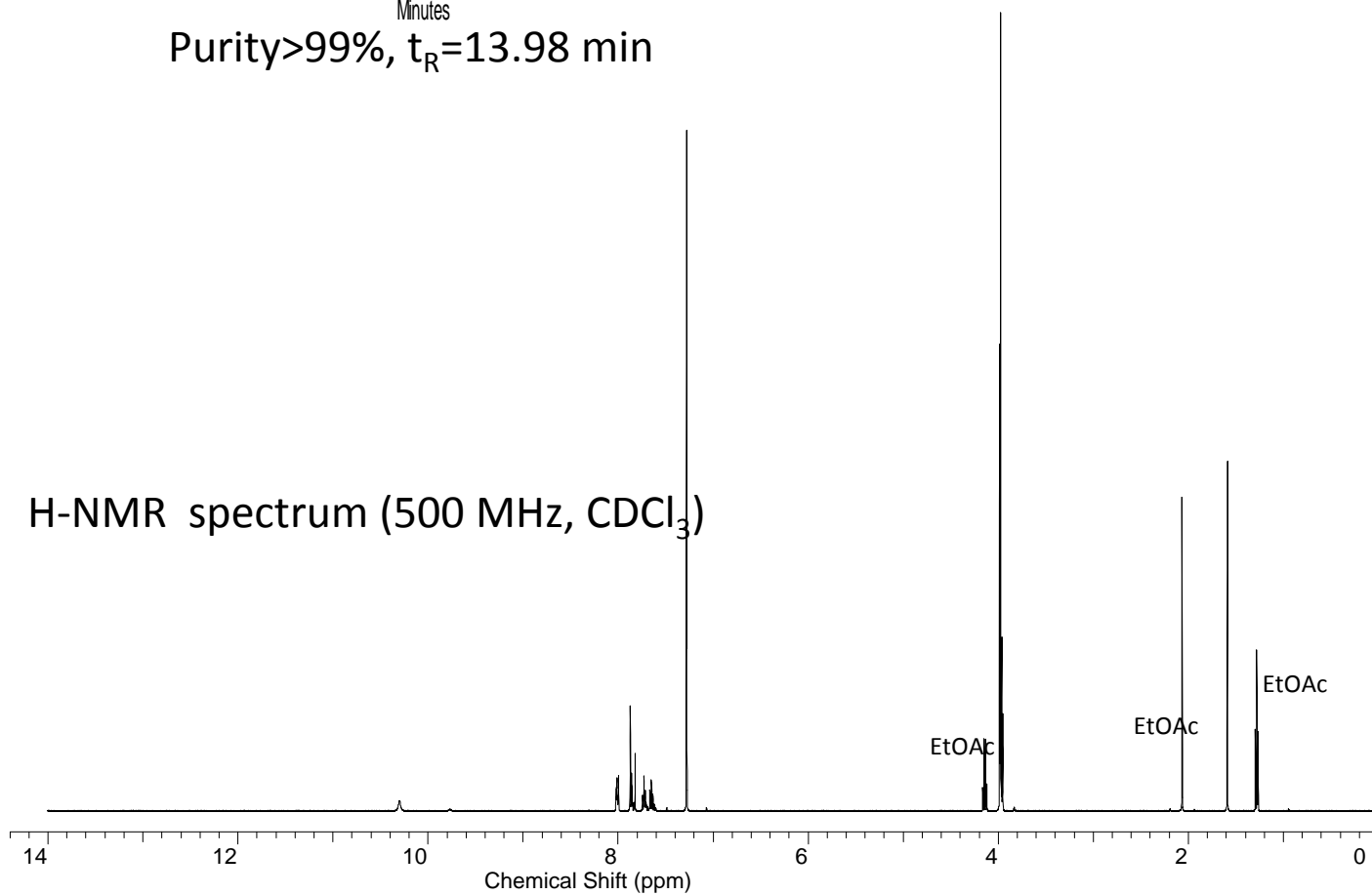
UV spectrum

HPLC purity determination

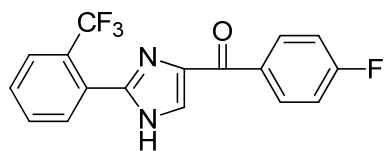


Purity > 99%, $t_R = 13.98$ min

H-NMR spectrum (500 MHz, $CDCl_3$)



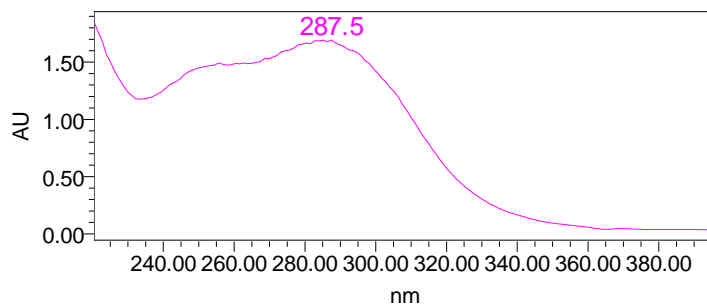
5ib



Chemical Formula: C₁₉H₁₇FN₂O₄

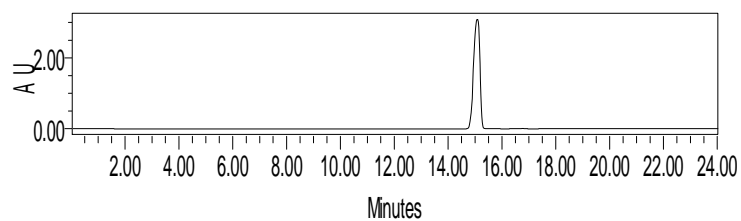
Exact Mass: 356.12

Molecular Weight: 356.35



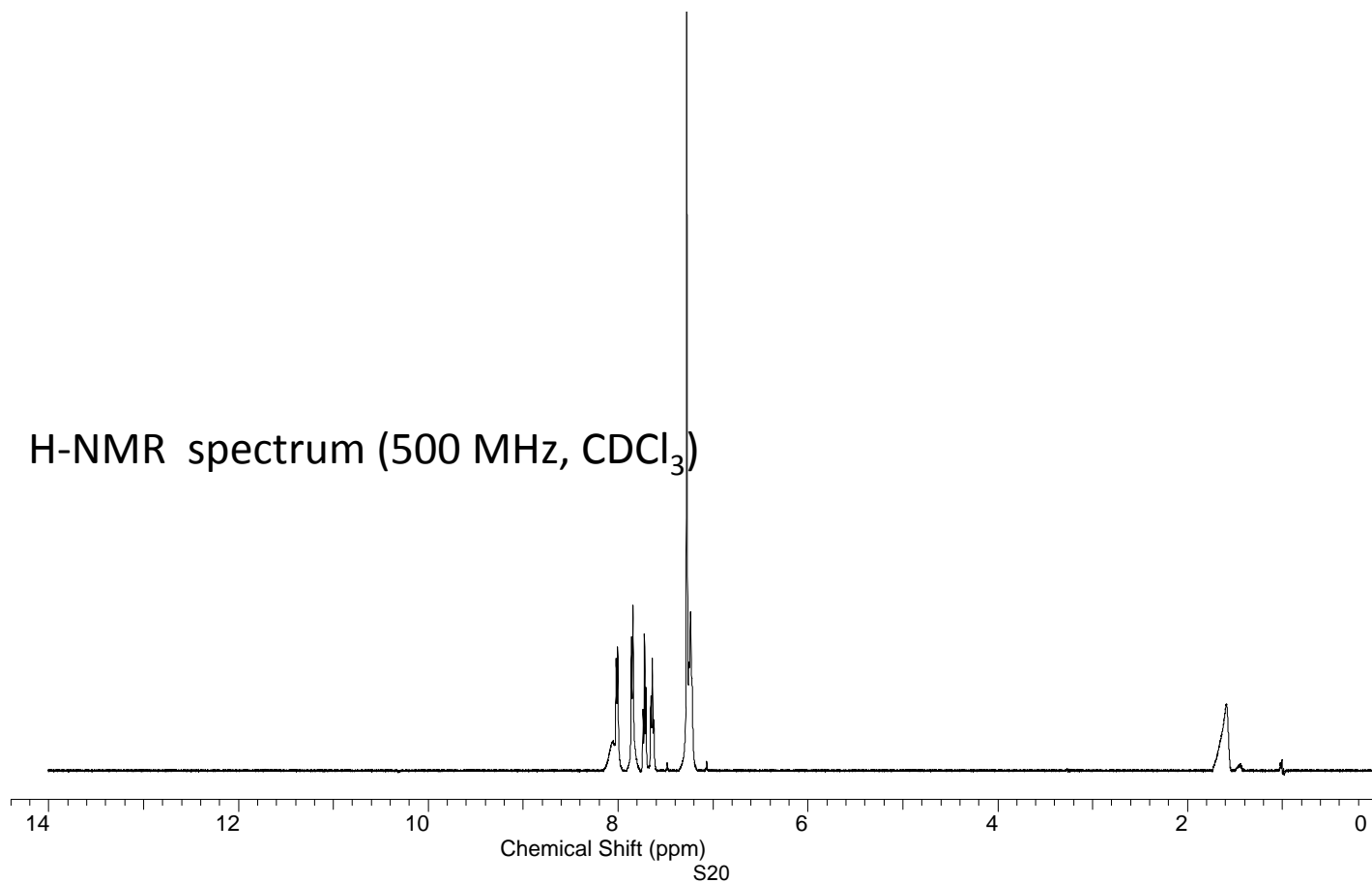
UV spectrum

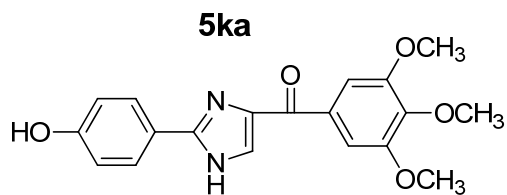
HPLC purity determination



Purity > 99%, t_R = 15.10 min

H-NMR spectrum (500 MHz, CDCl₃)

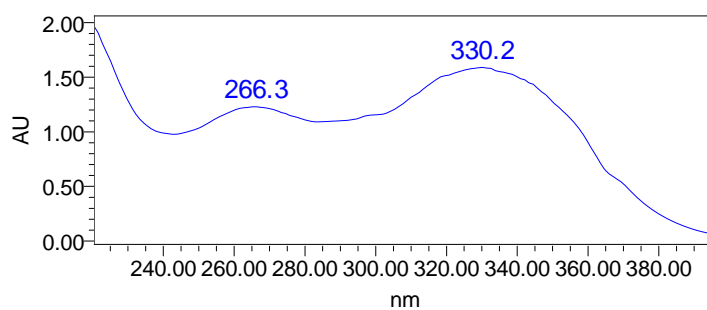




Chemical Formula: $C_{19}H_{18}N_2O_5$

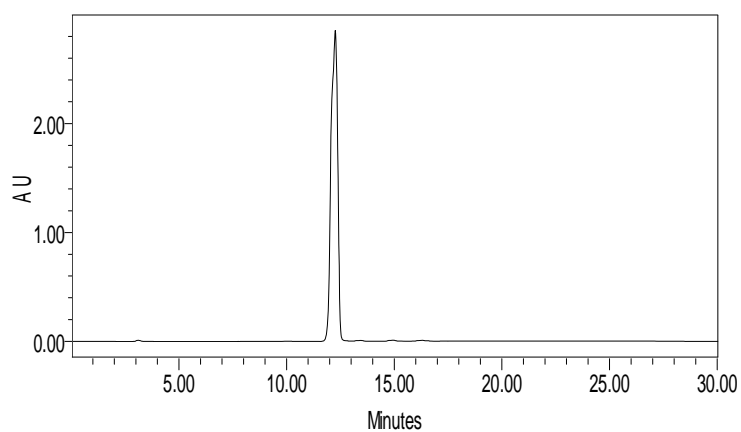
Exact Mass: 354.12

Molecular Weight: 354.36



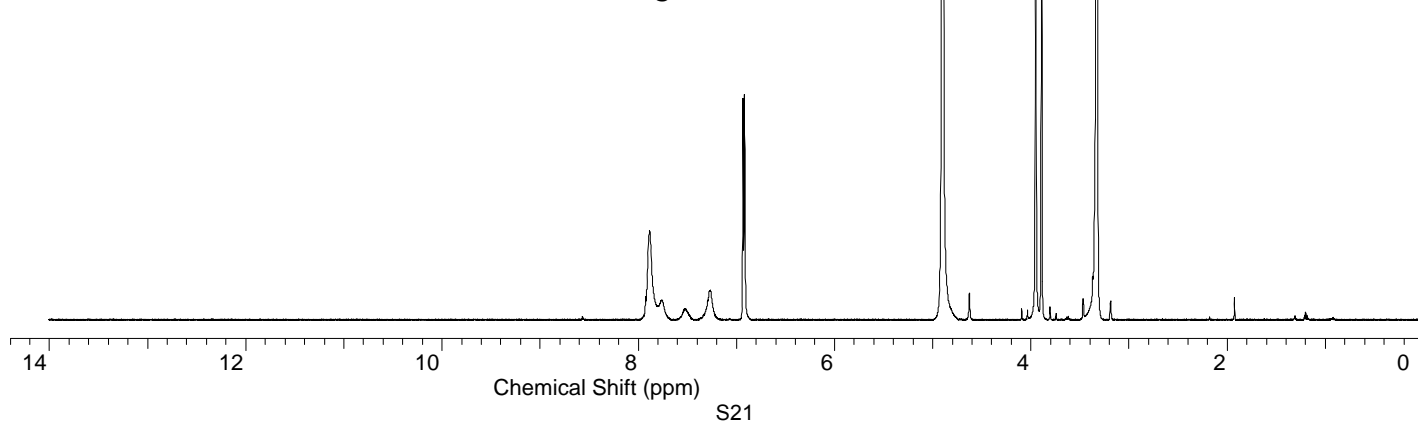
UV spectrum

HPLC purity determination

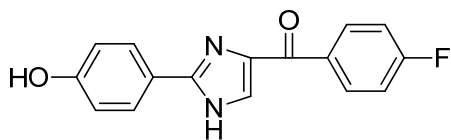


Purity=98.7%, t_R =12.25 min

H-NMR spectrum (500 MHz, CD_3OD)



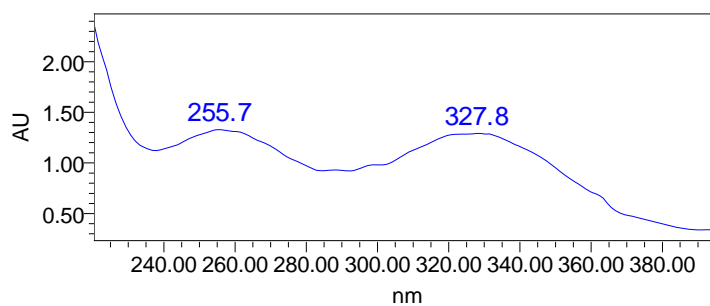
5kb



Chemical Formula: $C_{16}H_{11}FN_2O_2$

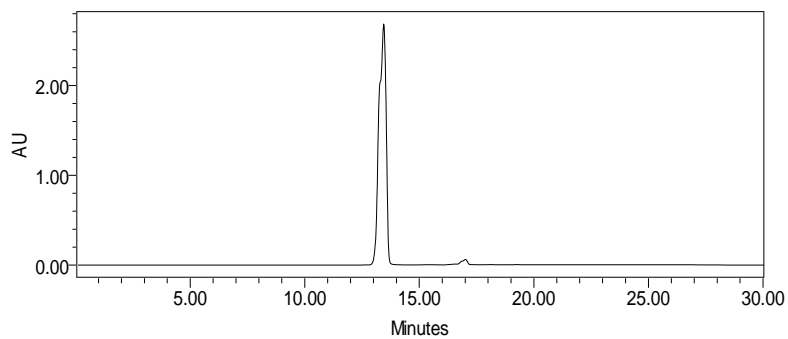
Exact Mass: 282.08

Molecular Weight: 282.27



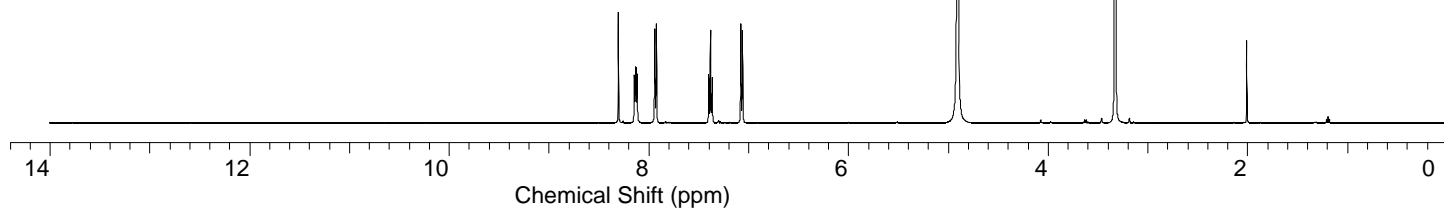
UV spectrum

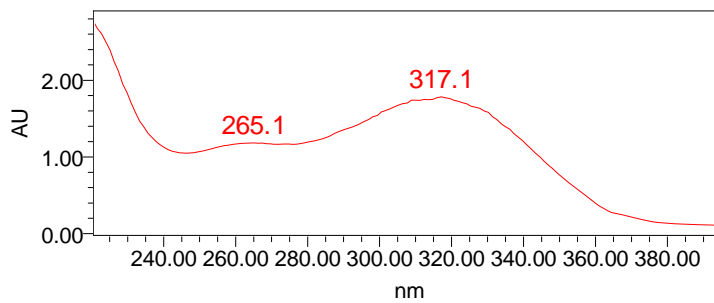
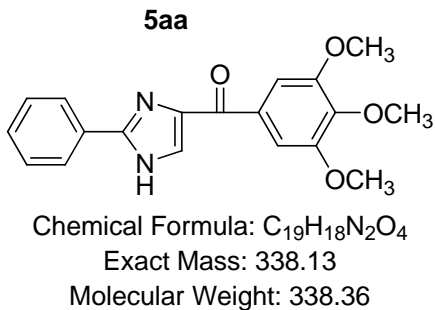
HPLC purity determination



Purity=97.65%, t_R =13.46 min

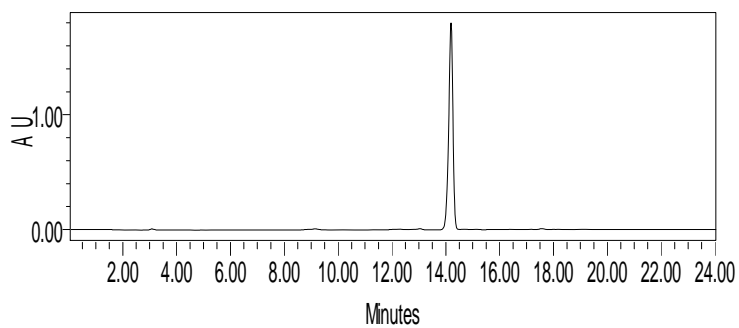
H-NMR spectrum (500 MHz, CD_3OD)





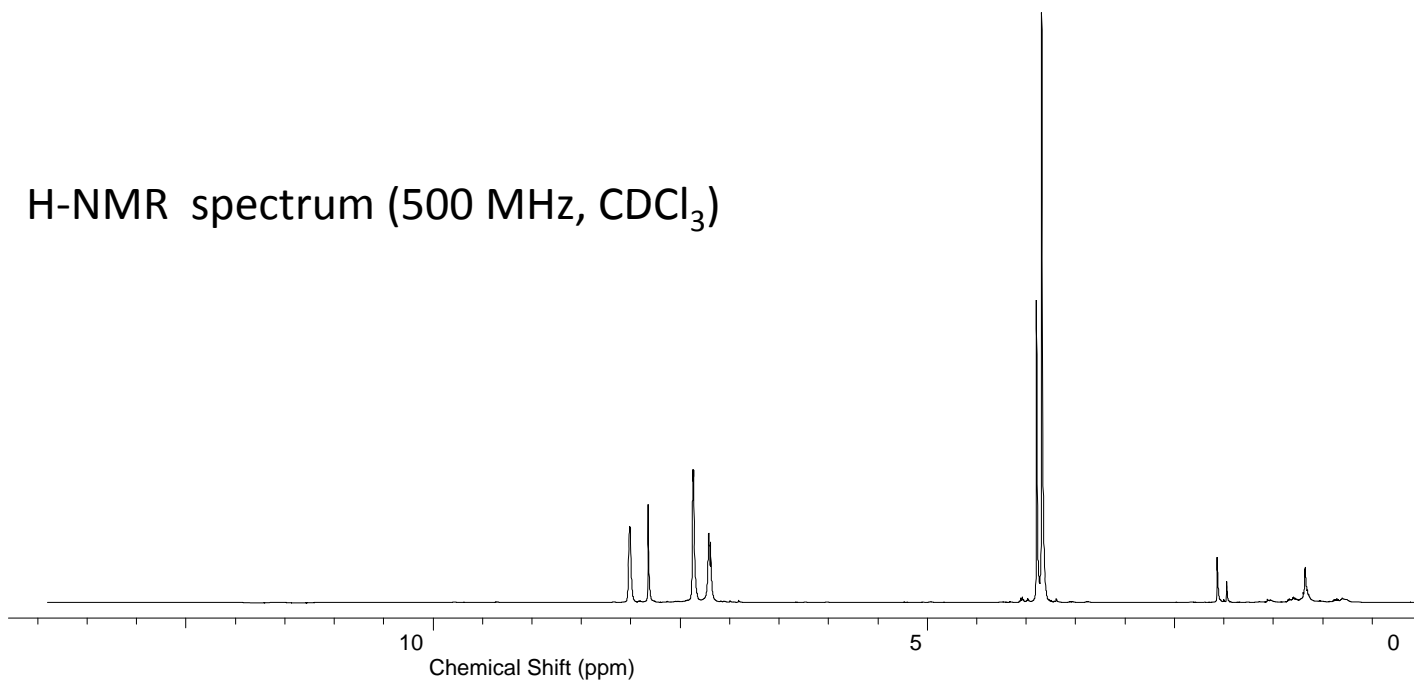
UV spectrum

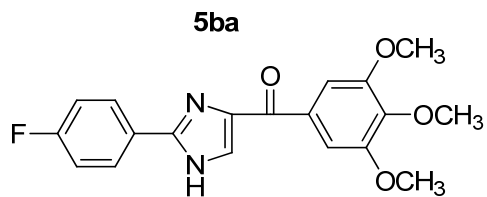
HPLC purity determination



Purity=96.3%, t_R =14.19 min

H-NMR spectrum (500 MHz, CDCl₃)

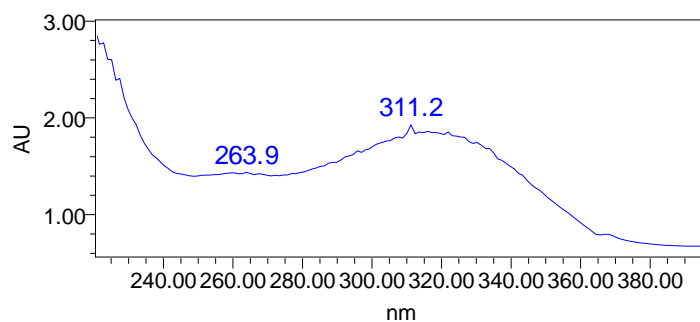




Chemical Formula: C₁₉H₁₇FN₂O₄

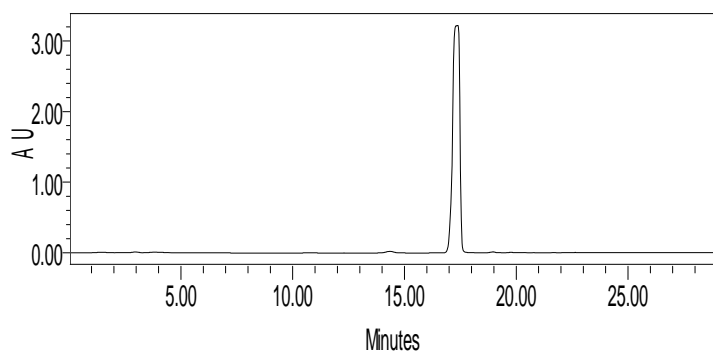
Exact Mass: 356.12

Molecular Weight: 356.35



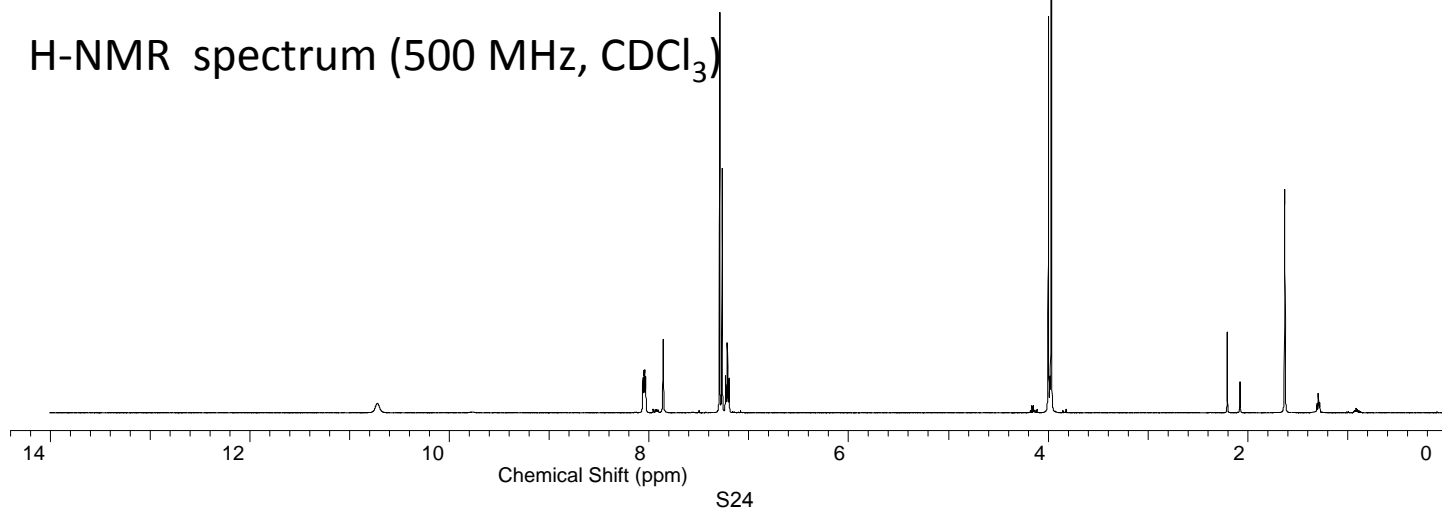
UV spectrum

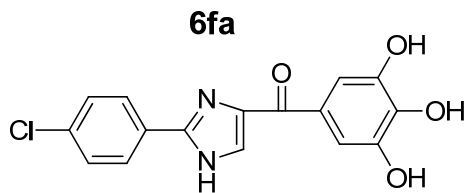
HPLC purity determination



Purity > 99%, $t_R = 17.23$ min

H-NMR spectrum (500 MHz, CDCl₃)

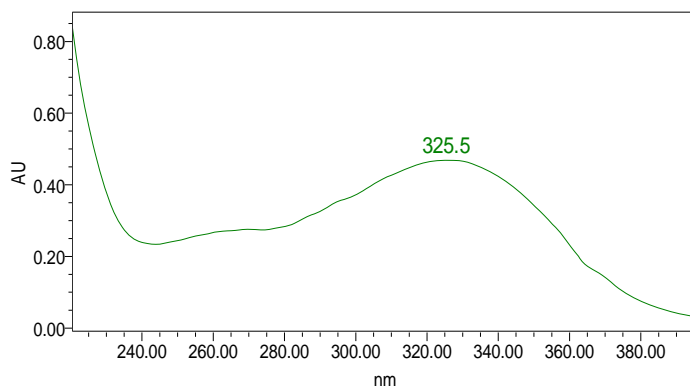




Chemical Formula: $C_{16}H_{11}ClN_2O_4$

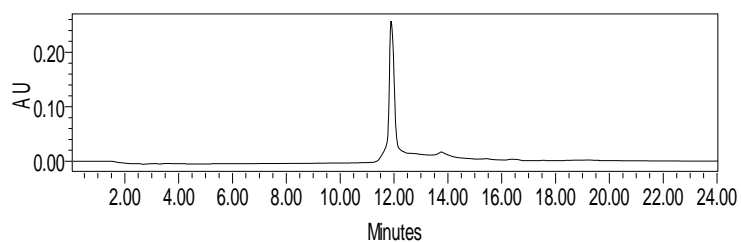
Exact Mass: 330.04

Molecular Weight: 330.72



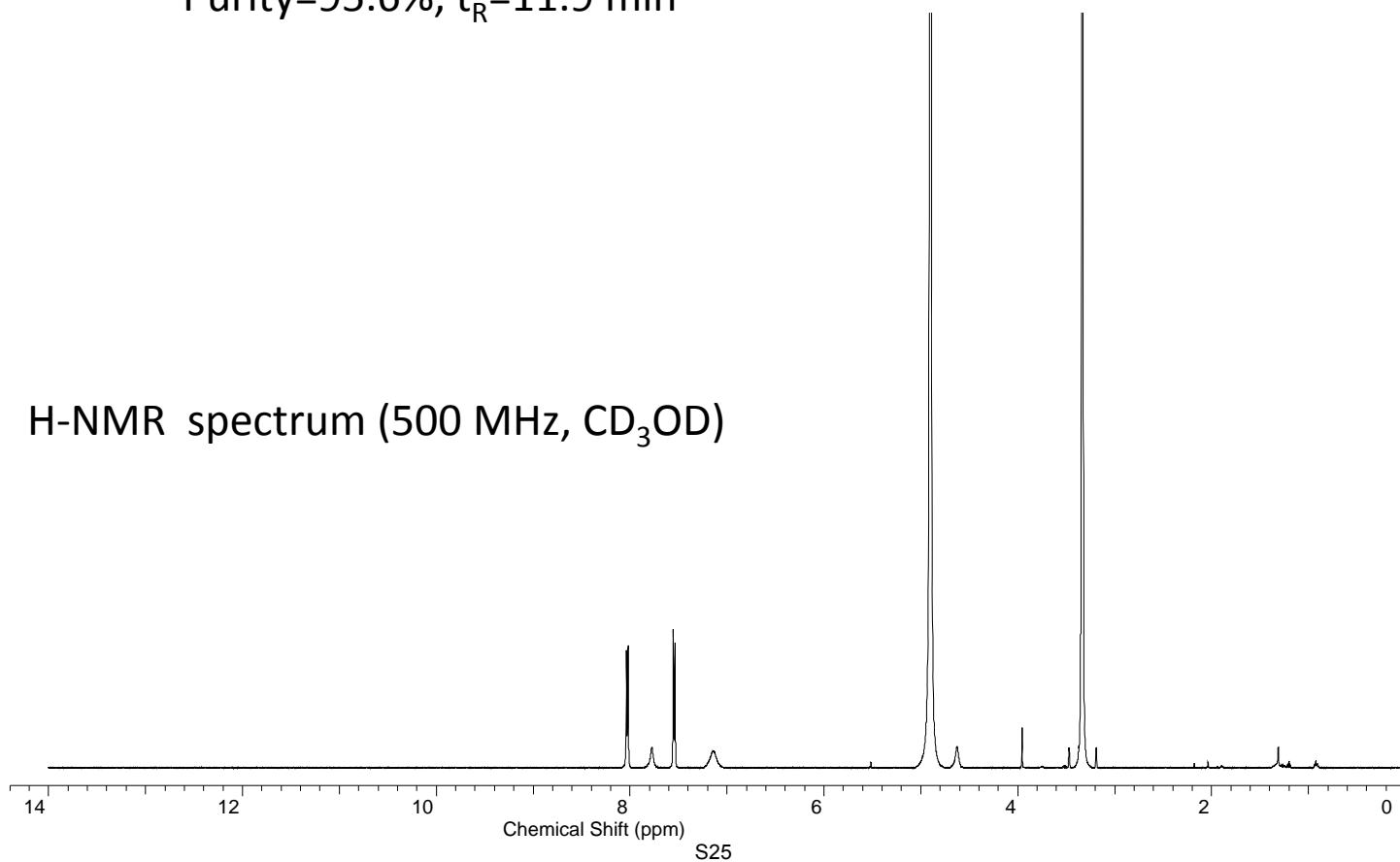
UV spectrum

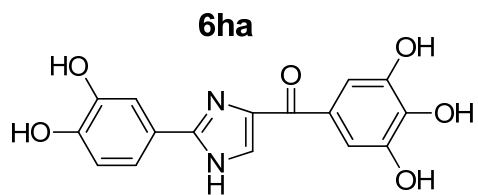
HPLC purity determination



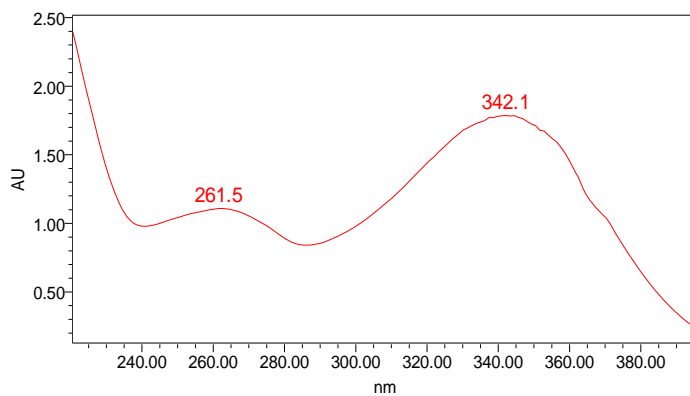
Purity=95.6%, t_R =11.9 min

H-NMR spectrum (500 MHz, CD_3OD)



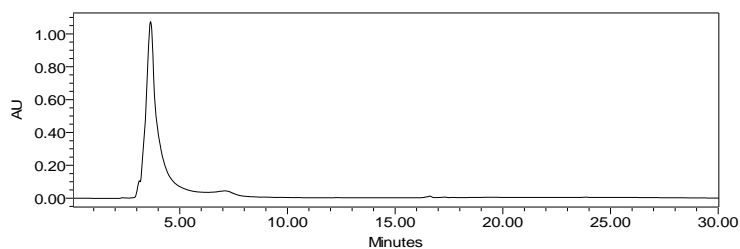


Chemical Formula: $C_{16}H_{12}N_2O_6$
Exact Mass: 328.07
Molecular Weight: 328.28



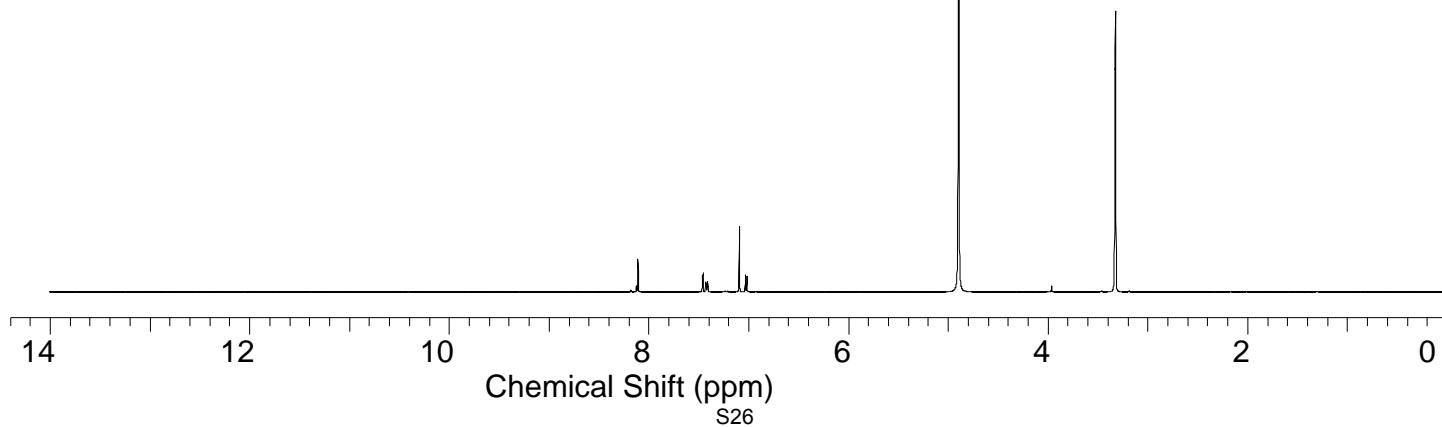
UV spectrum

HPLC purity determination

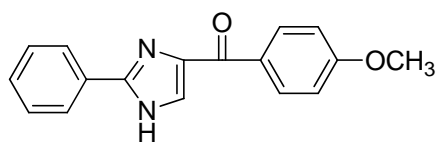


Purity=97.9%, t_R =3.64 min

H-NMR spectrum (500 MHz, CD_3OD)



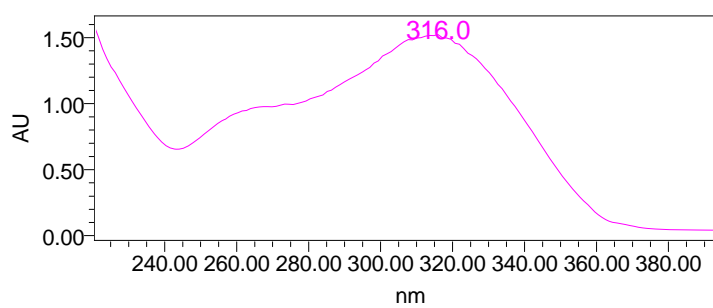
5ab



Chemical Formula: $C_{17}H_{14}N_2O_2$

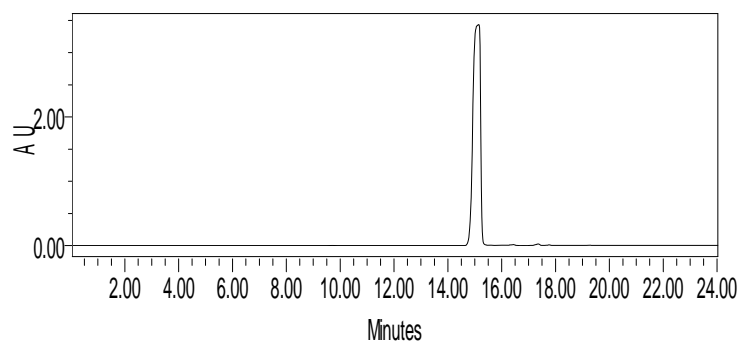
Exact Mass: 278.11

Molecular Weight: 278.31



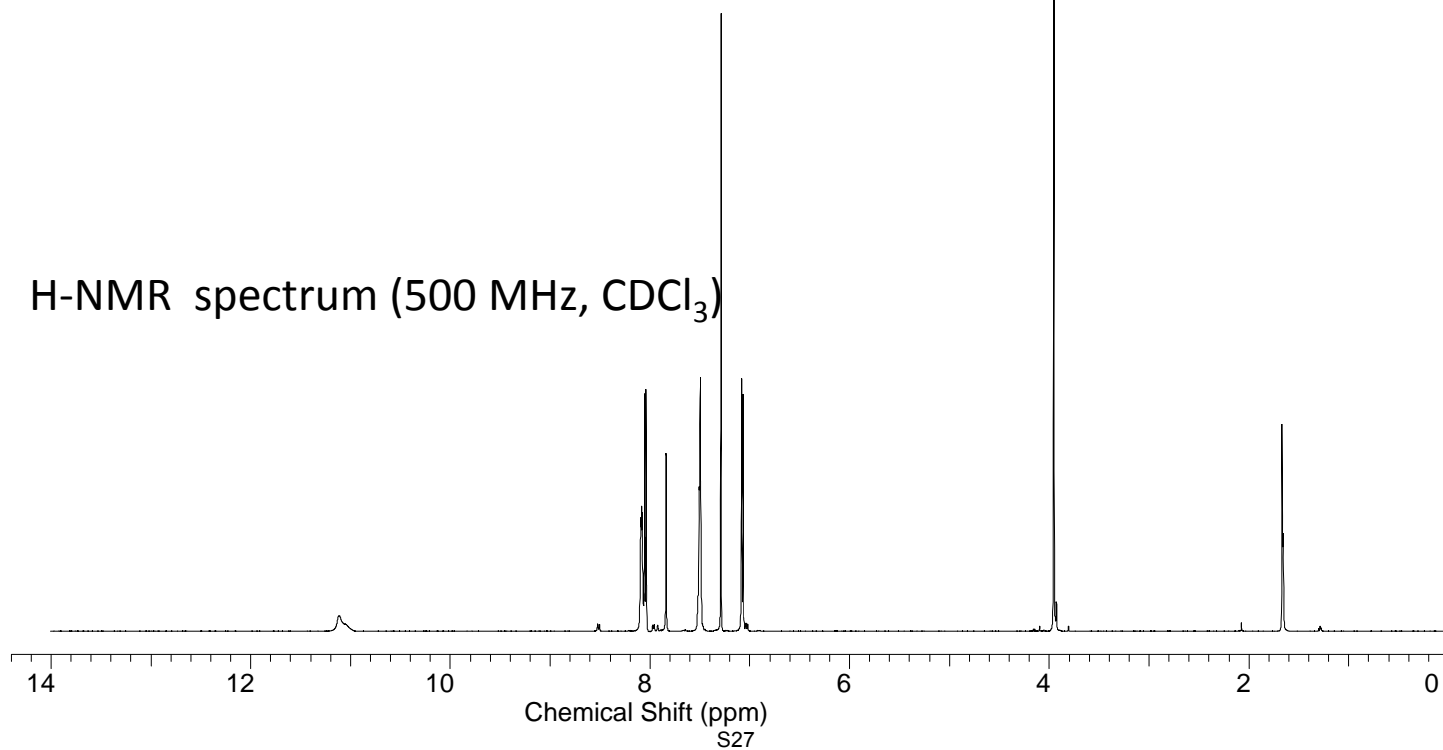
UV spectrum

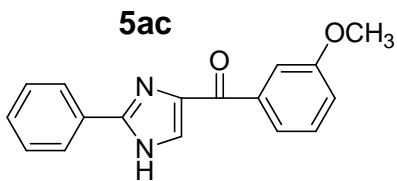
HPLC purity determination



Purity > 99%, $t_R = 15.14$ min

H-NMR spectrum (500 MHz, $CDCl_3$)

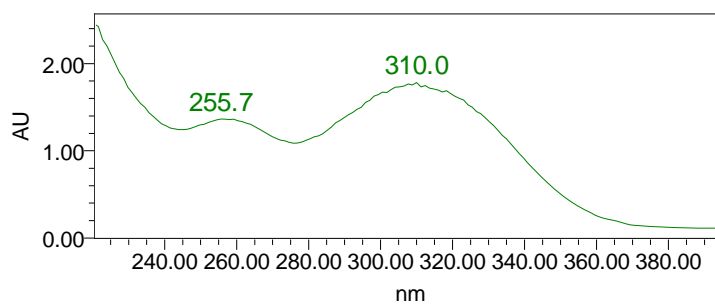




Chemical Formula: C₁₇H₁₄N₂O₂

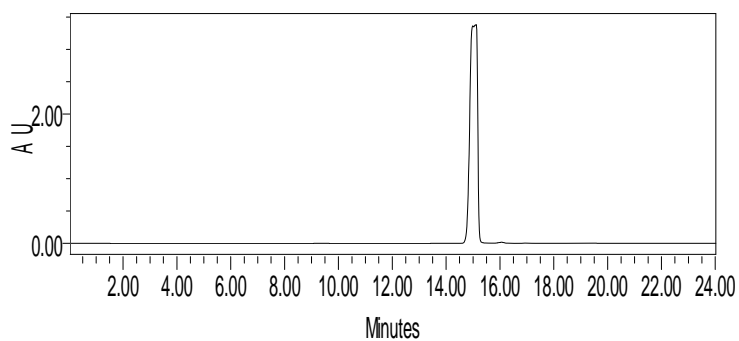
Exact Mass: 278.11

Molecular Weight: 278.31



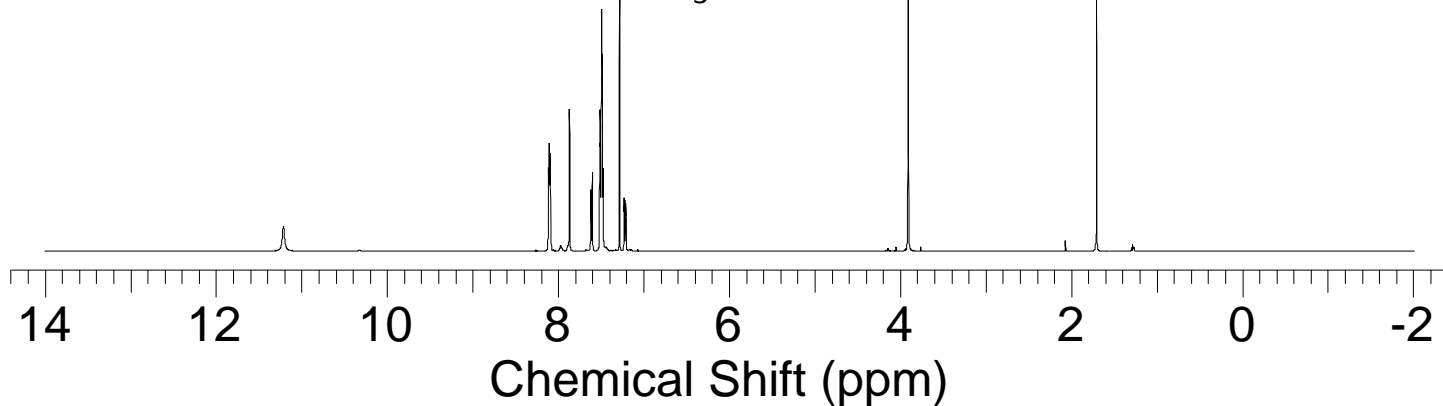
UV spectrum

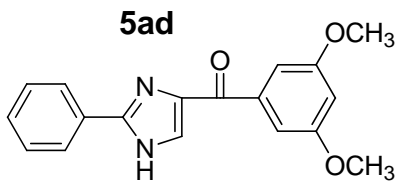
HPLC purity determination



Purity > 99%, $t_R = 15.07$ min

H-NMR spectrum (500 MHz, CDCl₃)

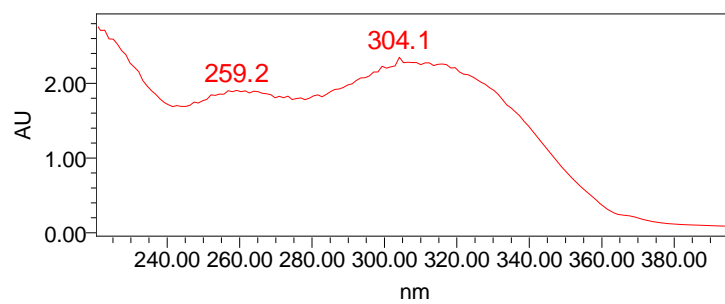




Chemical Formula: C₁₈H₁₆N₂O₃

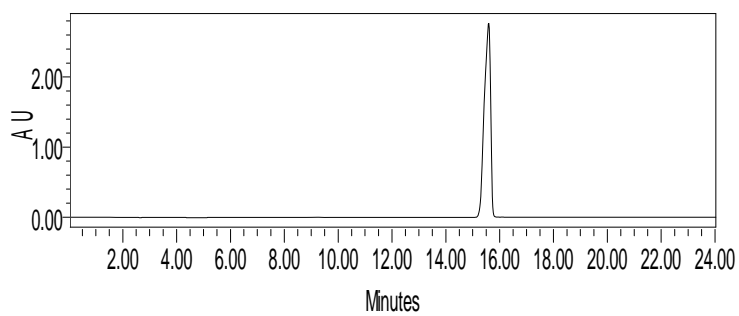
Exact Mass: 308.12

Molecular Weight: 308.33



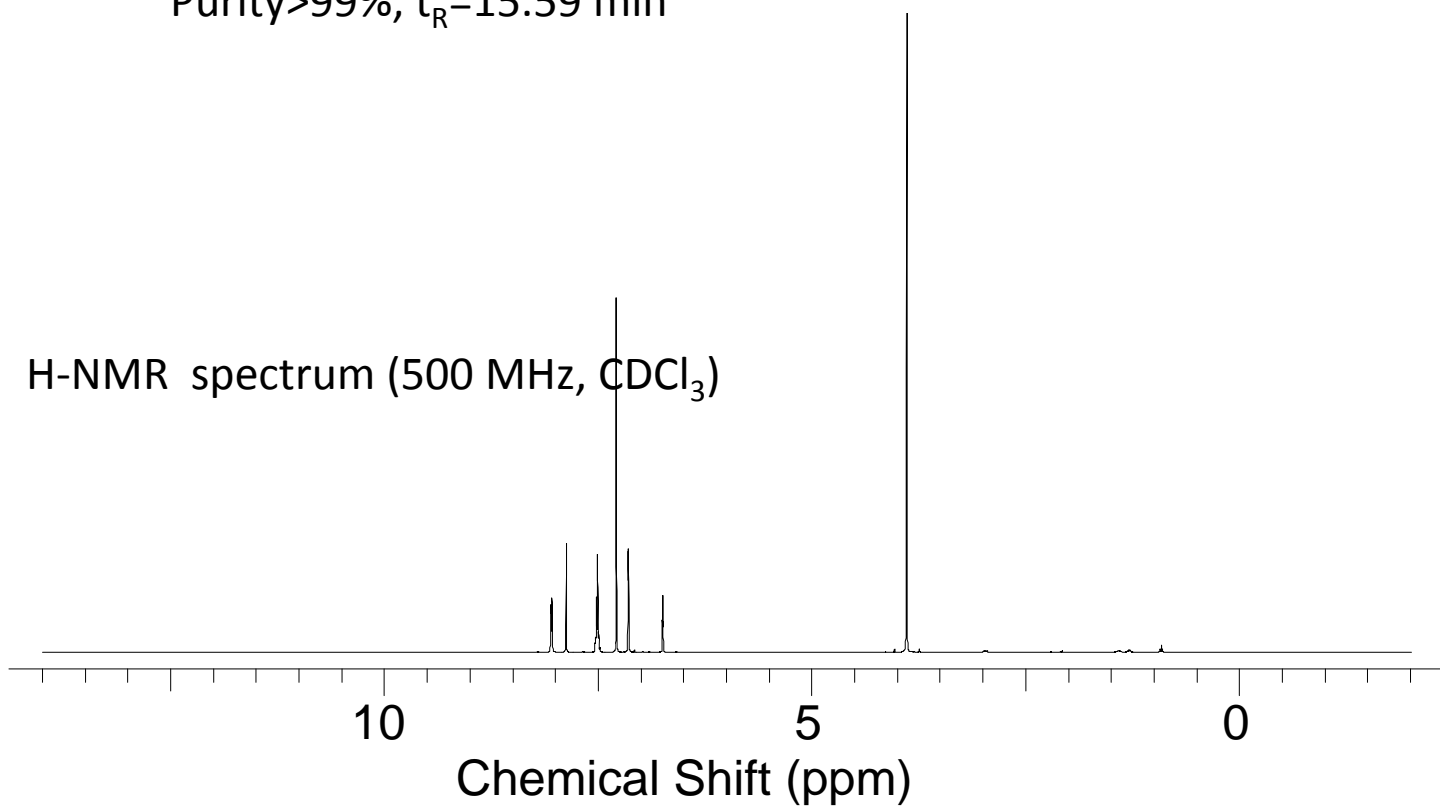
UV spectrum

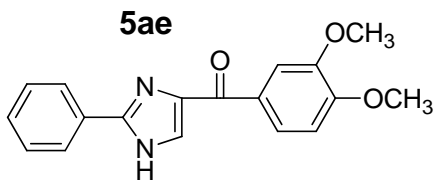
HPLC purity determination



Purity > 99%, $t_R = 15.59$ min

H-NMR spectrum (500 MHz, CDCl₃)

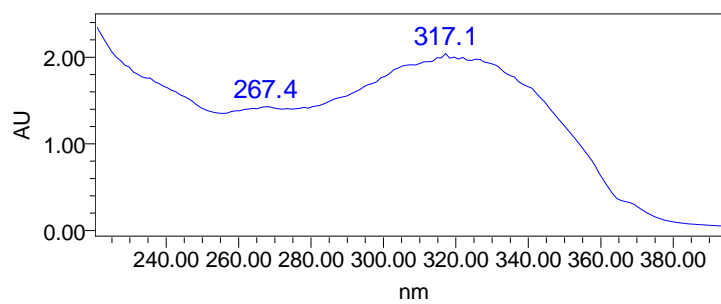




Chemical Formula: $C_{18}H_{16}N_2O_3$

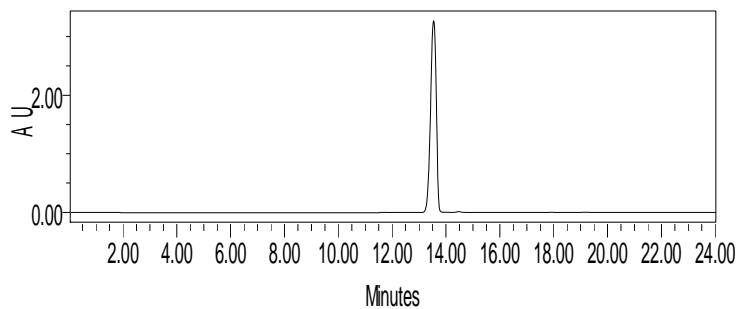
Exact Mass: 308.12

Molecular Weight: 308.33



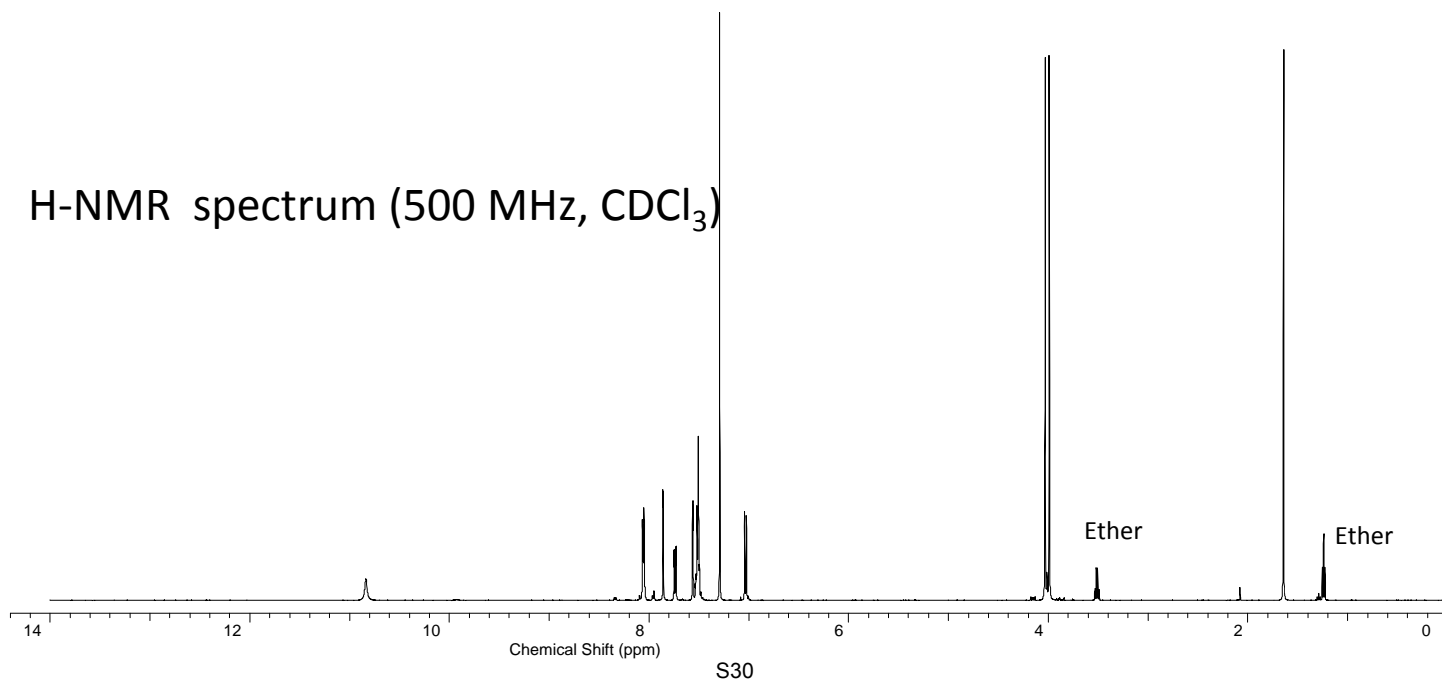
UV spectrum

HPLC purity determination

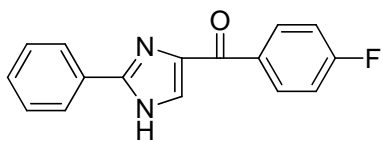


Purity >99%, $t_R = 13.54$ min

H-NMR spectrum (500 MHz, $CDCl_3$)



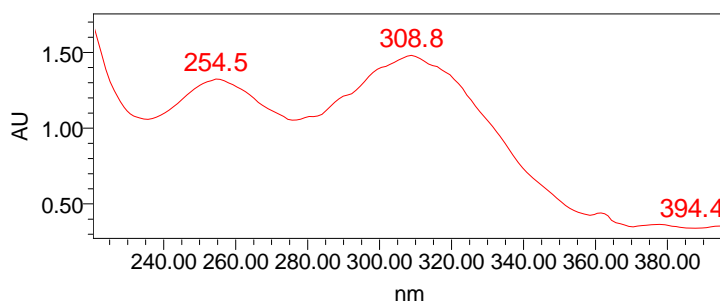
5af



Chemical Formula: C₁₆H₁₁FN₂O

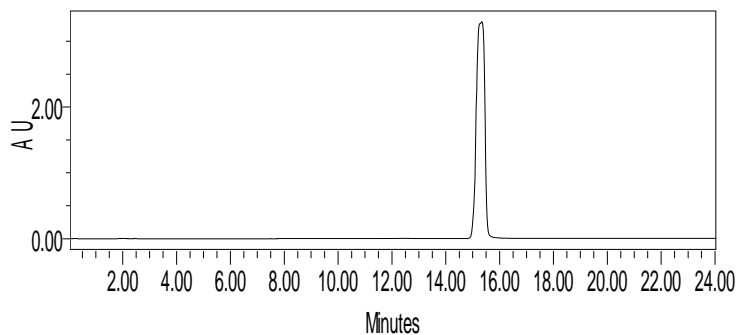
Exact Mass: 266.09

Molecular Weight: 266.27



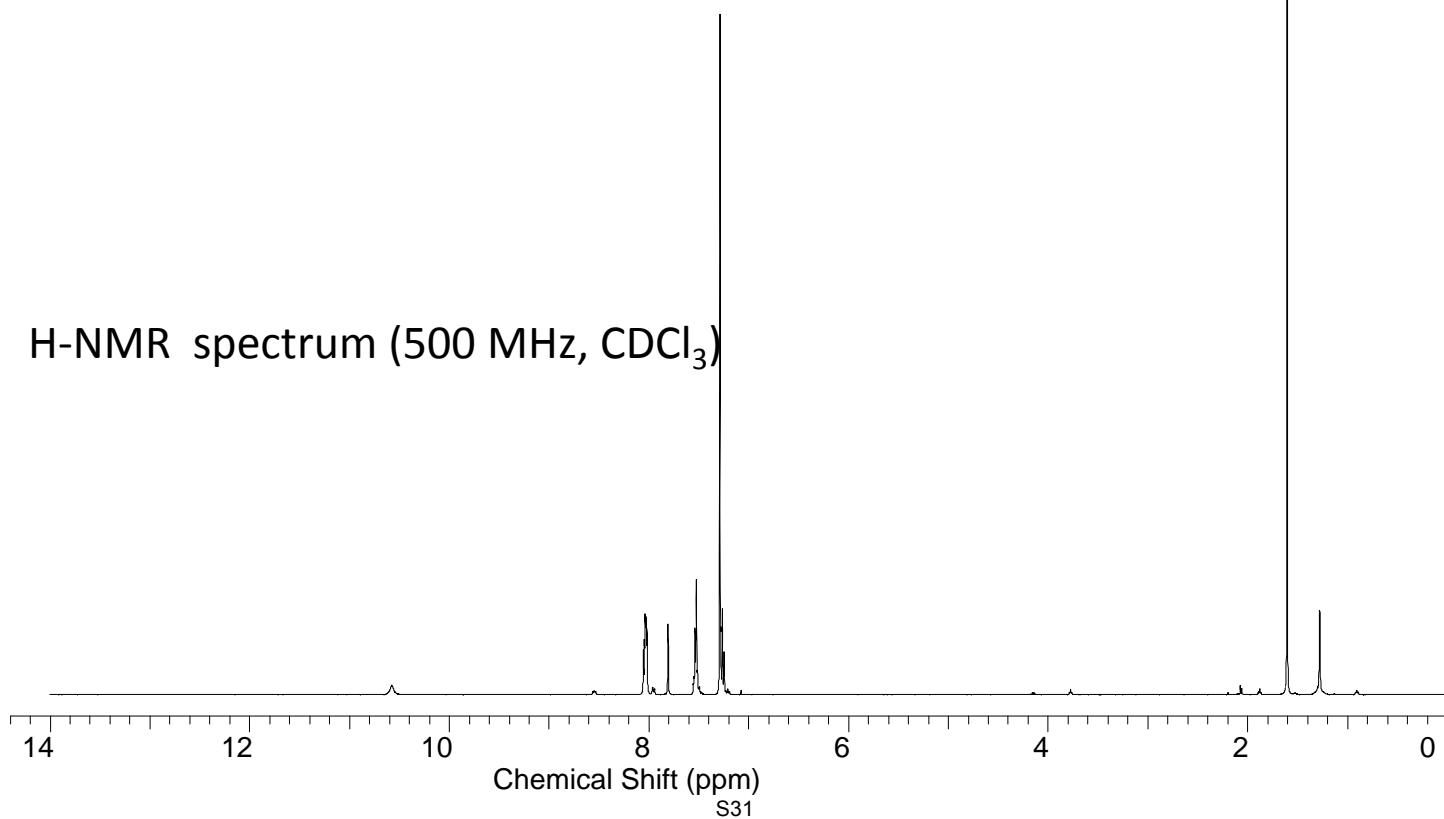
UV spectrum

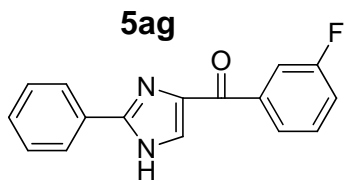
HPLC purity determination



Purity=98.9%, t_R =15.37 min

H-NMR spectrum (500 MHz, CDCl₃)

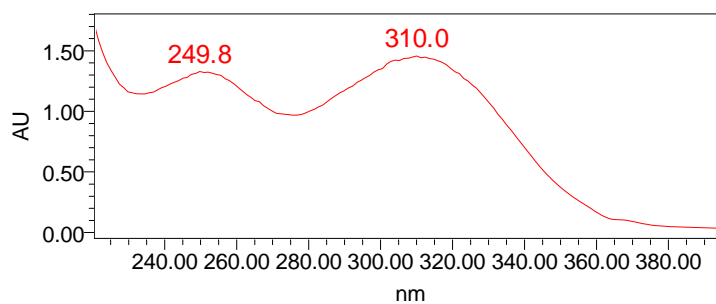




Chemical Formula: $C_{16}H_{11}FN_2O$

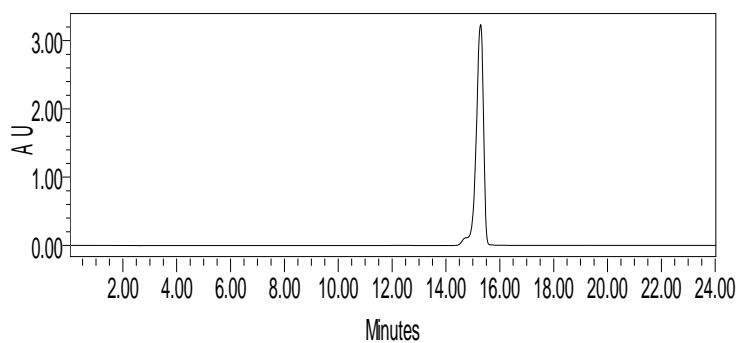
Exact Mass: 266.09

Molecular Weight: 266.27



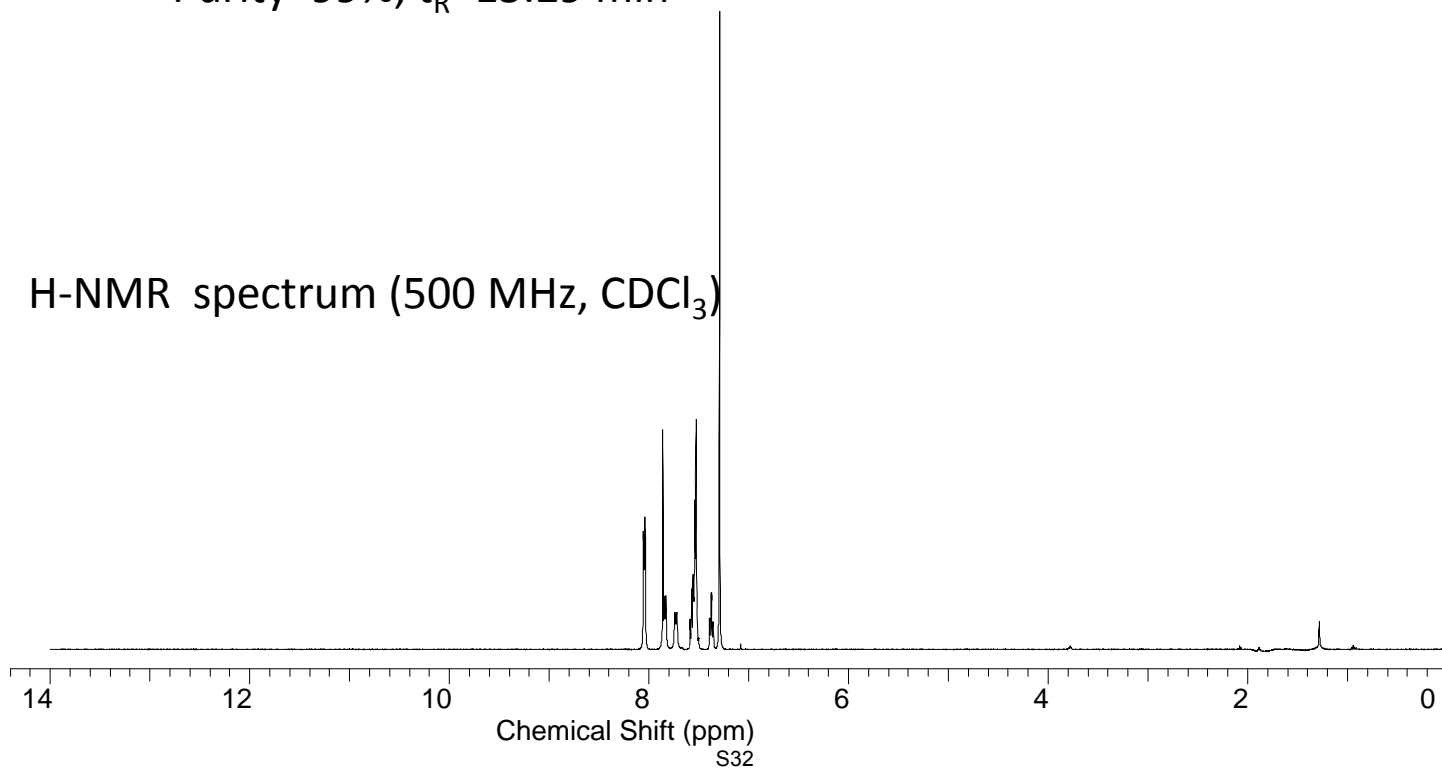
UV spectrum

HPLC purity determination

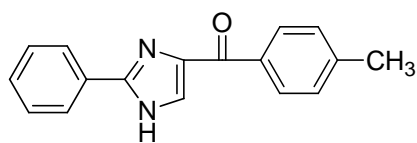


Purity > 99%, $t_R = 15.29$ min

H-NMR spectrum (500 MHz, $CDCl_3$)



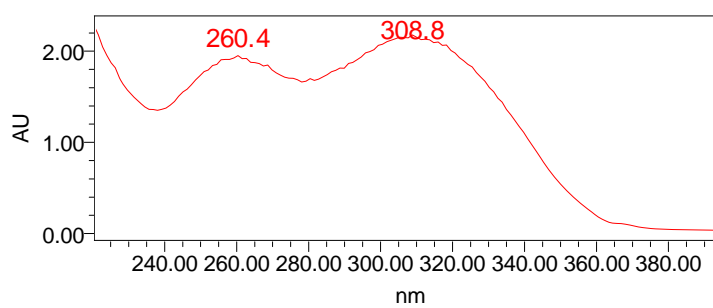
5ah



Chemical Formula: $C_{17}H_{14}N_2O$

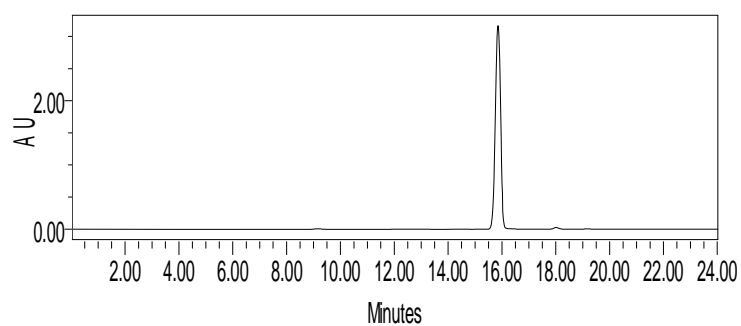
Exact Mass: 262.11

Molecular Weight: 262.31



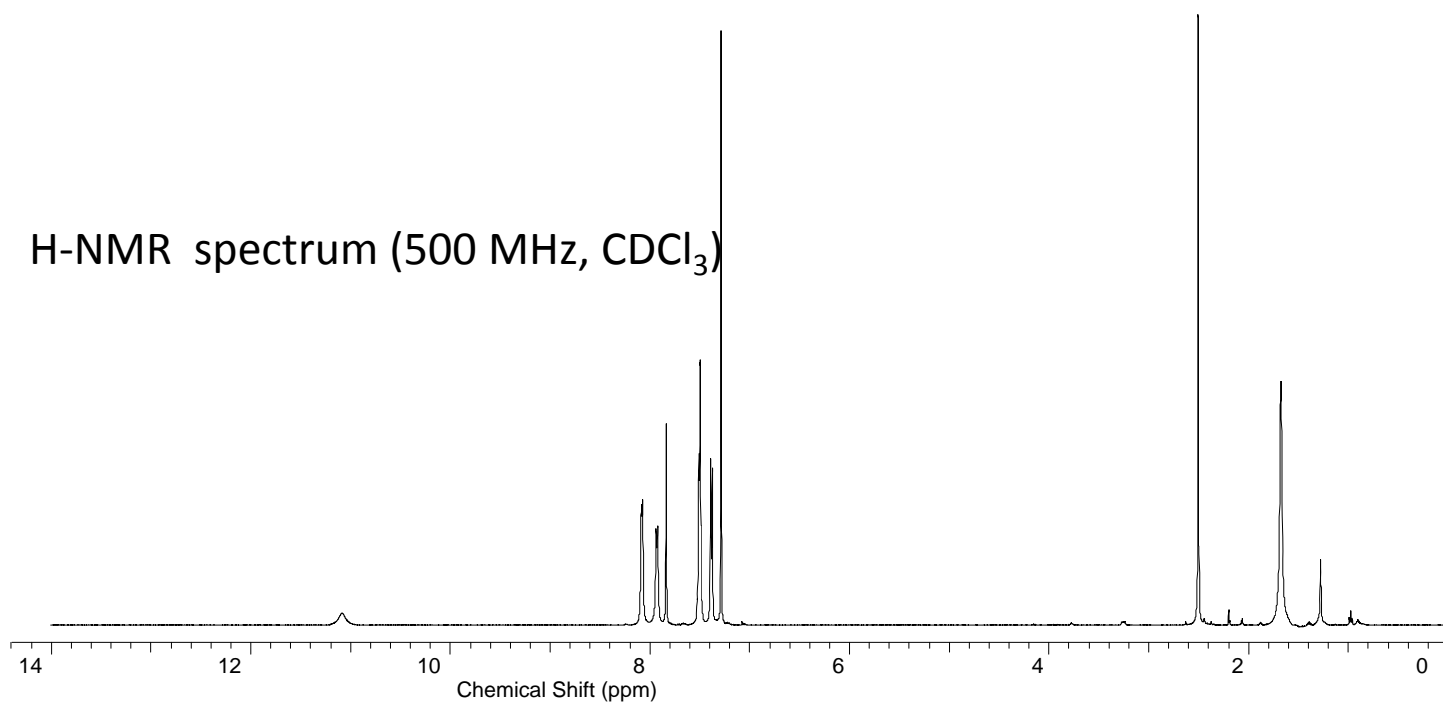
UV spectrum

HPLC purity determination

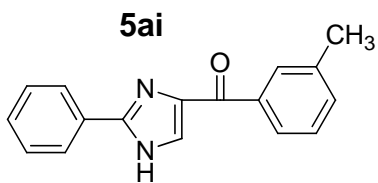


Purity=98.7%, t_R =15.86 min

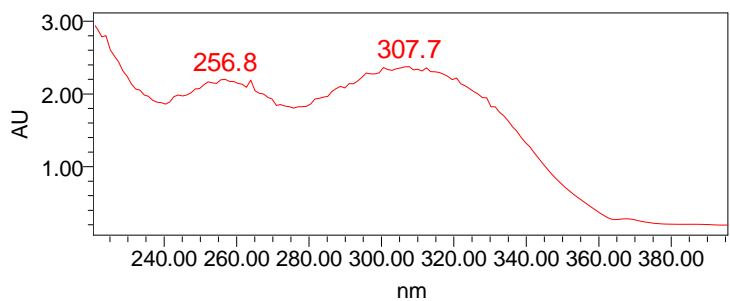
H-NMR spectrum (500 MHz, $CDCl_3$)



S33

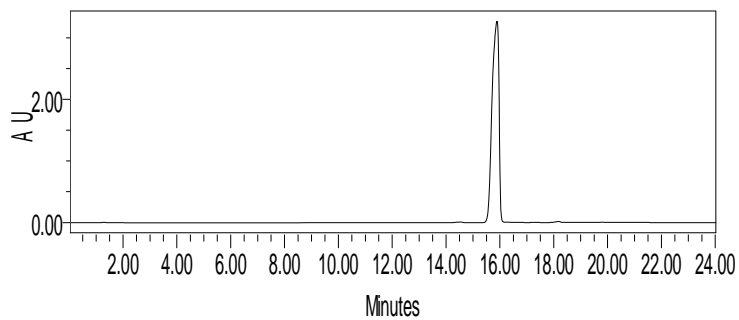


Chemical Formula: $C_{17}H_{14}N_2O$
Exact Mass: 262.11
Molecular Weight: 262.31



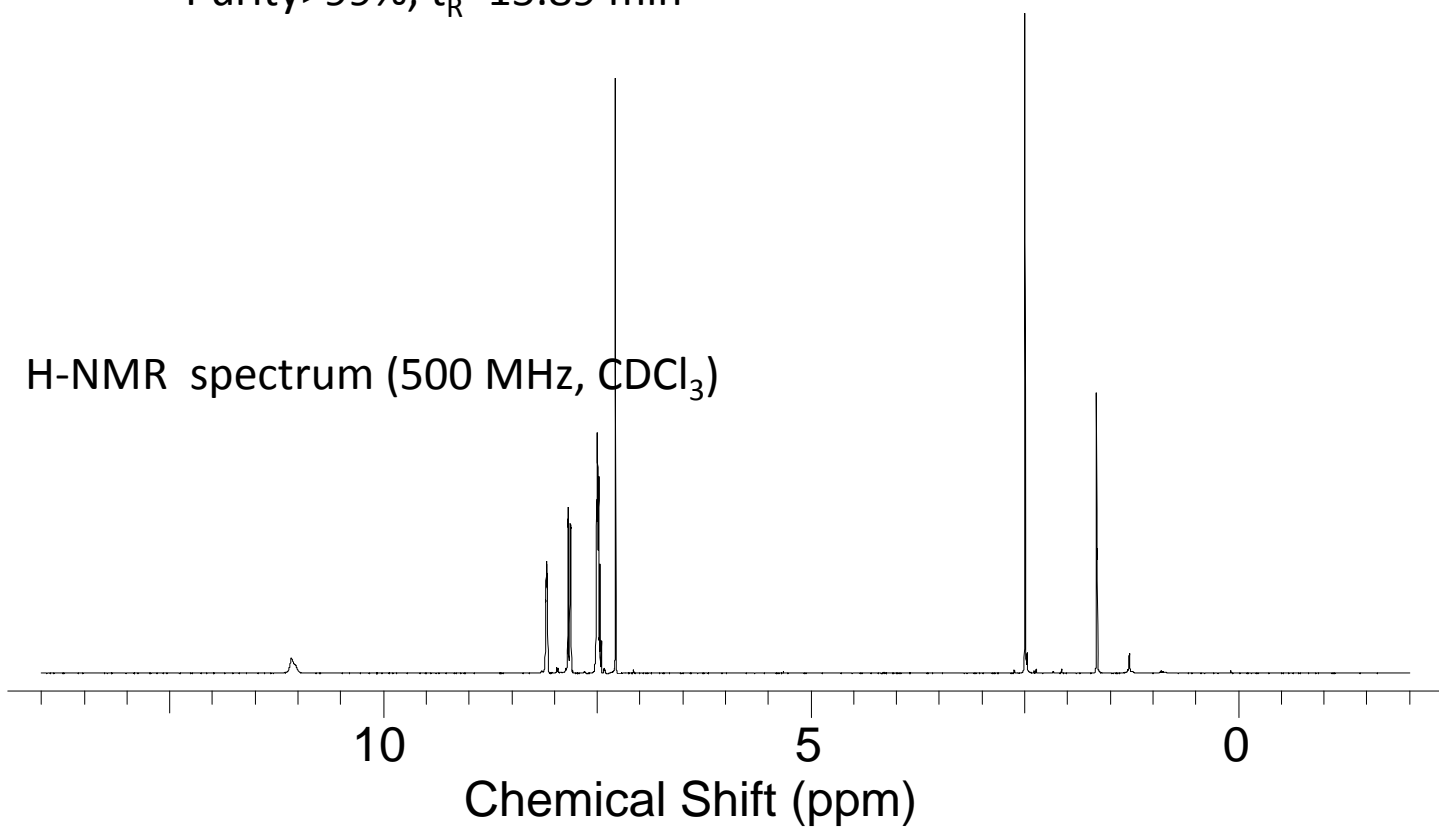
UV spectrum

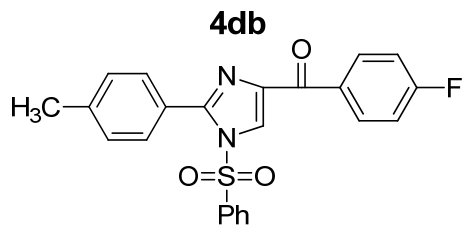
HPLC purity determination



Purity >99%, $t_R = 15.89$ min

H-NMR spectrum (500 MHz, $CDCl_3$)

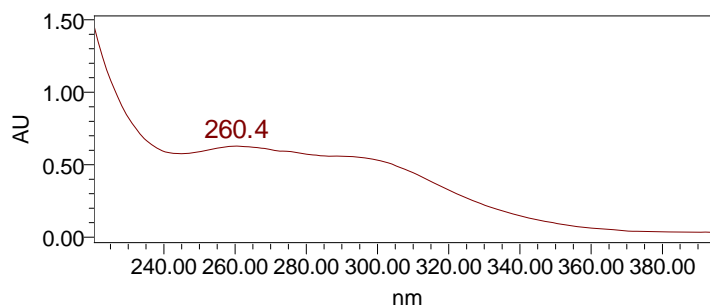




Chemical Formula: $C_{23}H_{17}FN_2O_3S$

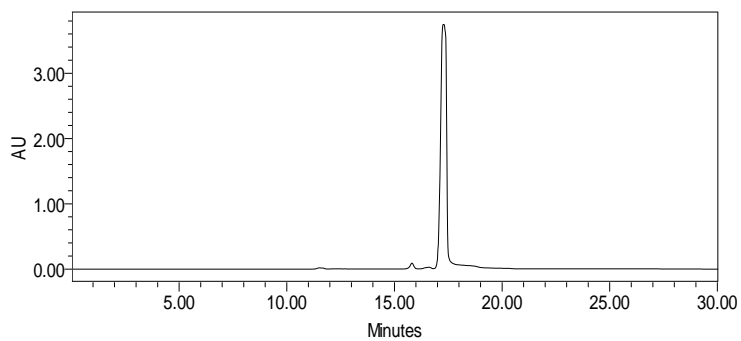
Exact Mass: 420.09

Molecular Weight: 420.46



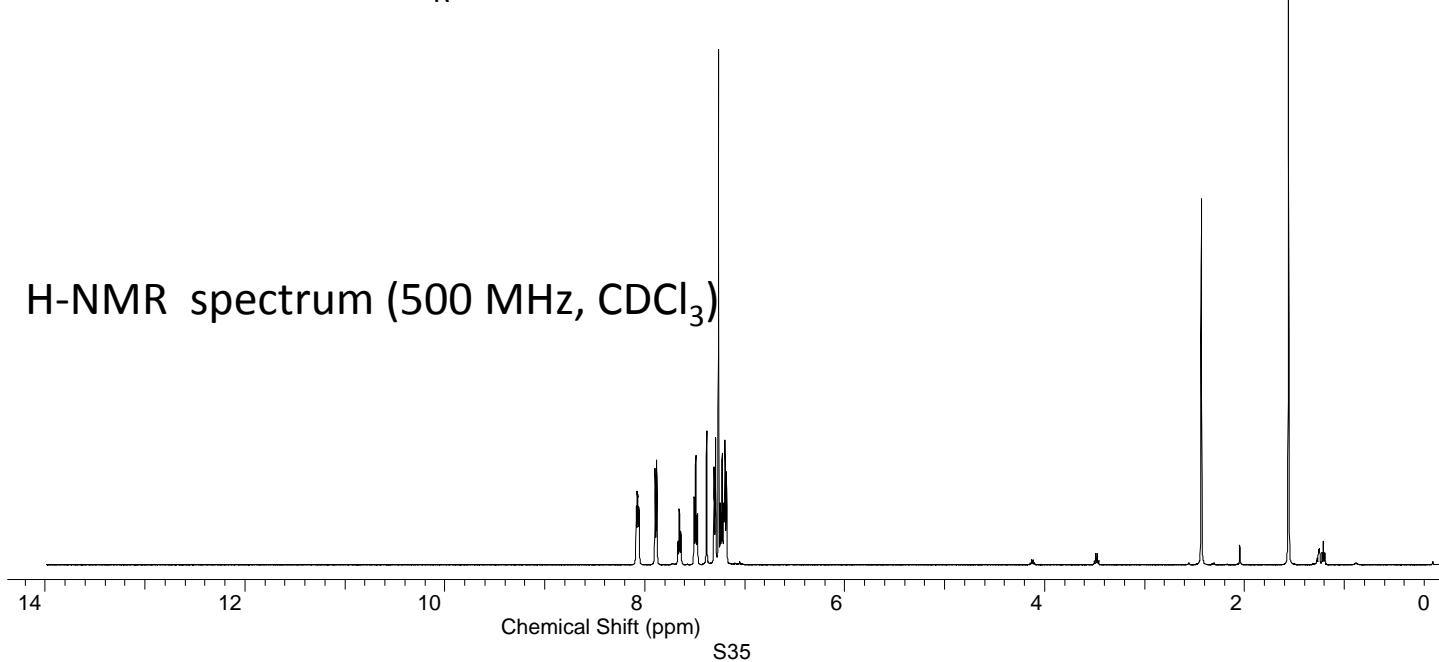
UV spectrum

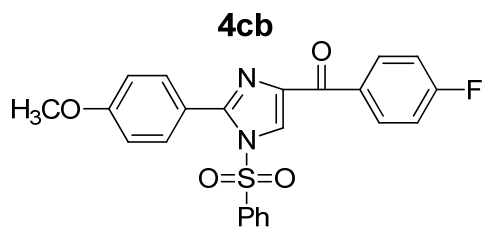
HPLC purity determination



Purity=97.3%, t_R =17.28 min

H-NMR spectrum (500 MHz, $CDCl_3$)

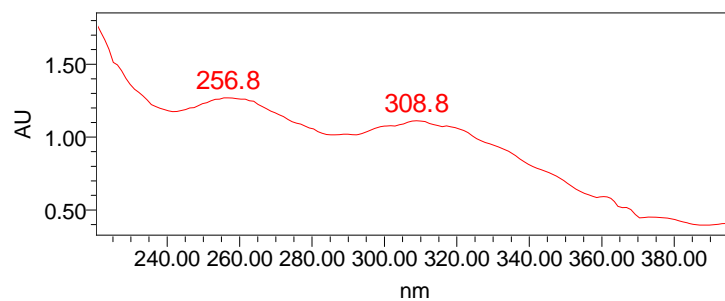




Chemical Formula: $C_{23}H_{17}FN_2O_4S$

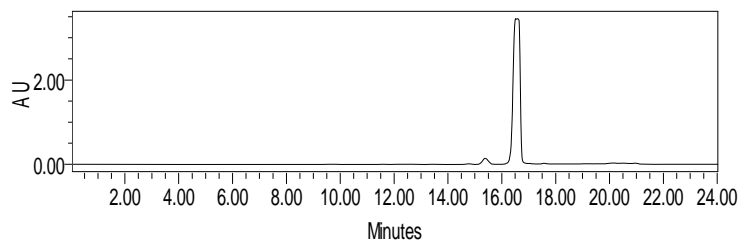
Exact Mass: 436.09

Molecular Weight: 436.46



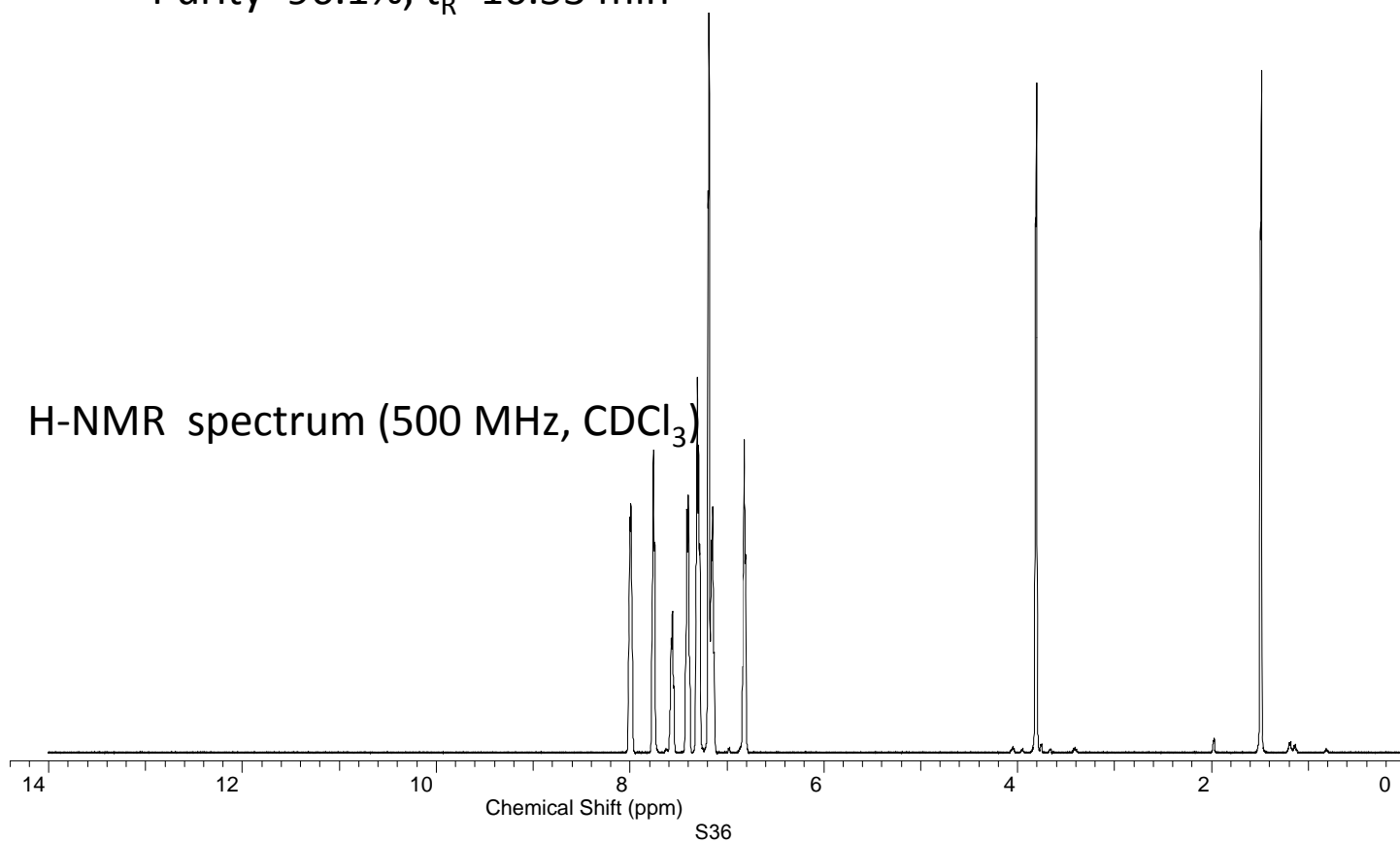
UV spectrum

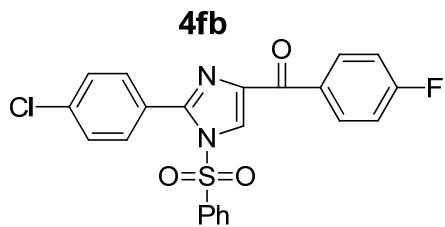
HPLC purity determination



Purity=96.1%, t_R =16.53 min

H-NMR spectrum (500 MHz, $CDCl_3$)

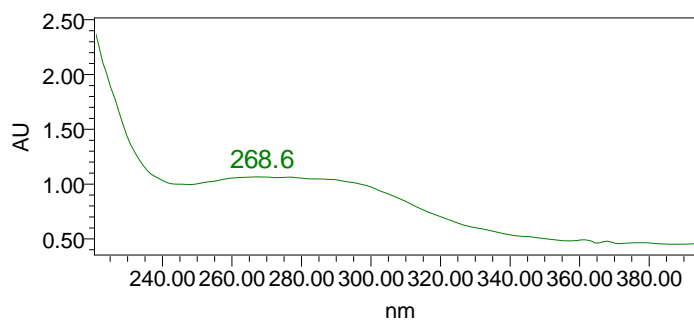




Chemical Formula: $C_{22}H_{14}ClFN_2O_3S$

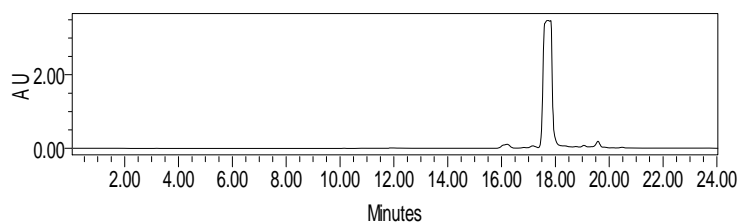
Exact Mass: 440.04

Molecular Weight: 440.87



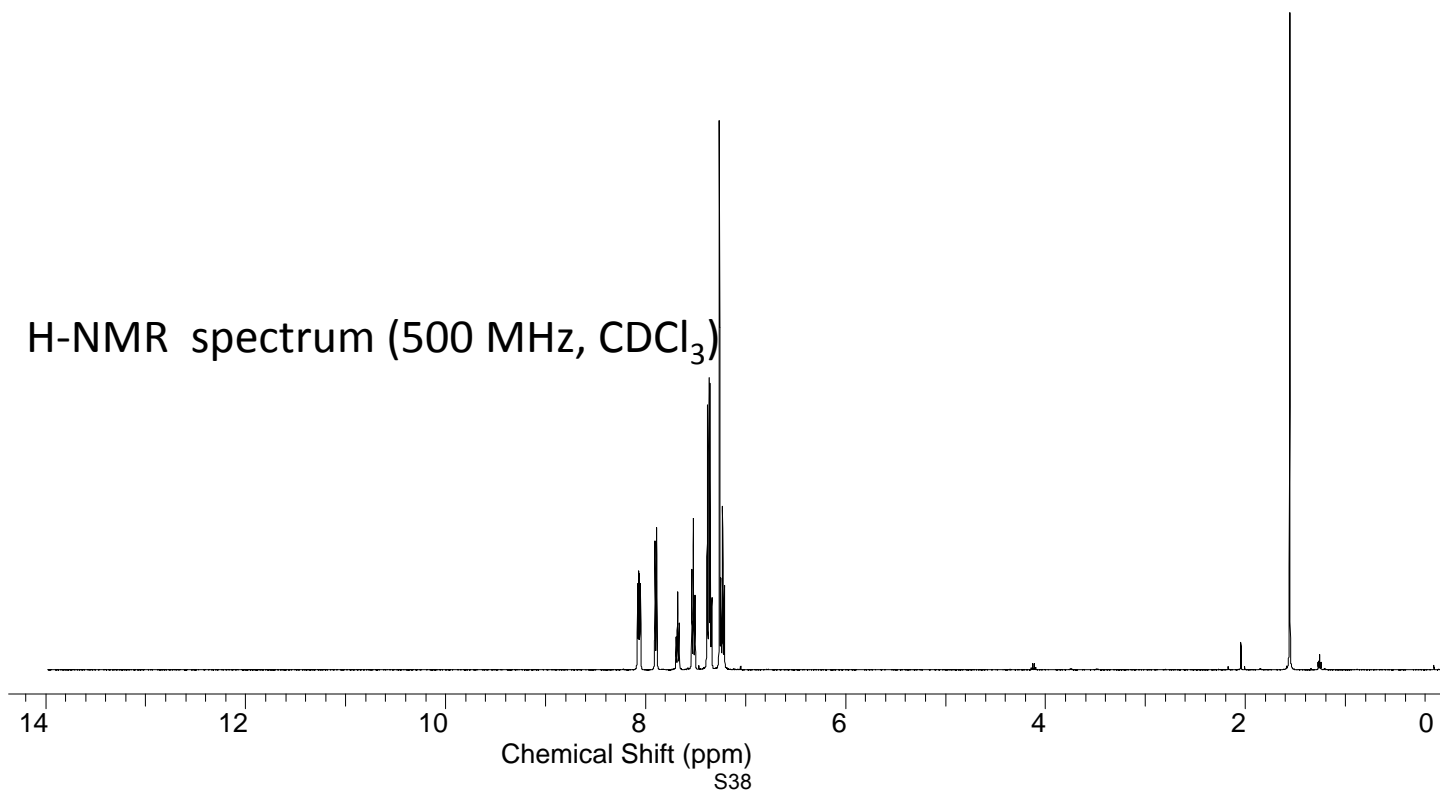
UV spectrum

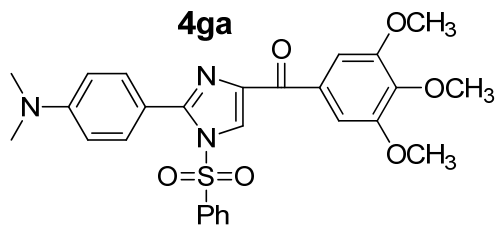
HPLC purity determination



Purity=97.4%, $t_R=17.72$ min

H-NMR spectrum (500 MHz, $CDCl_3$)

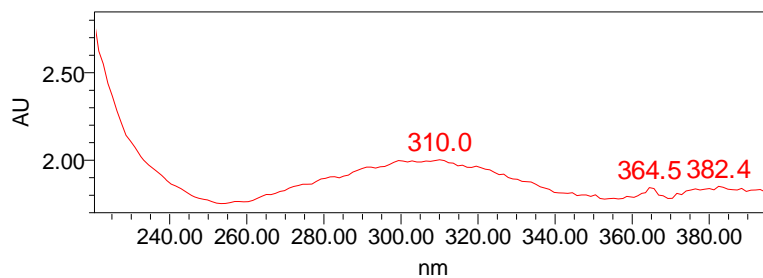




Chemical Formula: $C_{27}H_{27}N_3O_6S$

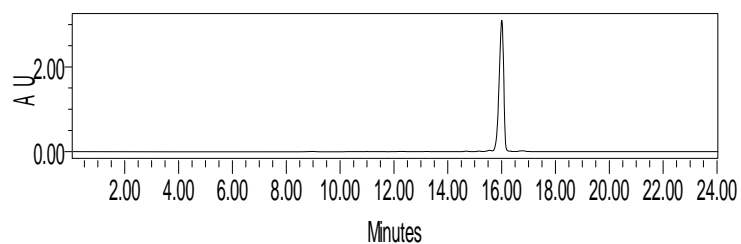
Exact Mass: 521.16

Molecular Weight: 521.58



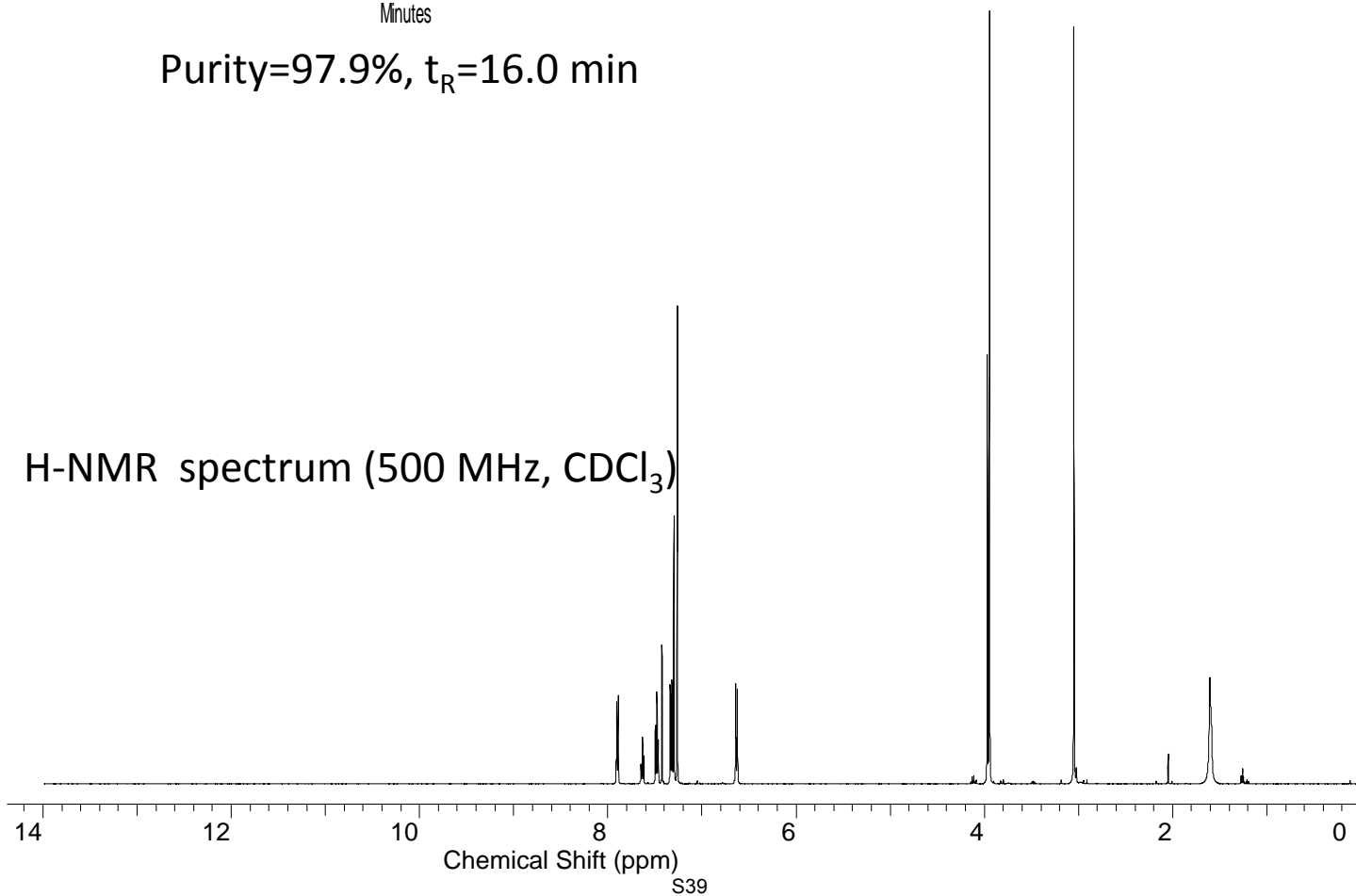
UV spectrum

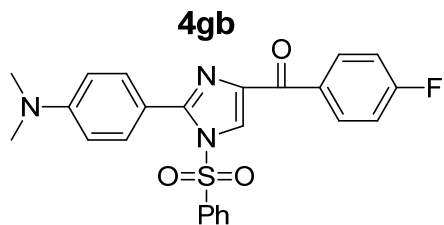
HPLC purity determination



Purity=97.9%, t_R =16.0 min

H-NMR spectrum (500 MHz, $CDCl_3$)

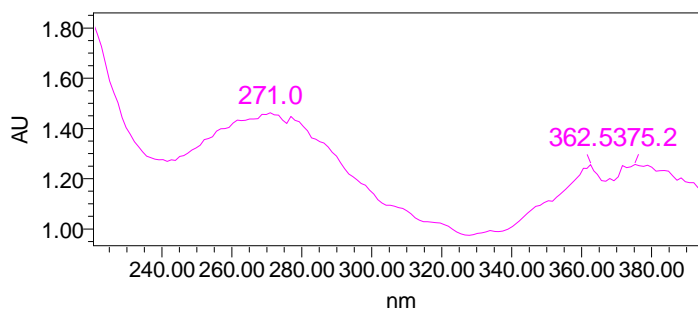




Chemical Formula: $C_{24}H_{20}FN_3O_3S$

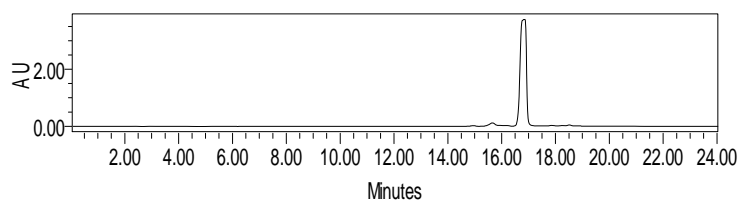
Exact Mass: 449.12

Molecular Weight: 449.50



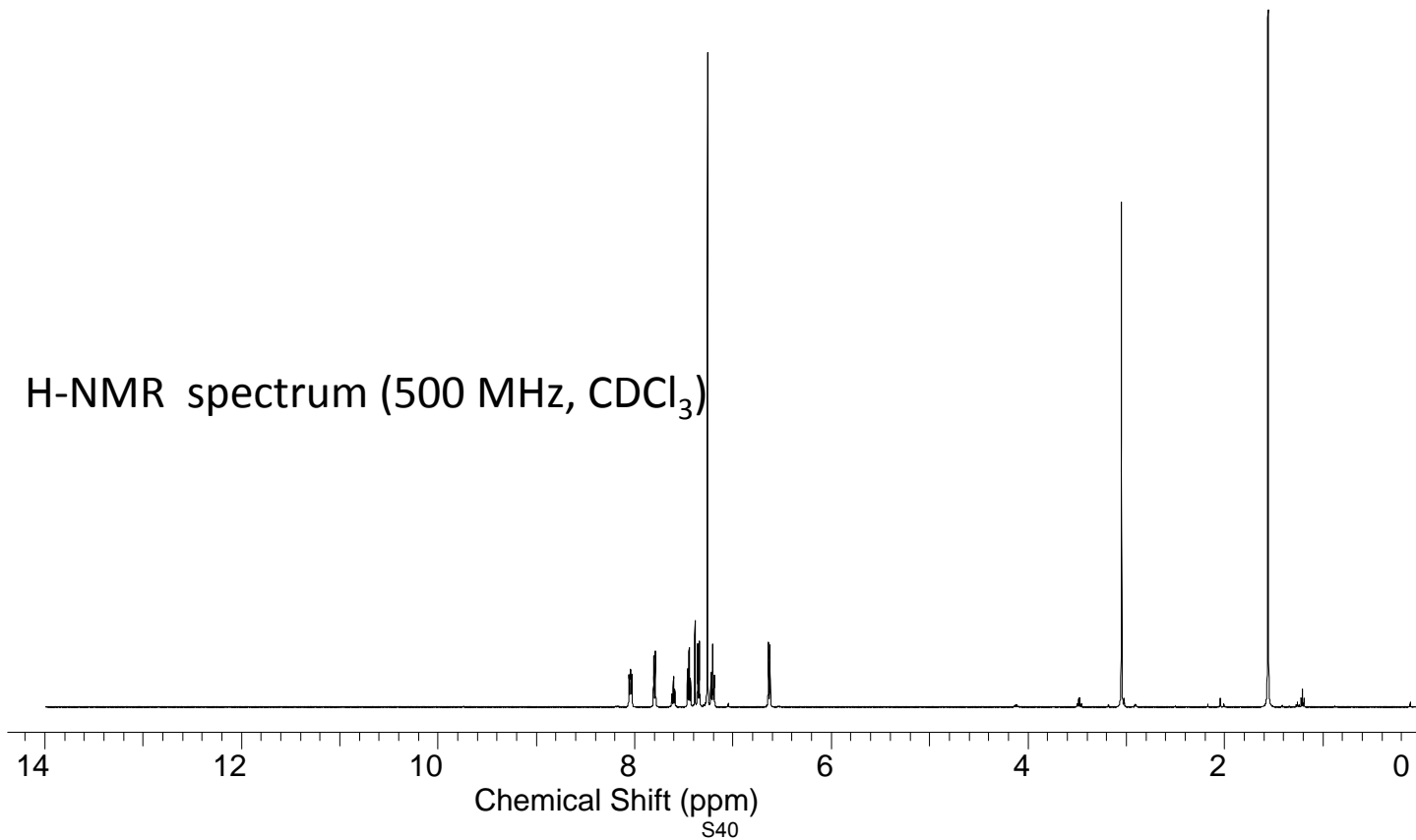
UV spectrum

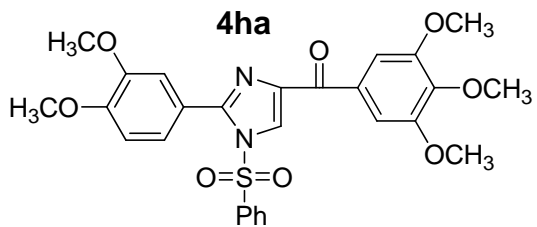
HPLC purity determination



Purity=96.5%, t_R =16.85 min

H-NMR spectrum (500 MHz, $CDCl_3$)

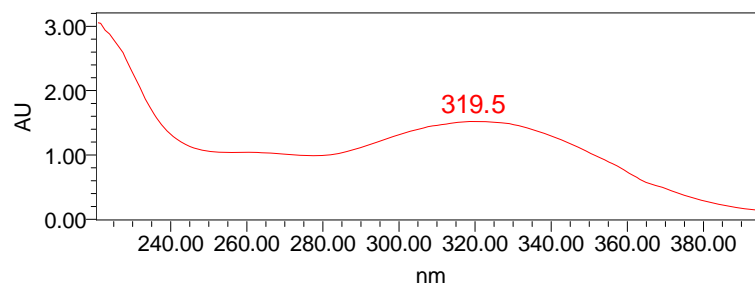




Chemical Formula: $C_{27}H_{26}N_2O_8S$

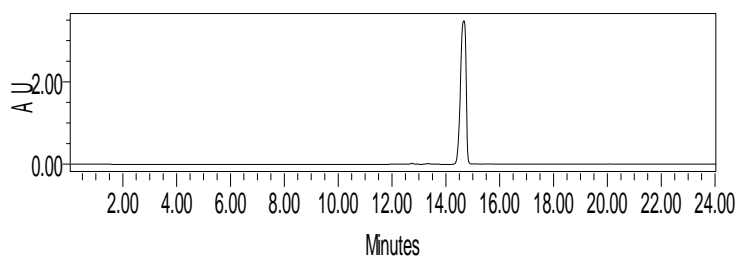
Exact Mass: 538.14

Molecular Weight: 538.57



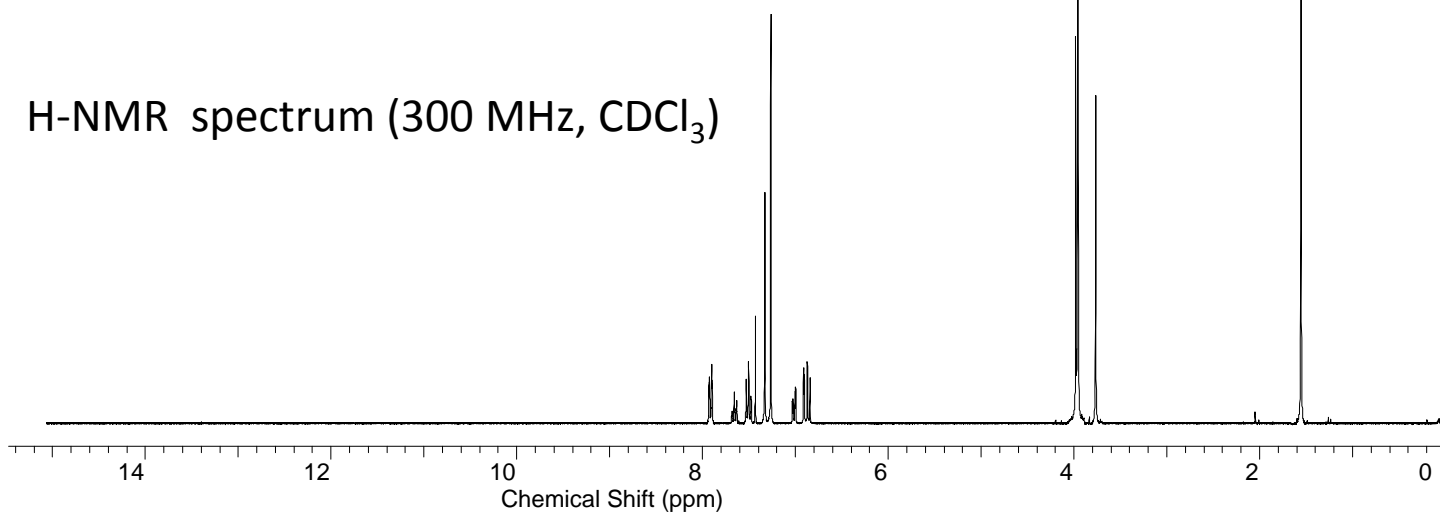
UV spectrum

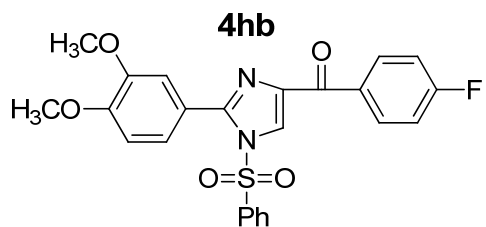
HPLC purity determination



Purity=98.2%, $t_R=14.67$ min

H-NMR spectrum (300 MHz, $CDCl_3$)

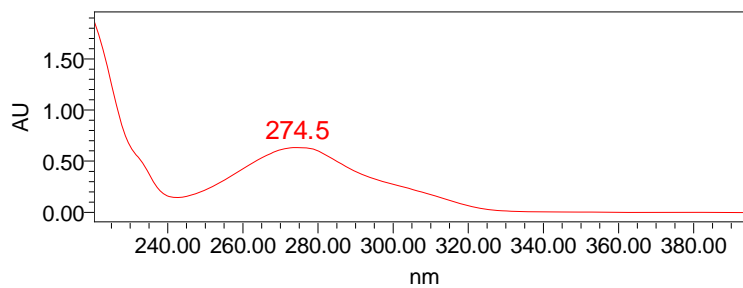




Chemical Formula: $C_{24}H_{19}FN_2O_5S$

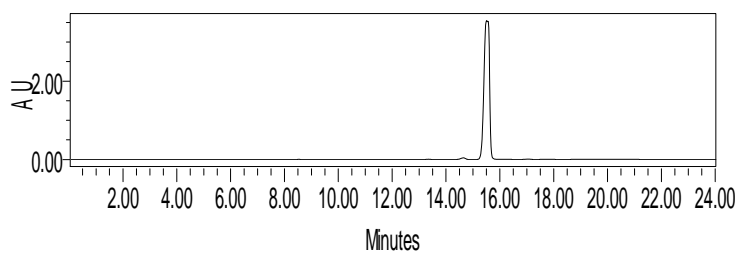
Exact Mass: 466.10

Molecular Weight: 466.48



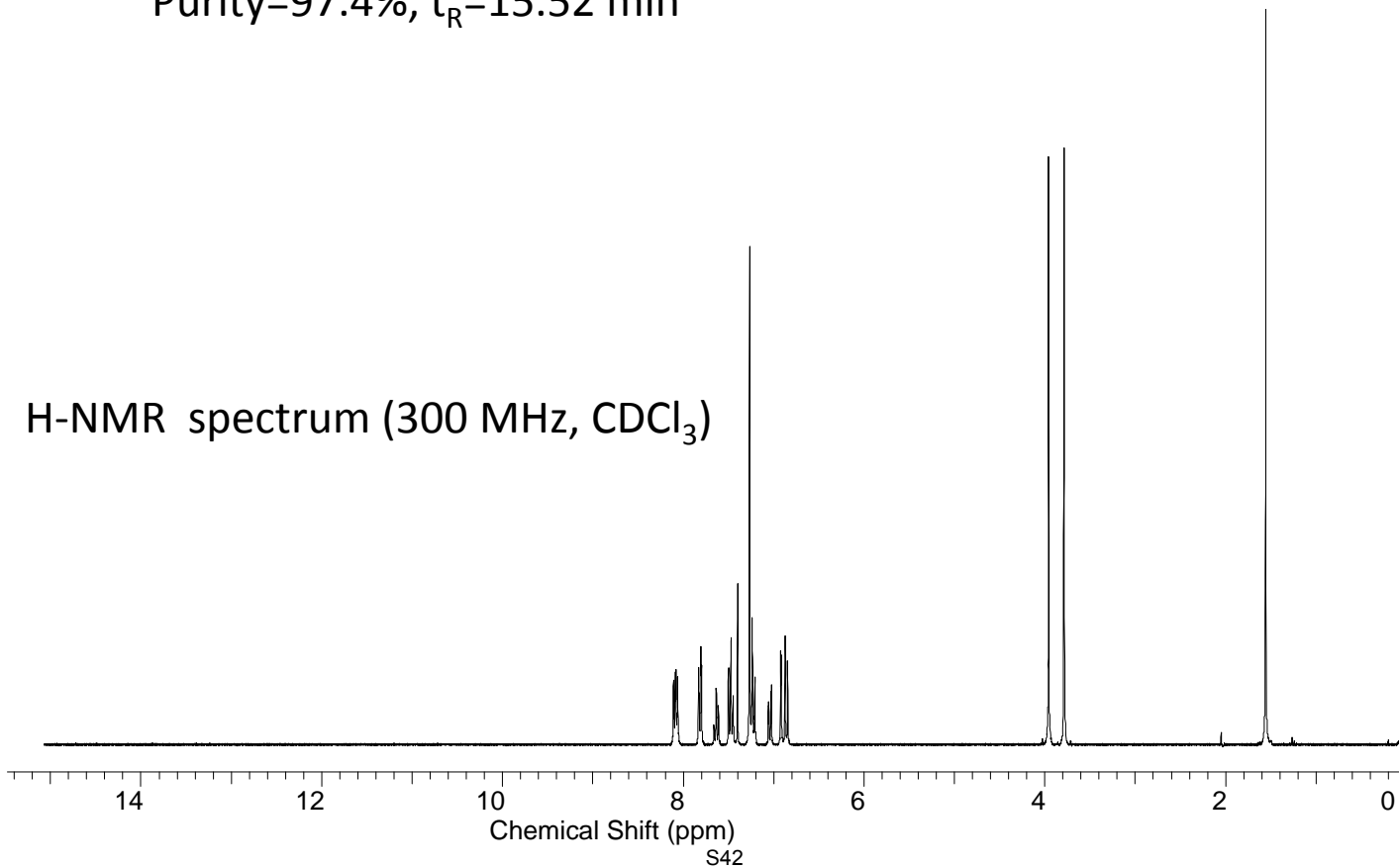
UV spectrum

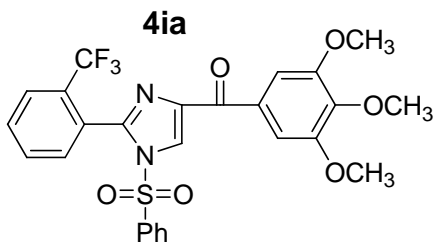
HPLC purity determination



Purity=97.4%, t_R =15.52 min

H-NMR spectrum (300 MHz, $CDCl_3$)

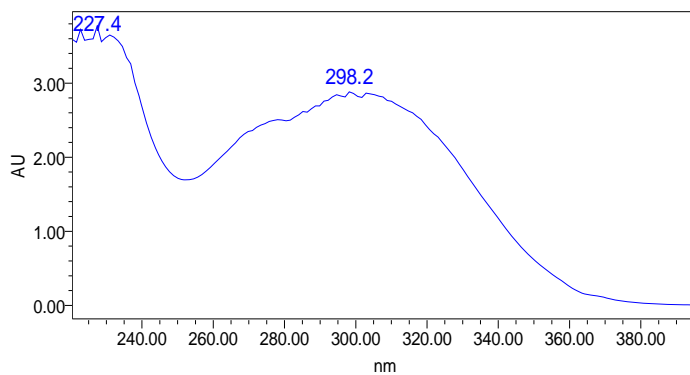




Chemical Formula: $C_{26}H_{21}F_3N_2O_6S$

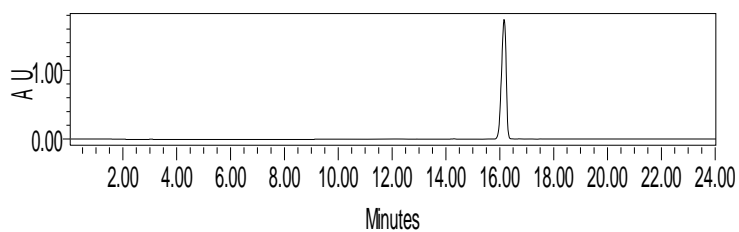
Exact Mass: 546.11

Molecular Weight: 546.51



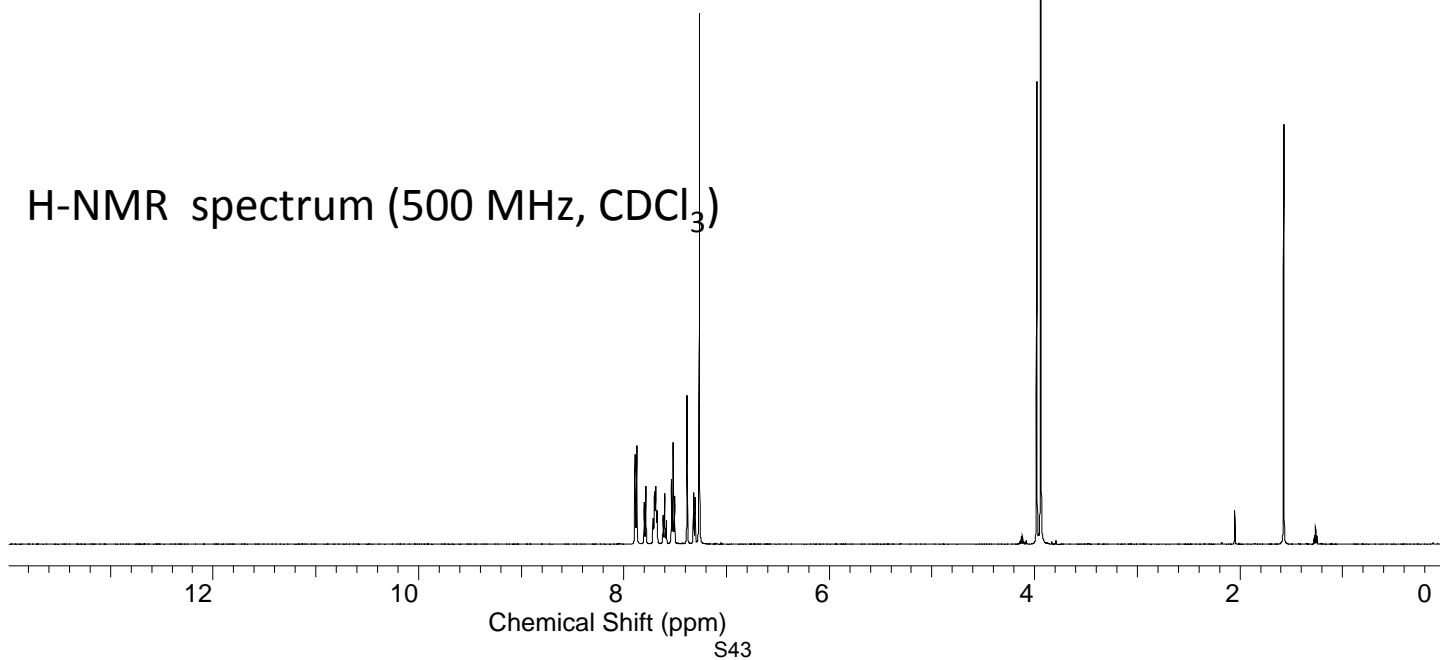
UV spectrum

HPLC purity determination

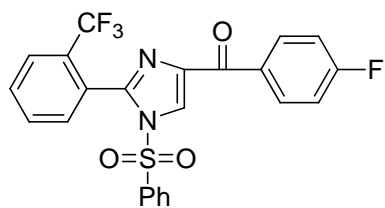


Purity=98.9%, t_R =16.16 min

H-NMR spectrum (500 MHz, $CDCl_3$)



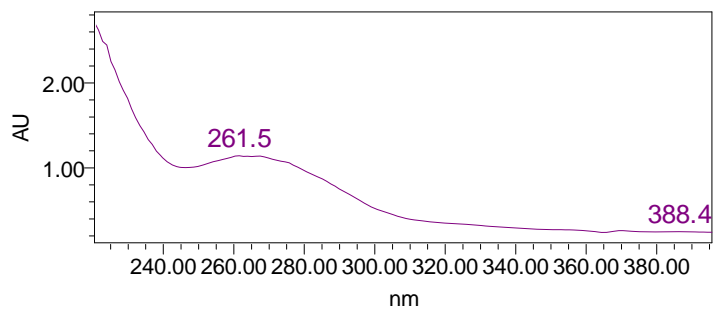
4ib



Chemical Formula: C₂₃H₁₄F₄N₂O₃S

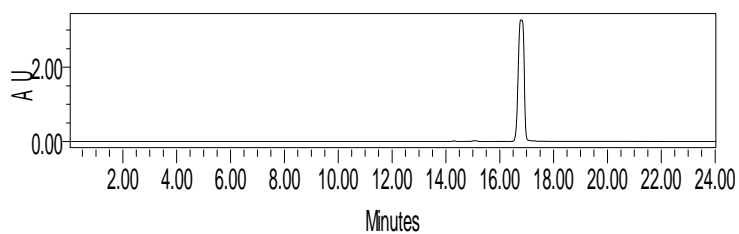
Exact Mass: 474.07

Molecular Weight: 474.43



UV spectrum

HPLC purity determination



Purity=98.2%, t_R=16.80 min

H-NMR spectrum (500 MHz, CDCl₃)

