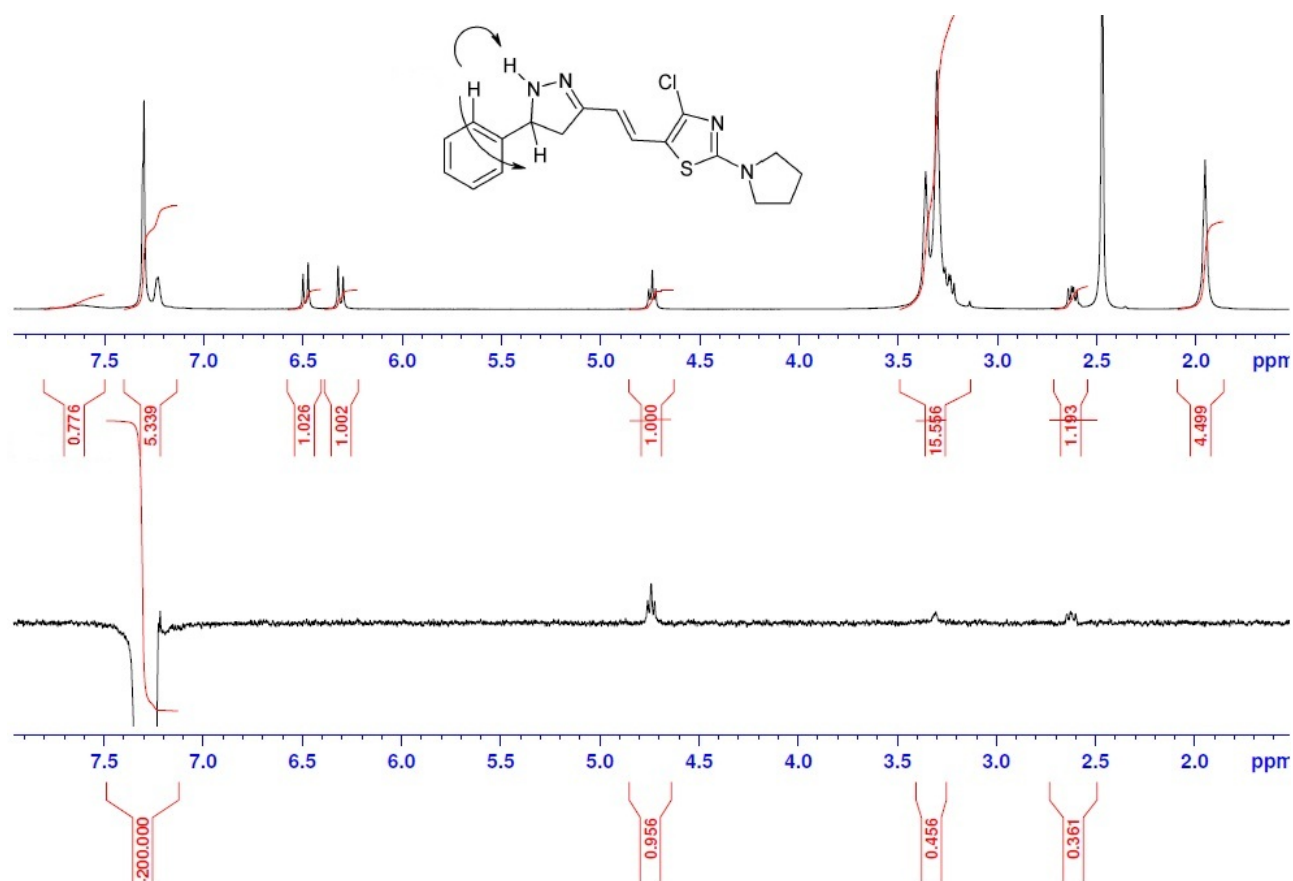


# Novel Asymmetric Thiazolyl-Substituted Penta-1,4-dien-3-ones and 3,5-Diaryl-2-pyrazolines on their Background

Oleksii O. Kolomoitsev, Volodymyr M. Kotlyar, Dmytro O. Tarasenko, Andrey O. Doroshenko

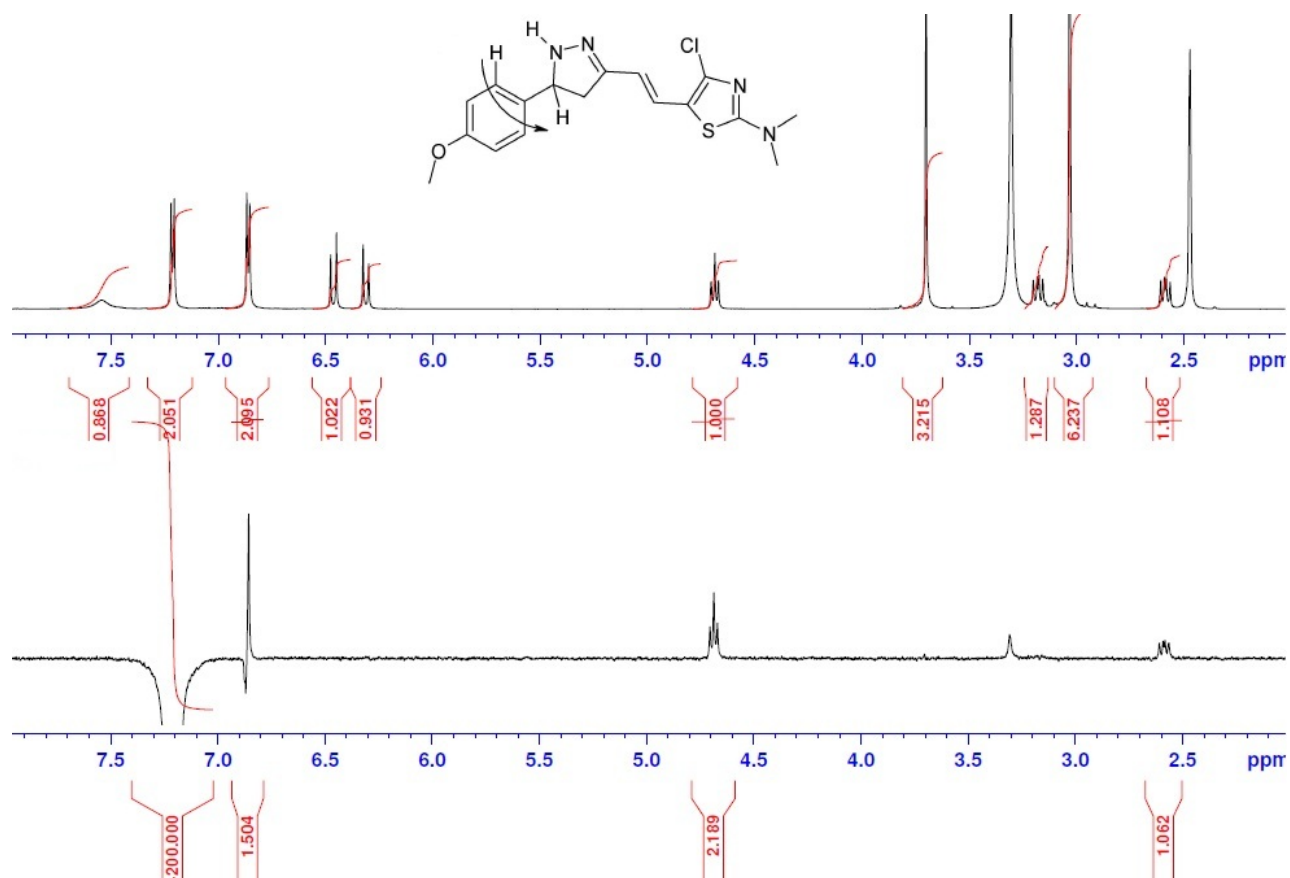
*V. N. Karazin Kharkiv National University, Svobody Sq., 4, Kharkiv, 61022, Ukraine*

## NOE spectrum of 4-chloro-5-[2-(5-phenyl-4,5-dihydro-1H-pyrazol-3-yl)vinyl]-2-pyrrolidin-1-yl-thiazole (6b)



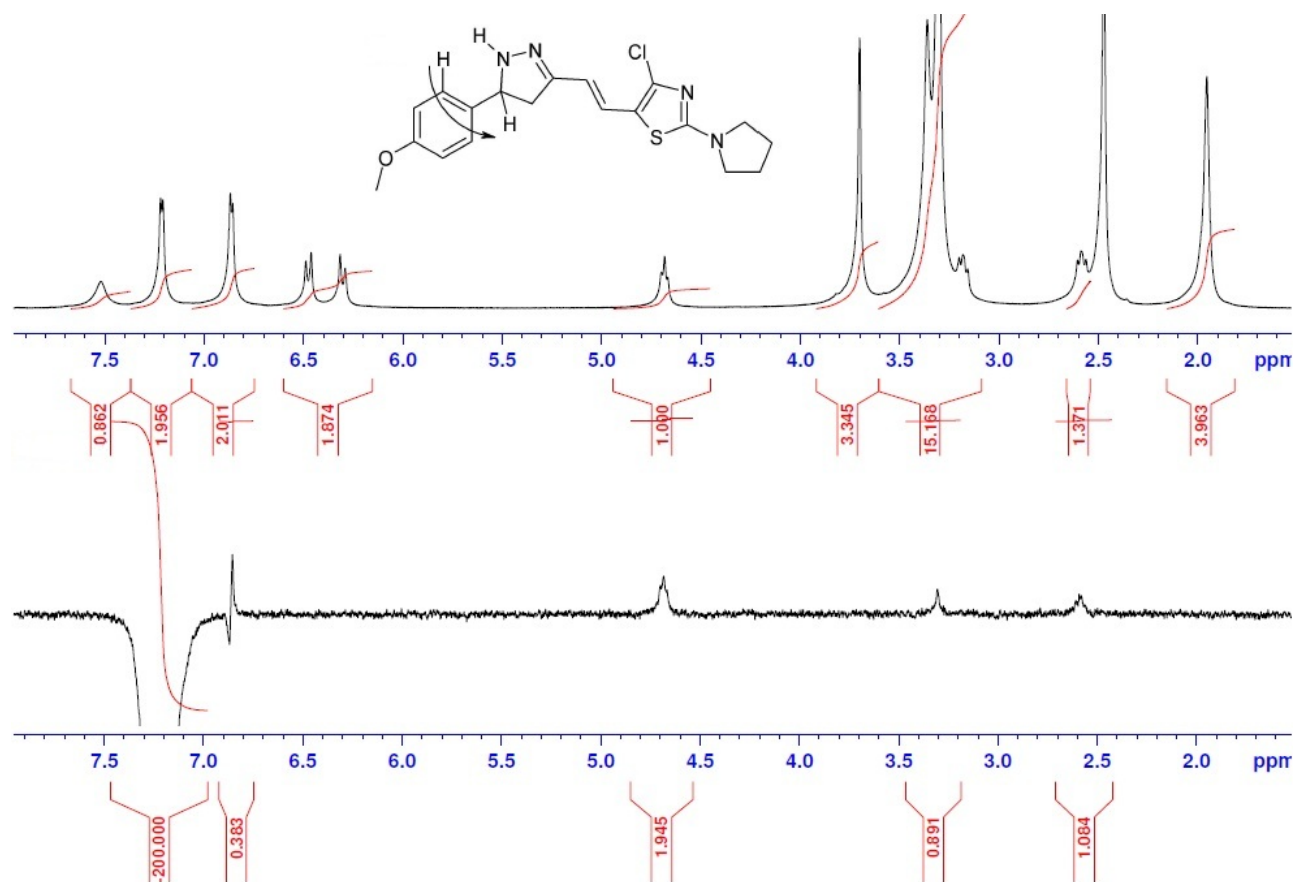
NOE spectrum of compound **6b**

NOE spectrum of 4-chloro-5-[2-[5-(4-methoxyphenyl)-4,5-dihydro-1H-pyrazol-3-yl]vinyl]-  
N,N-dimethyl-thiazol-2-amine (8a)



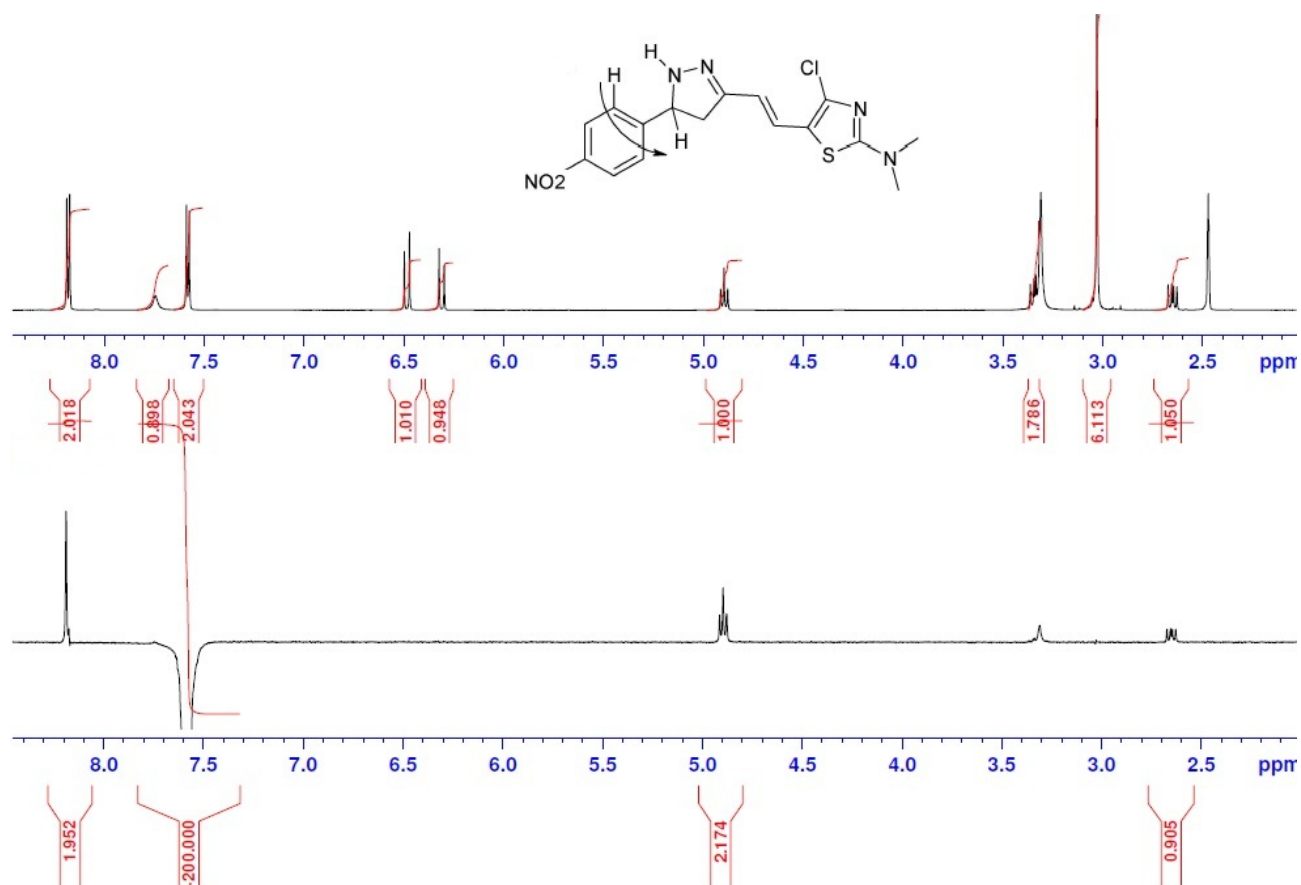
NOE spectrum of compound 8a

NOE spectrum of 4-chloro-5-[2-[5-(4-methoxyphenyl)-4,5-dihydro-1H-pyrazol-3-yl]vinyl]-2-pyrrolidin-1-yl-thiazole (8b)



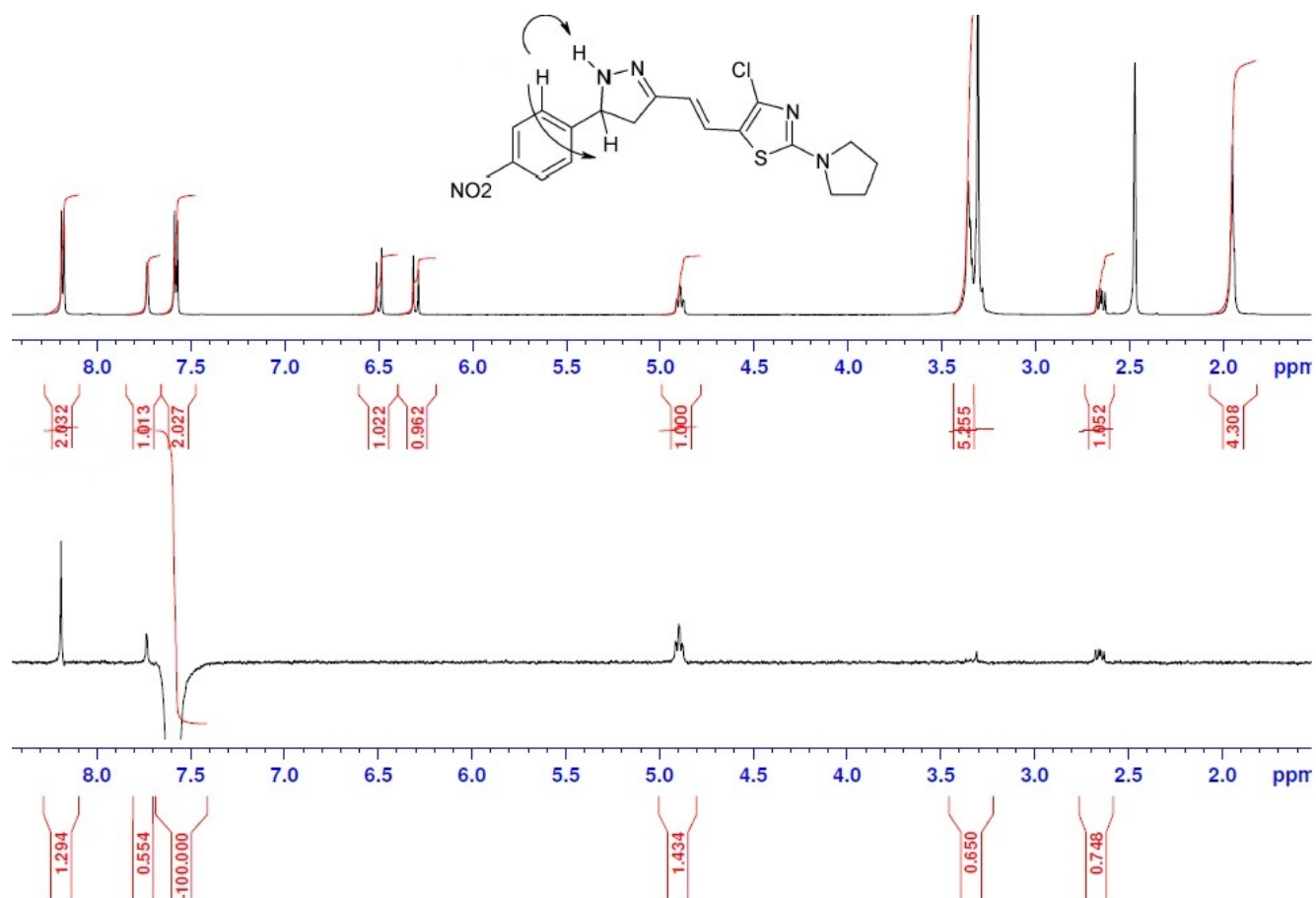
NOE spectrum of compound 8b

NOE spectrum of 4-chloro-N,N-dimethyl-5-[2-[5-(4-nitrophenyl)-4,5-dihydro-1H-pyrazol-3-yl]vinyl]thiazol-2-amine (9a)



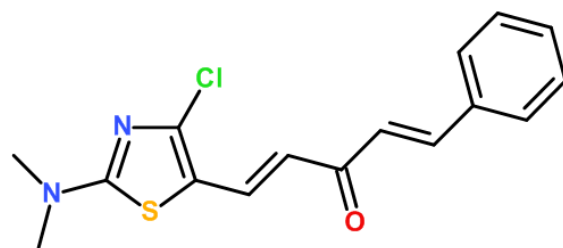
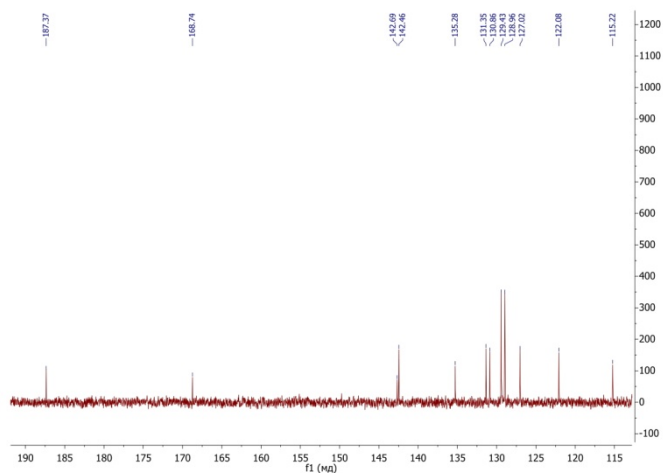
NOE spectrum of compound 9a

NOE spectrum of 4-chloro-5-[2-[5-(4-nitrophenyl)-4,5-dihydro-1H-pyrazol-3-yl]vinyl]-2-pyrrolidin-1-yl-thiazole (9b)

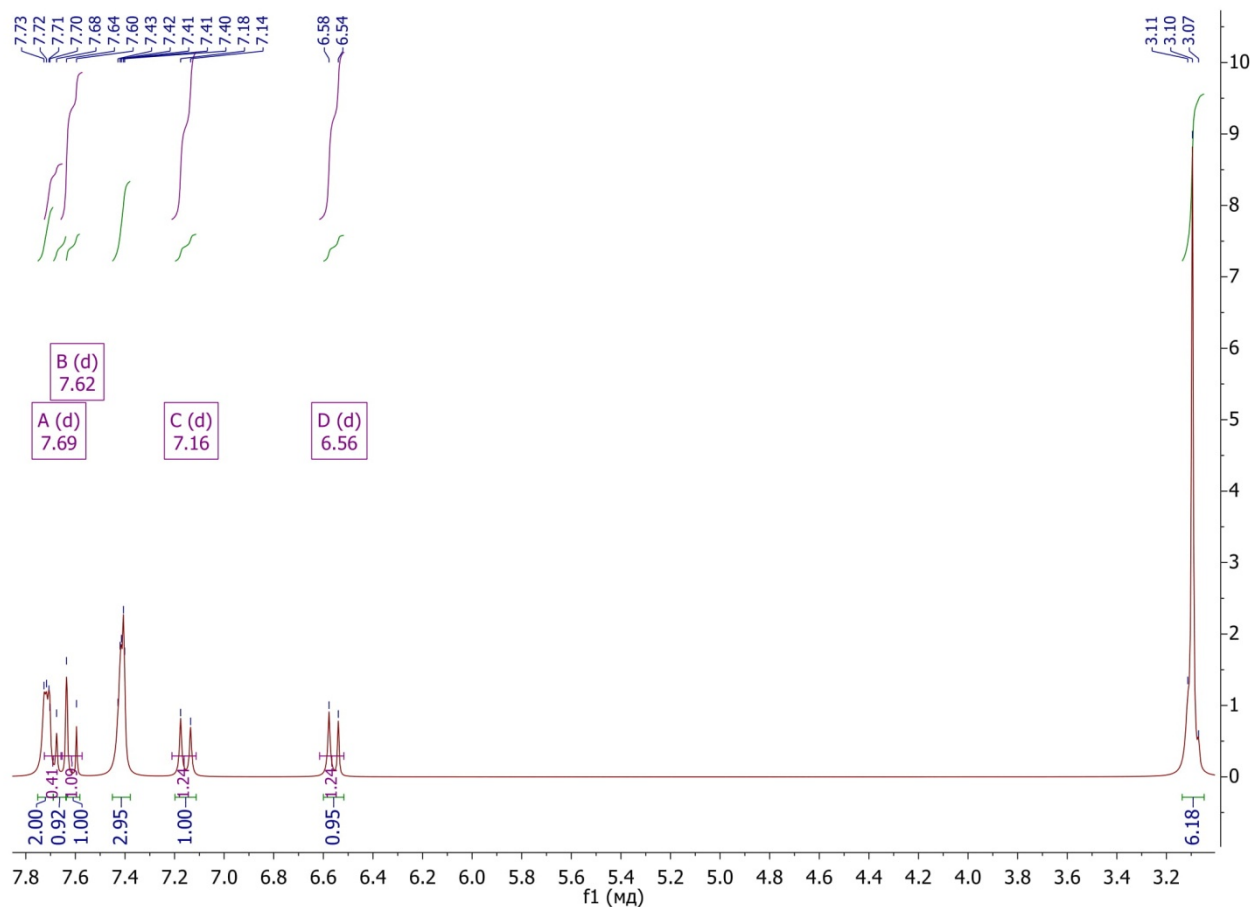


NOE spectrum of compound 9b

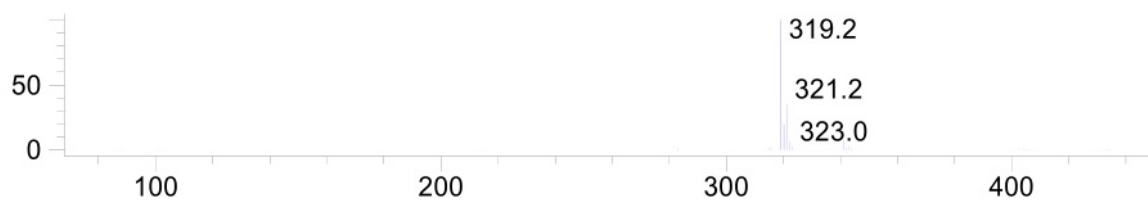
# 1-[4-Chloro-2-(dimethylamino)thiazol-5-yl]-5-phenyl-penta-1,4-dien-3-one (2a)



## <sup>13</sup>C NMR spectrum of compound 2a

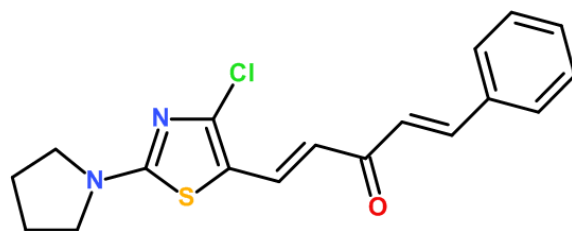
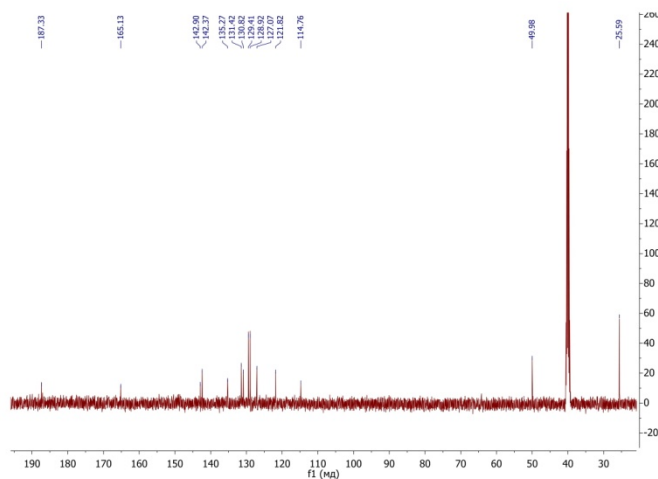


## <sup>1</sup>H NMR spectrum of compound 2a

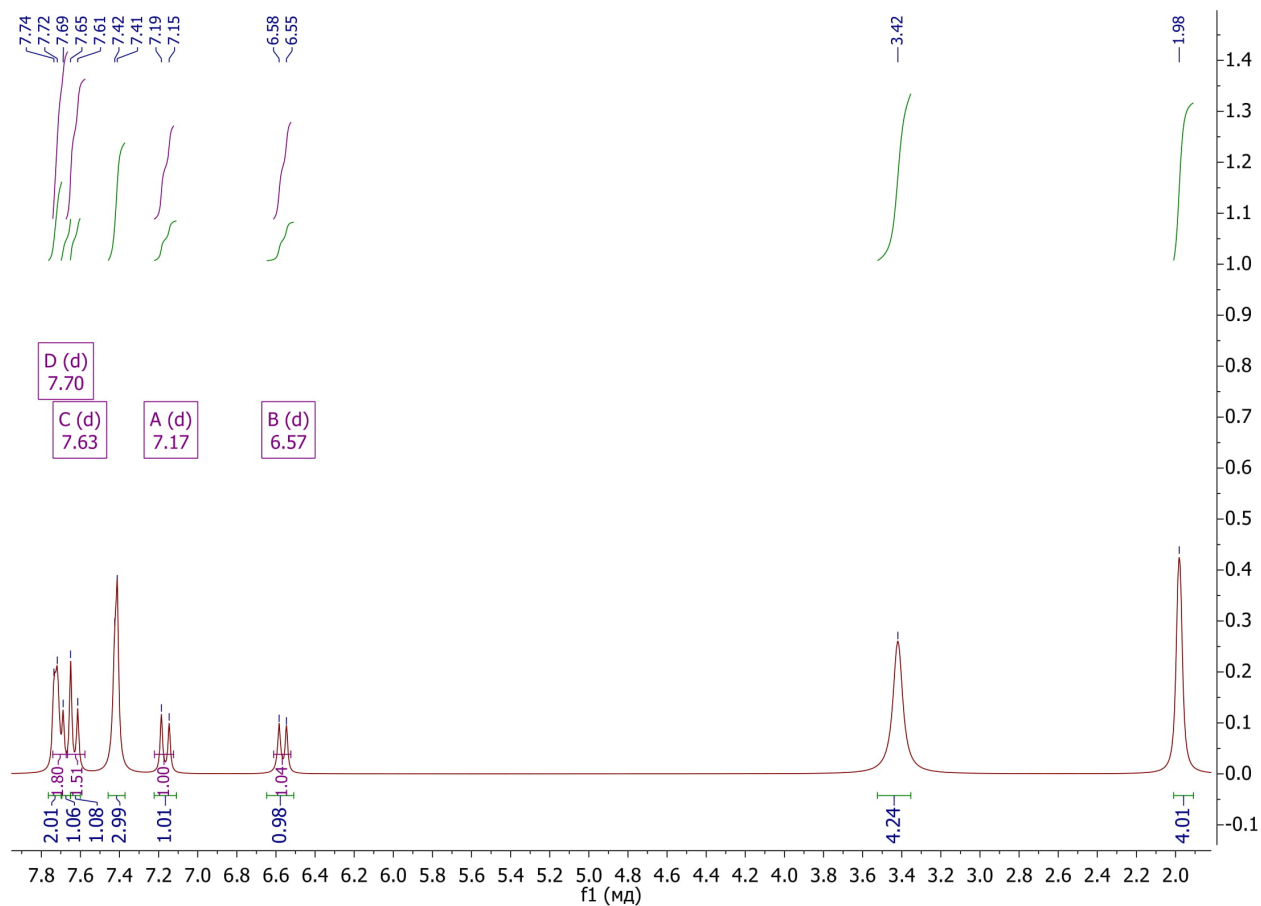


## Mass spectrum of compound 2a

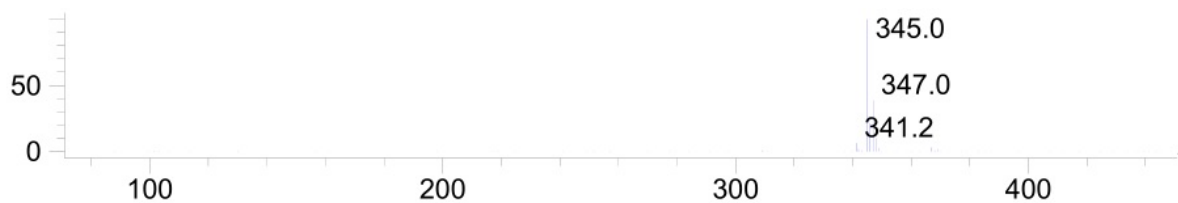
# 1-(4-Chloro-2-pyrrolidin-1-yl-thiazol-5-yl)-5-phenyl-penta-1,4-dien-3-one (2b)



## <sup>13</sup>C NMR spectrum of compound 2b

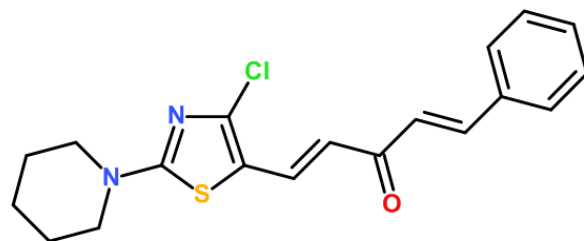
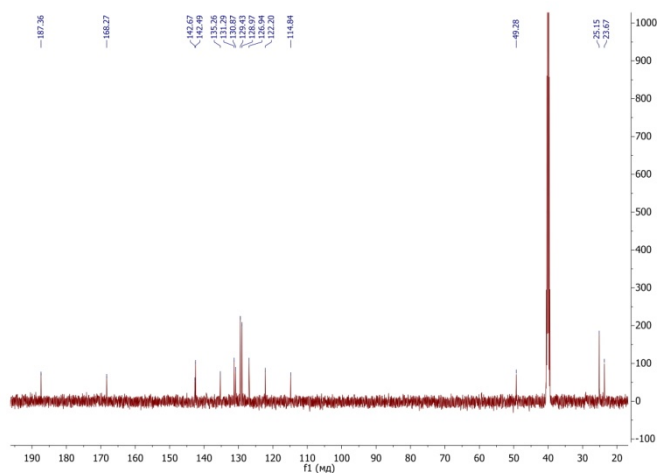


## <sup>1</sup>H NMR spectrum of compound 2b

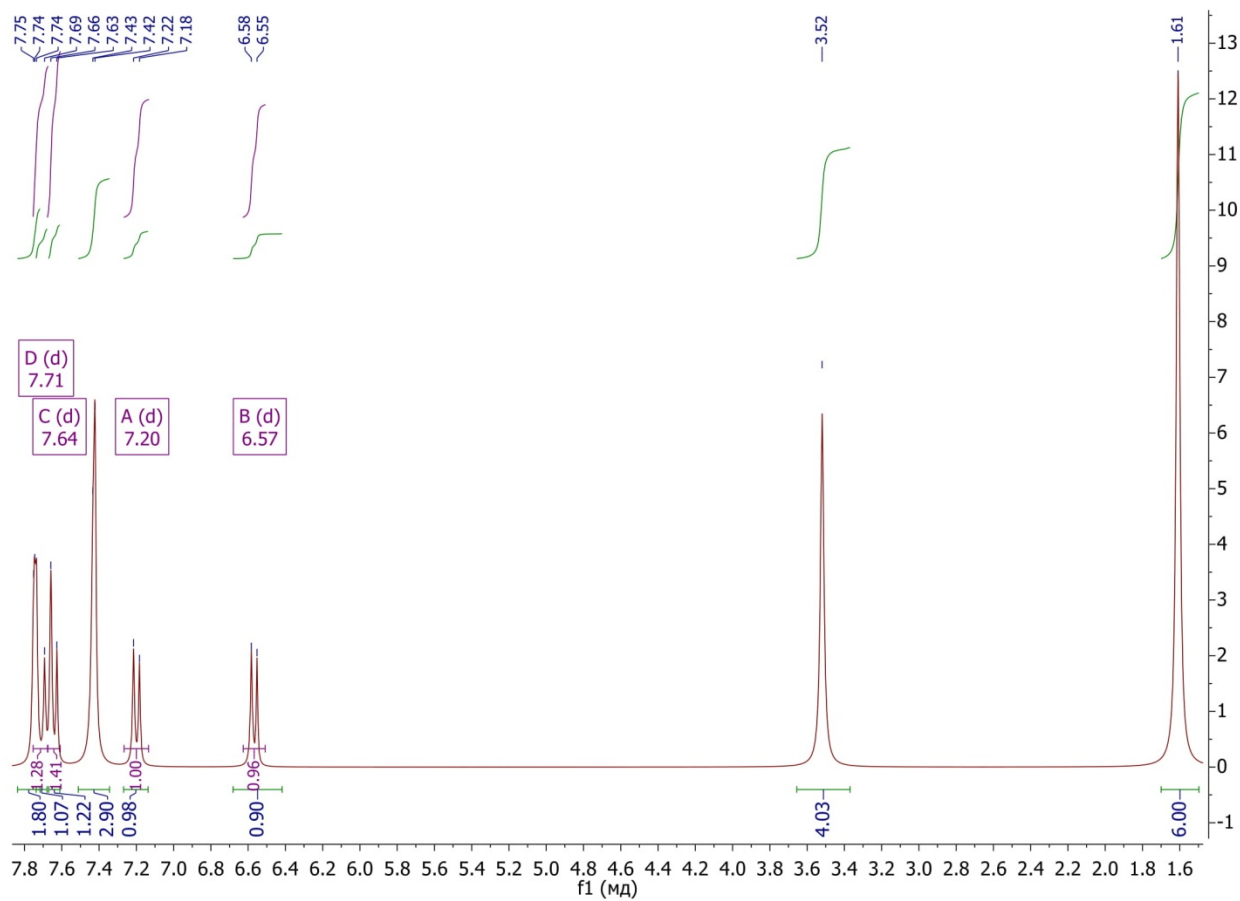


## Mass spectrum of compound 2b

# 1-[4-Chloro-2-(1-piperidyl)thiazol-5-yl]-5-phenyl-penta-1,4-dien-3-one (2c)



## <sup>13</sup>C NMR spectrum of compound 2c



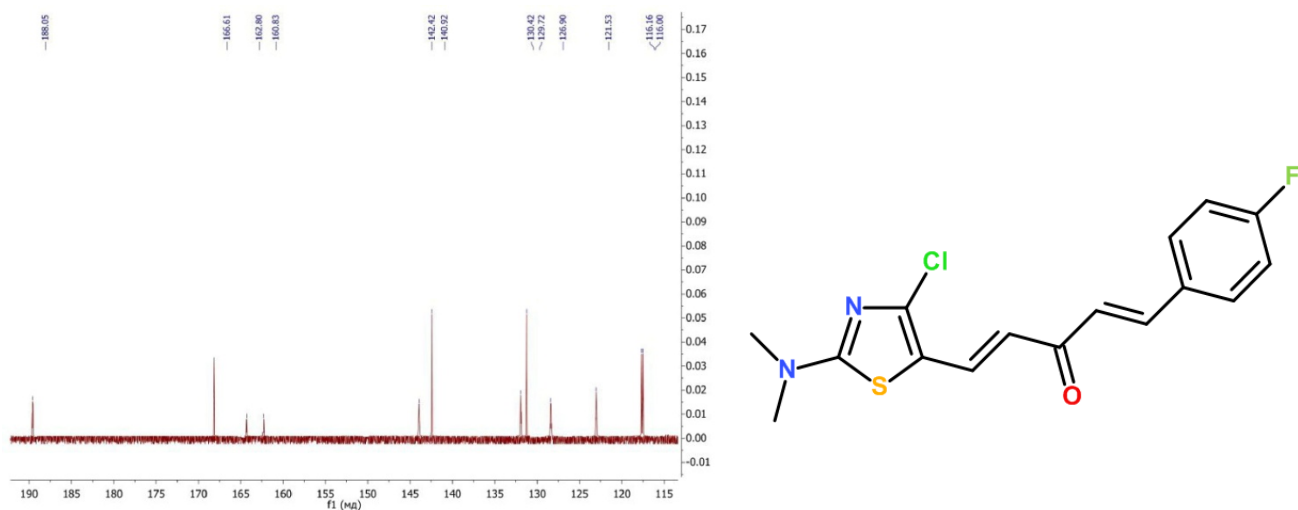
## <sup>1</sup>H NMR spectrum of compound 2c



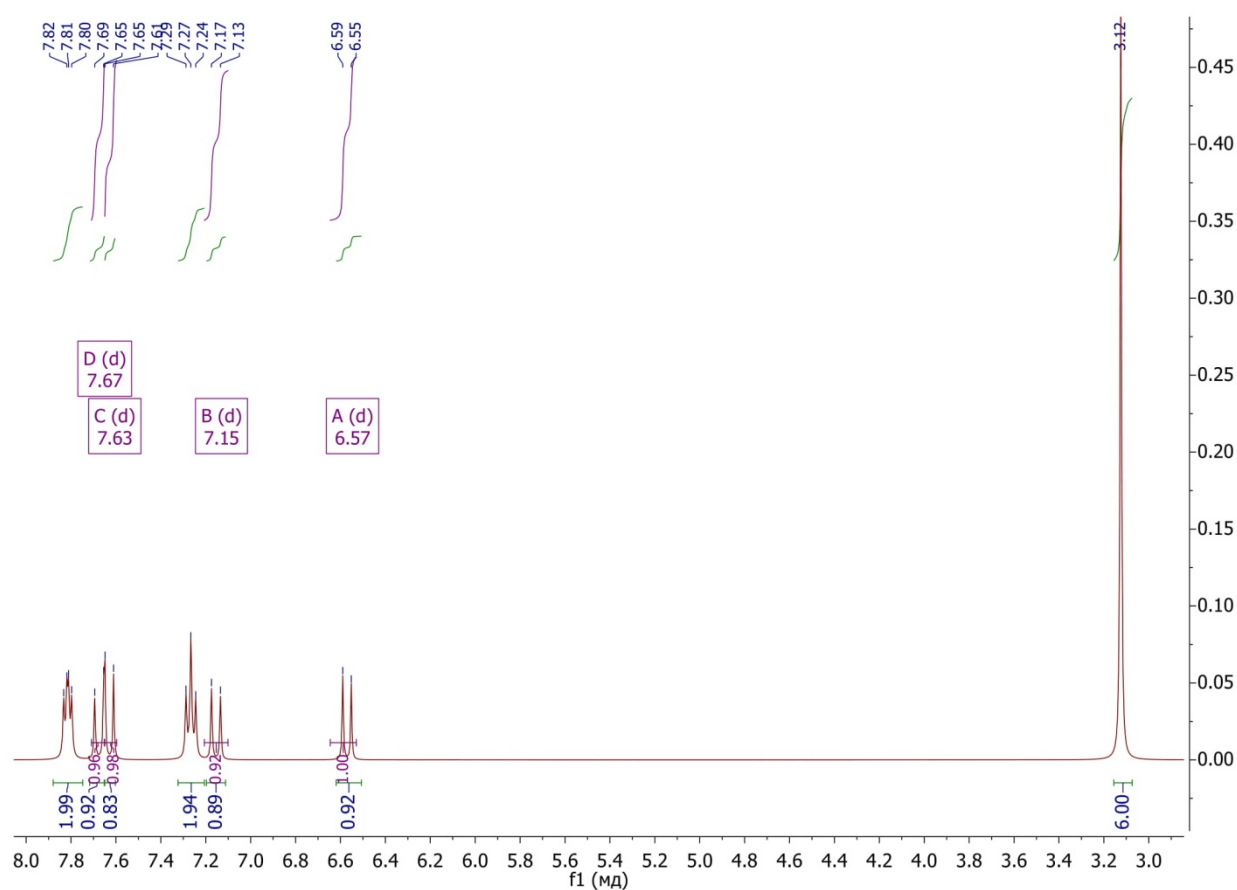
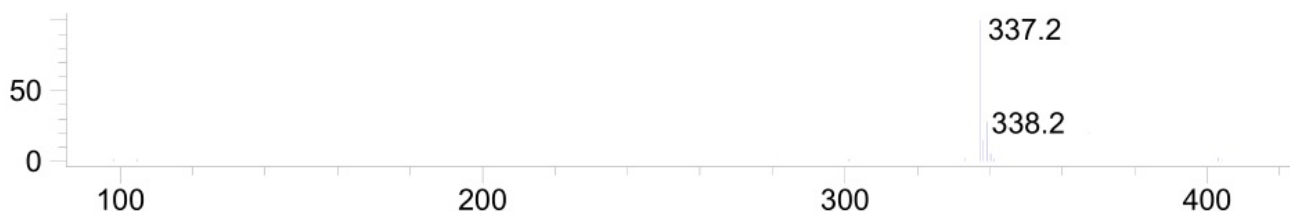
## Mass spectrum of compound 2c



**1-[4-Chloro-2-(dimethylamino)thiazol-5-yl]-5-(4-fluorophenyl)penta-1,4-dien-3-one (3a)**

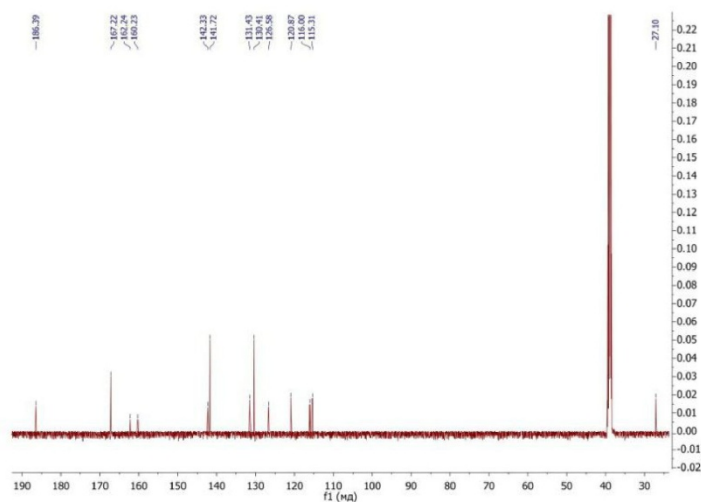


<sup>13</sup>C NMR spectrum of compound **3a**

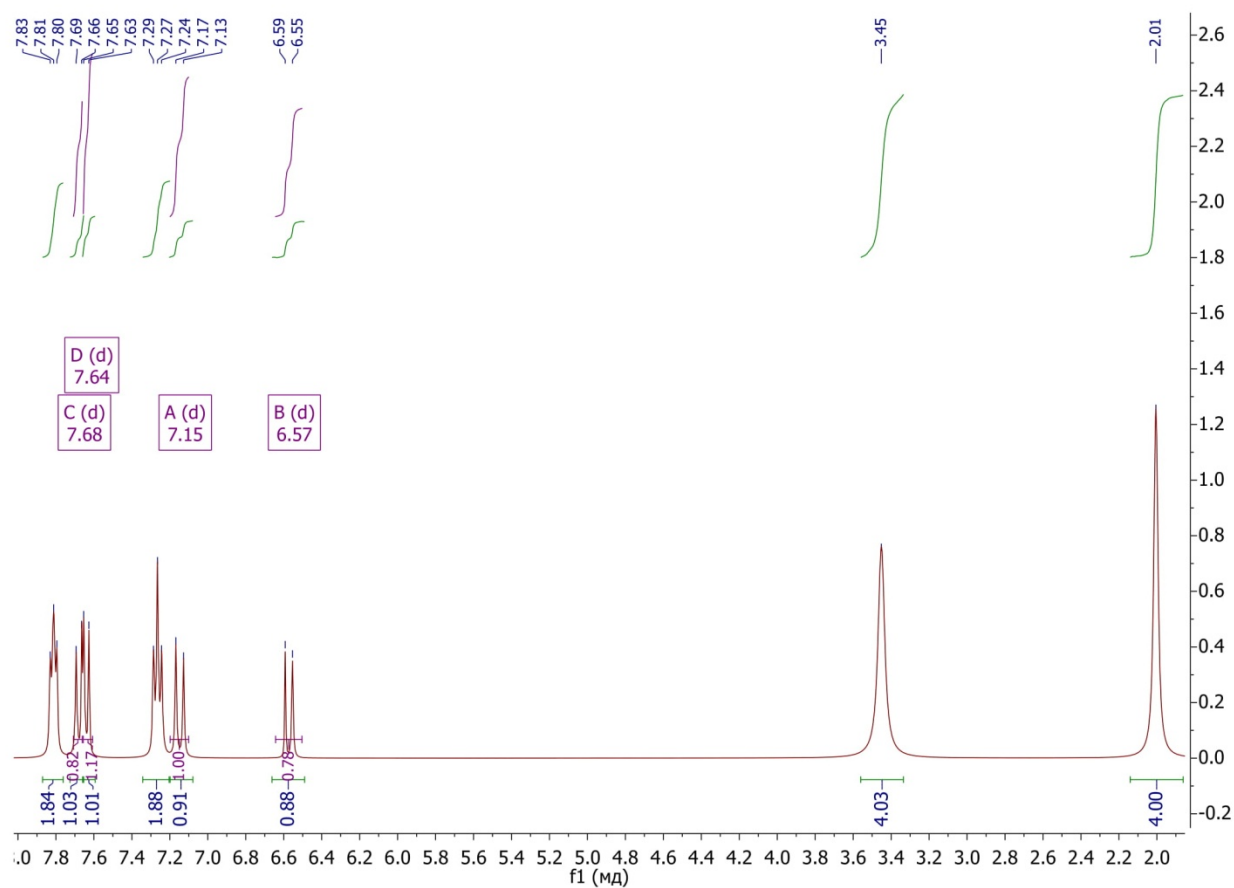
<sup>1</sup>H NMR spectrum of compound **3a**

Mass spectrum of compound **3a**

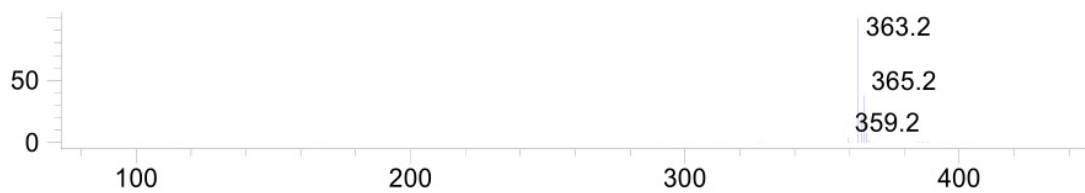
# 1-(4-Chloro-2-pyrrolidin-1-yl-thiazol-5-yl)-5-(4-fluorophenyl)penta-1,4-dien-3-one (3b)



<sup>13</sup>C NMR spectrum of compound 3b

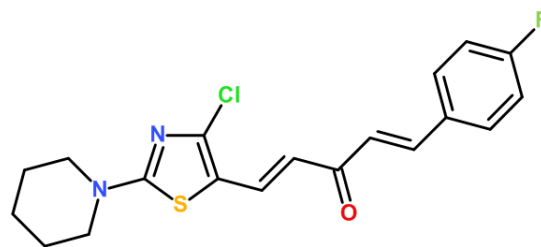
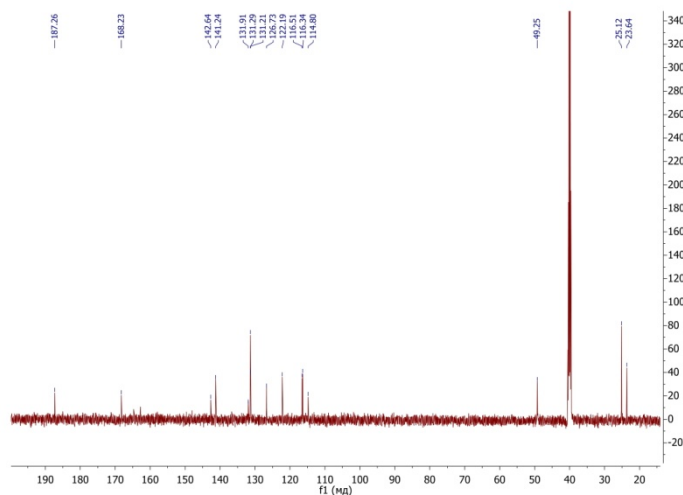


<sup>1</sup>H NMR spectrum of compound 3b

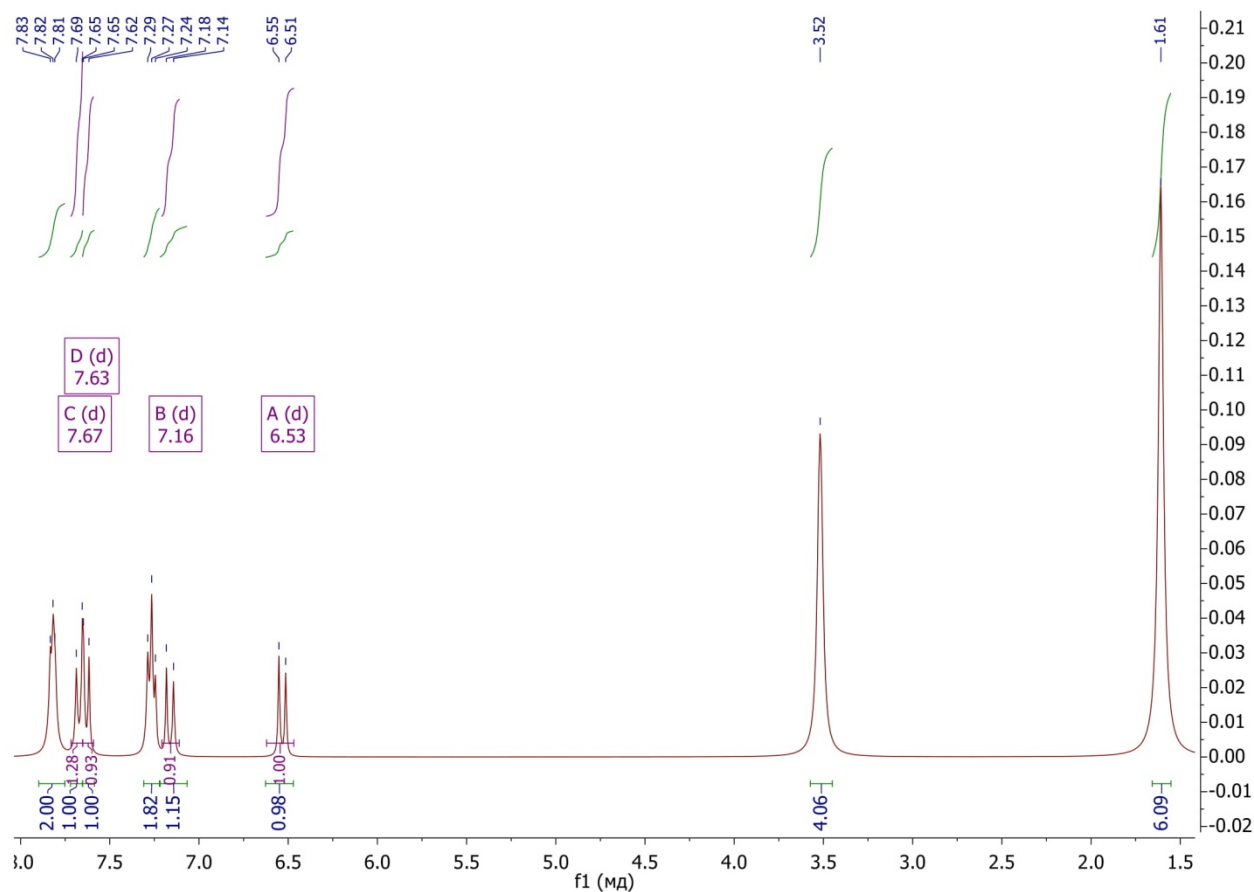


Mass spectrum of compound 3b

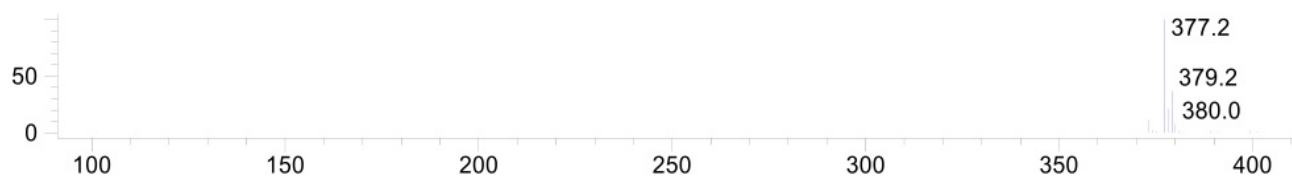
# 1-[4-Chloro-2-(1-piperidyl)thiazol-5-yl]-5-(4-fluorophenyl)penta-1,4-dien-3-one (3c)



## <sup>13</sup>C NMR spectrum of compound 3c

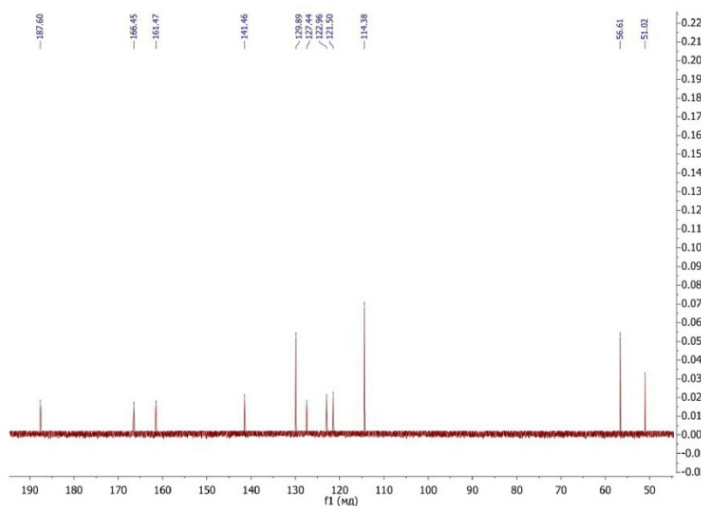


## <sup>1</sup>H NMR spectrum of compound 3c

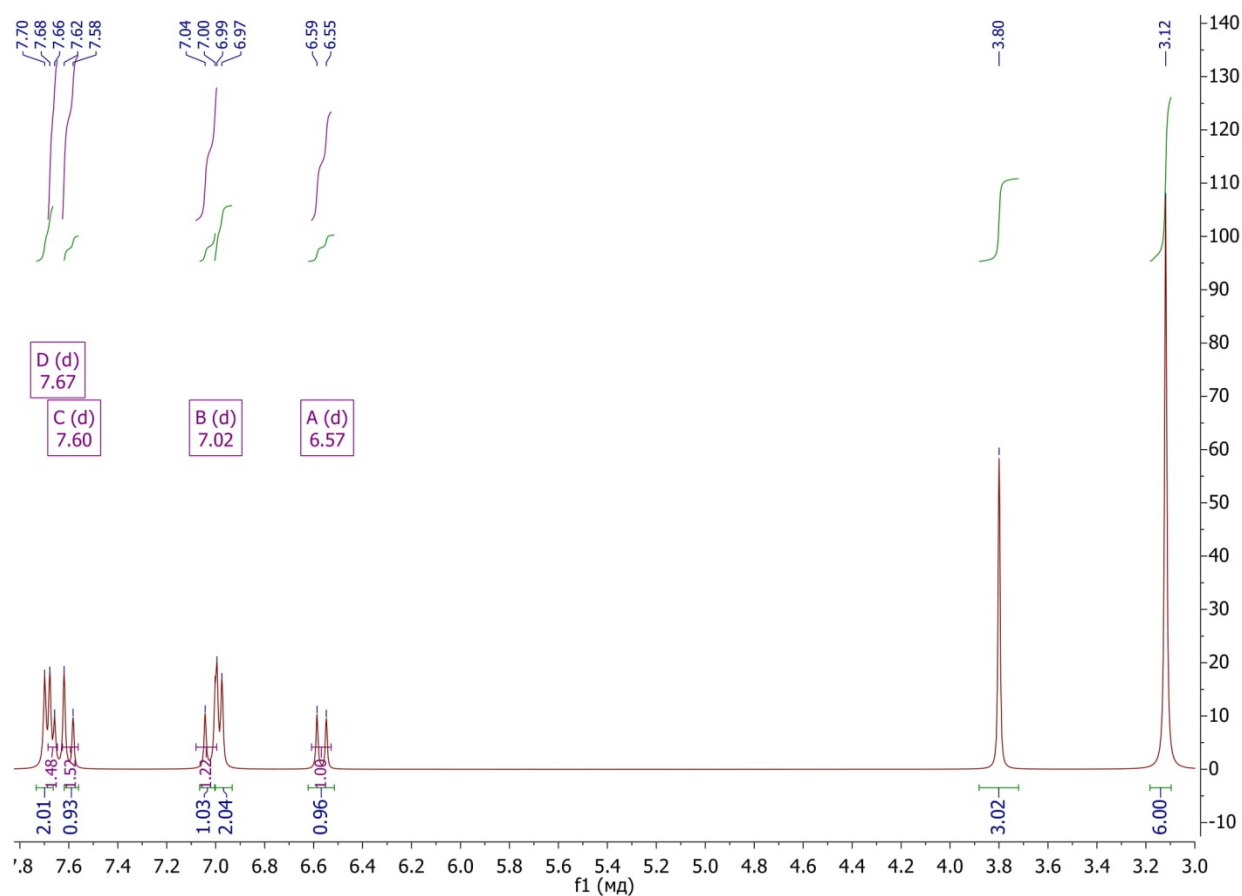


## Mass spectrum of compound 3c

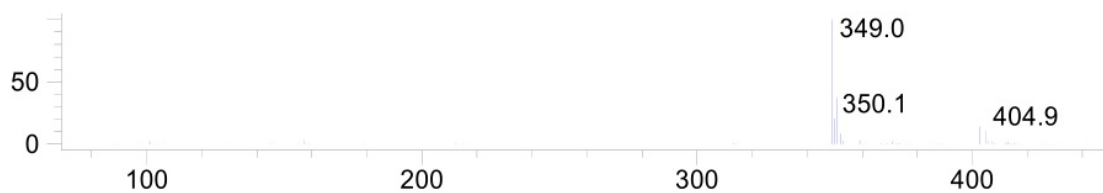
# 1-[4-Chloro-2-(dimethylamino)thiazol-5-yl]-5-(4-methoxyphenyl)penta-1,4-dien-3-one (4a)



<sup>13</sup>C NMR spectrum of compound 4a

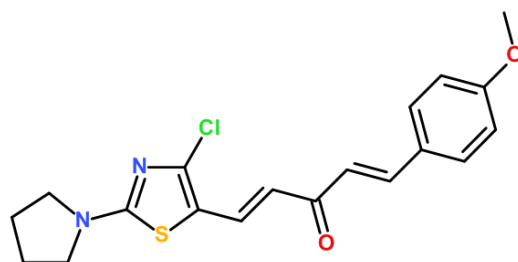
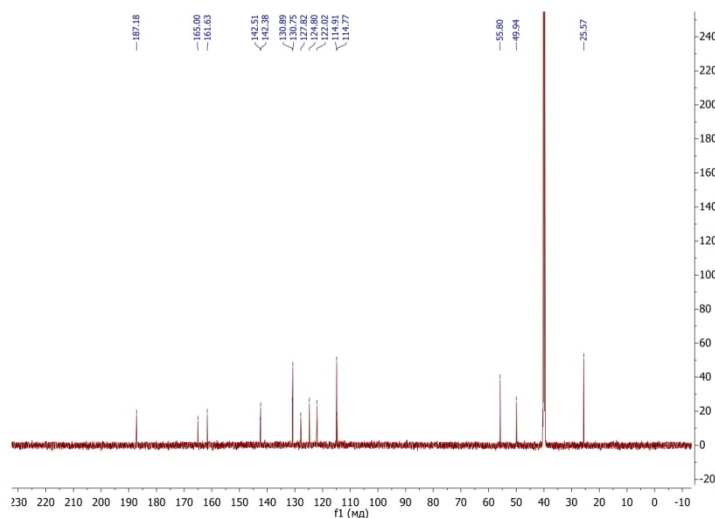


<sup>1</sup>H NMR spectrum of compound 4a

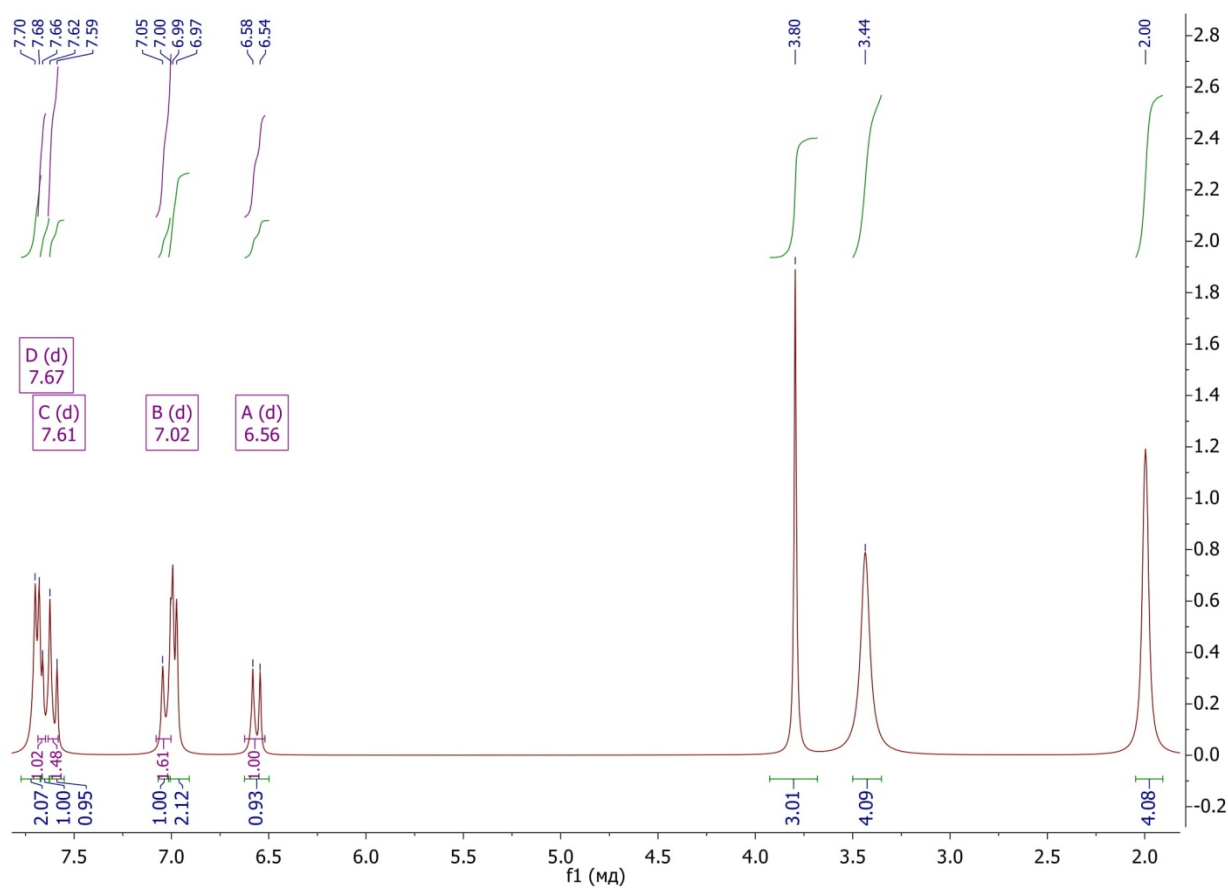


Mass spectrum of compound 4a

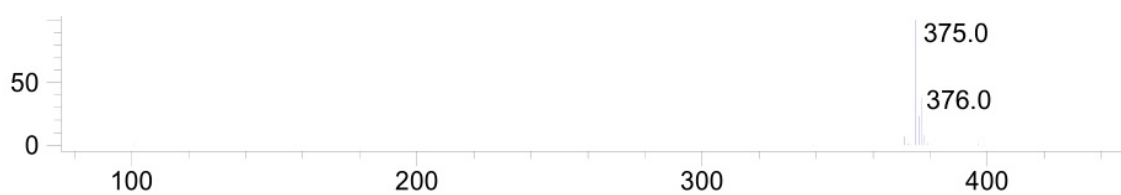
# 1-(4-Chloro-2-pyrrolidin-1-yl-thiazol-5-yl)-5-(4-methoxyphenyl)penta-1,4-dien-3-one (4b)



<sup>13</sup>C NMR spectrum of compound 4b

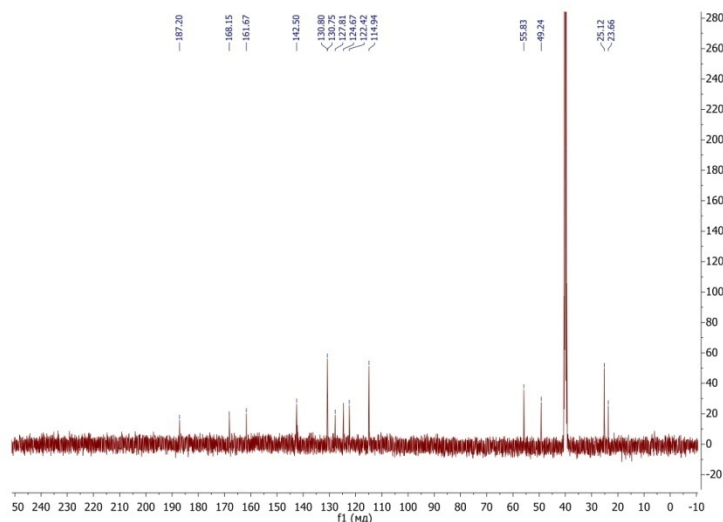


<sup>1</sup>H NMR spectrum of compound 4b

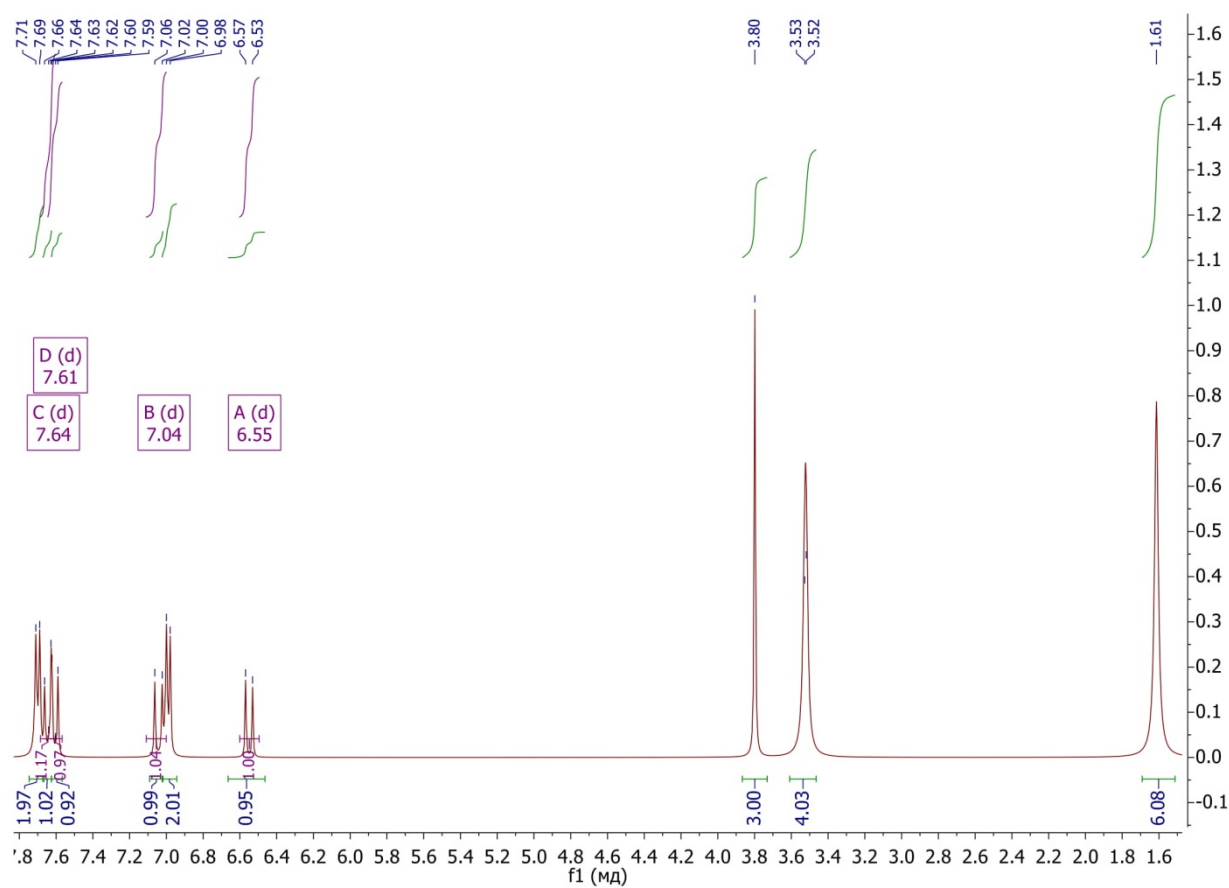


Mass spectrum of compound 4b

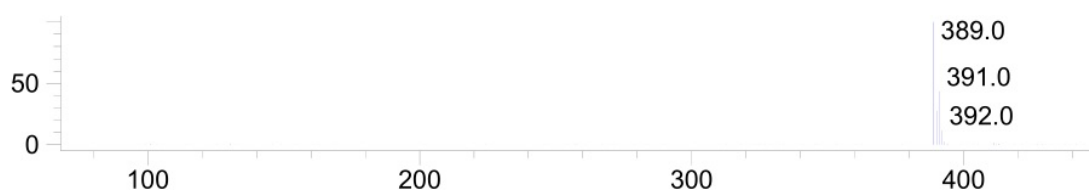
# 1-[4-Chloro-2-(1-piperidyl)thiazol-5-yl]-5-(4-methoxyphenyl)penta-1,4-dien-3-one (4c)



<sup>13</sup>C NMR spectrum of compound 4c

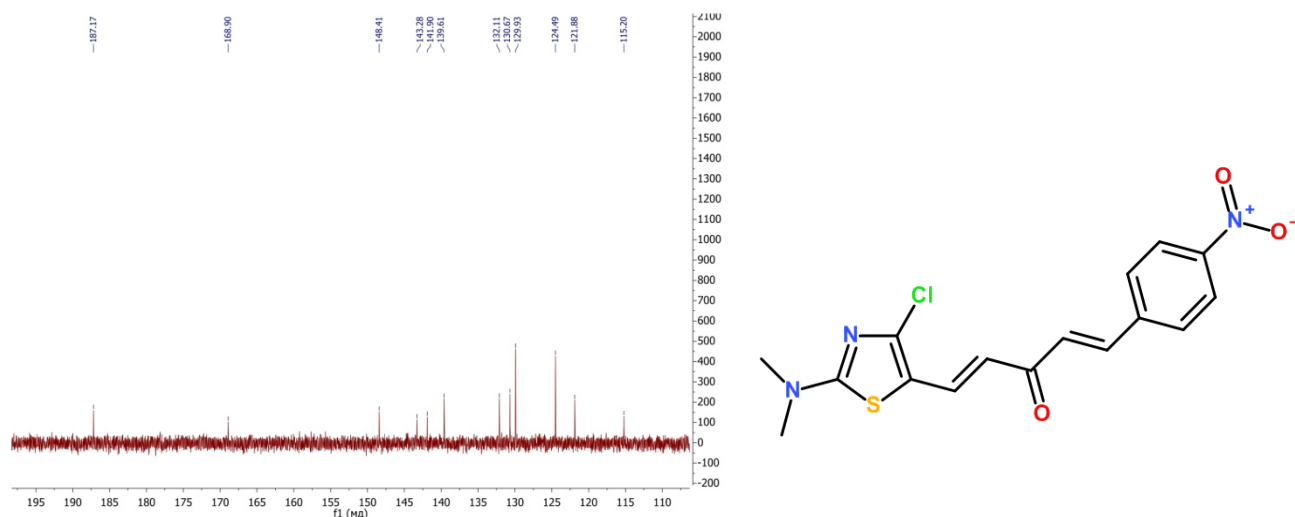


<sup>1</sup>H NMR spectrum of compound 4c

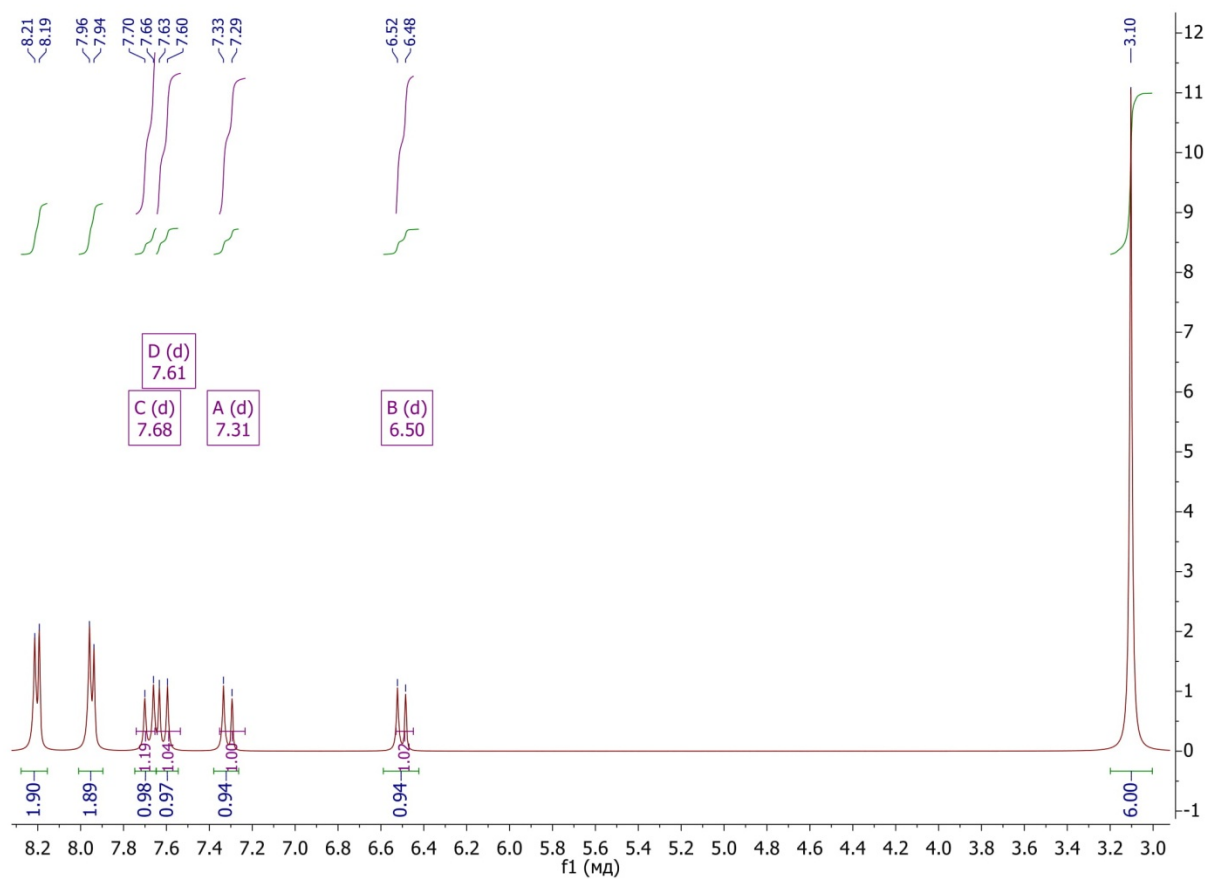


Mass spectrum of compound 4c

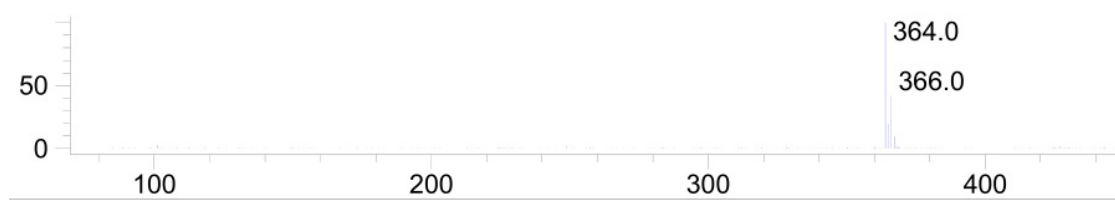
# 1-[4-Chloro-2-(dimethylamino)thiazol-5-yl]-5-(4-nitrophenyl)penta-1,4-dien-3-one (5a)



<sup>13</sup>C NMR spectrum of compound 5a

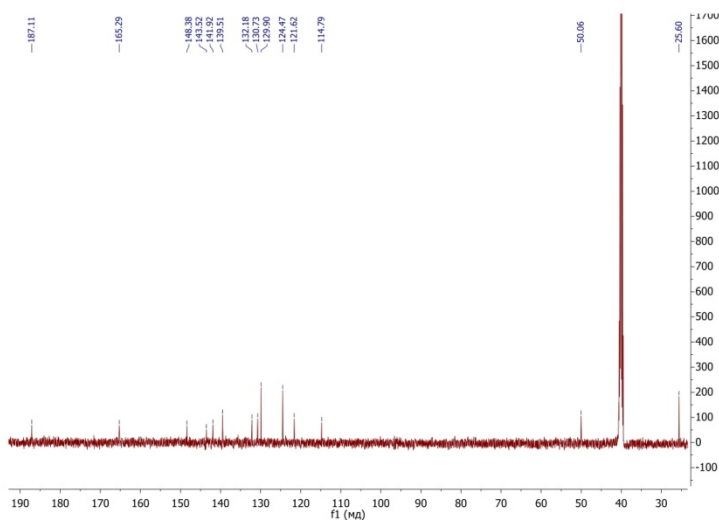


<sup>1</sup>H NMR spectrum of compound 5a

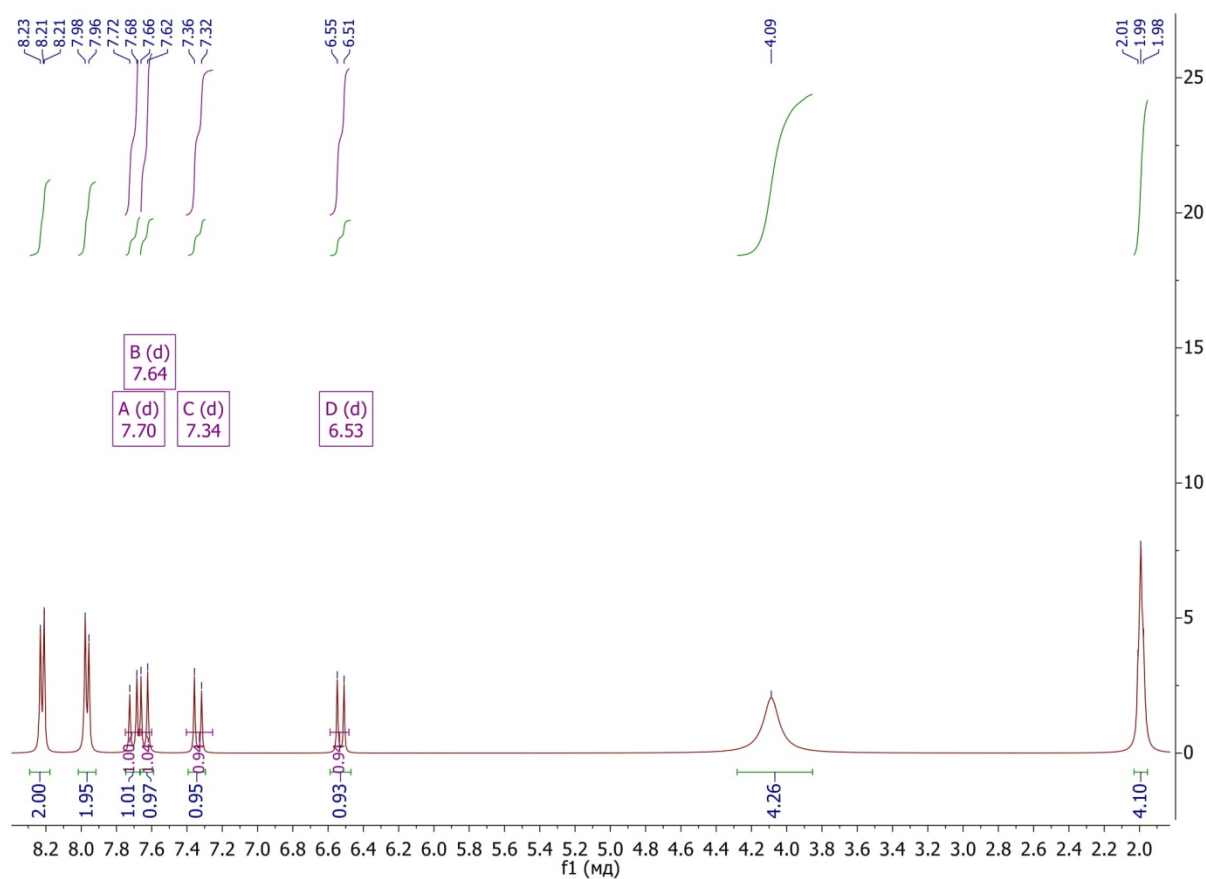


Mass spectrum of compound 5a

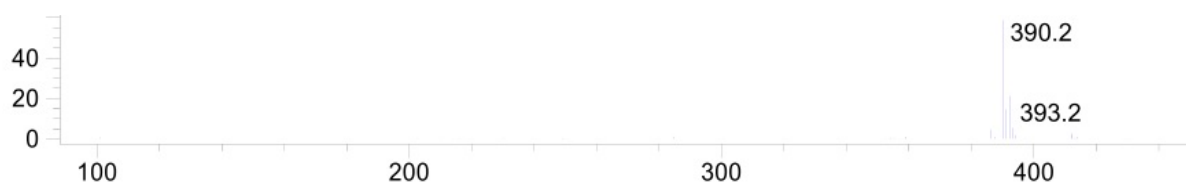
# 1-(4-Chloro-2-pyrrolidin-1-yl-thiazol-5-yl)-5-(4-nitrophenyl)penta-1,4-dien-3-one (5b)



$^{13}\text{C}$  NMR spectrum of compound **5b**



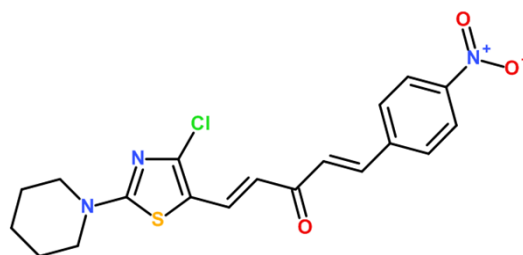
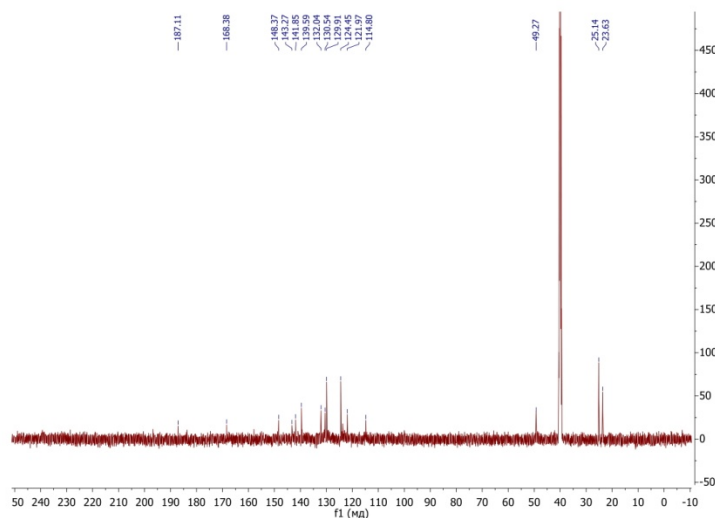
$^1\text{H}$  NMR spectrum of compound **5b**



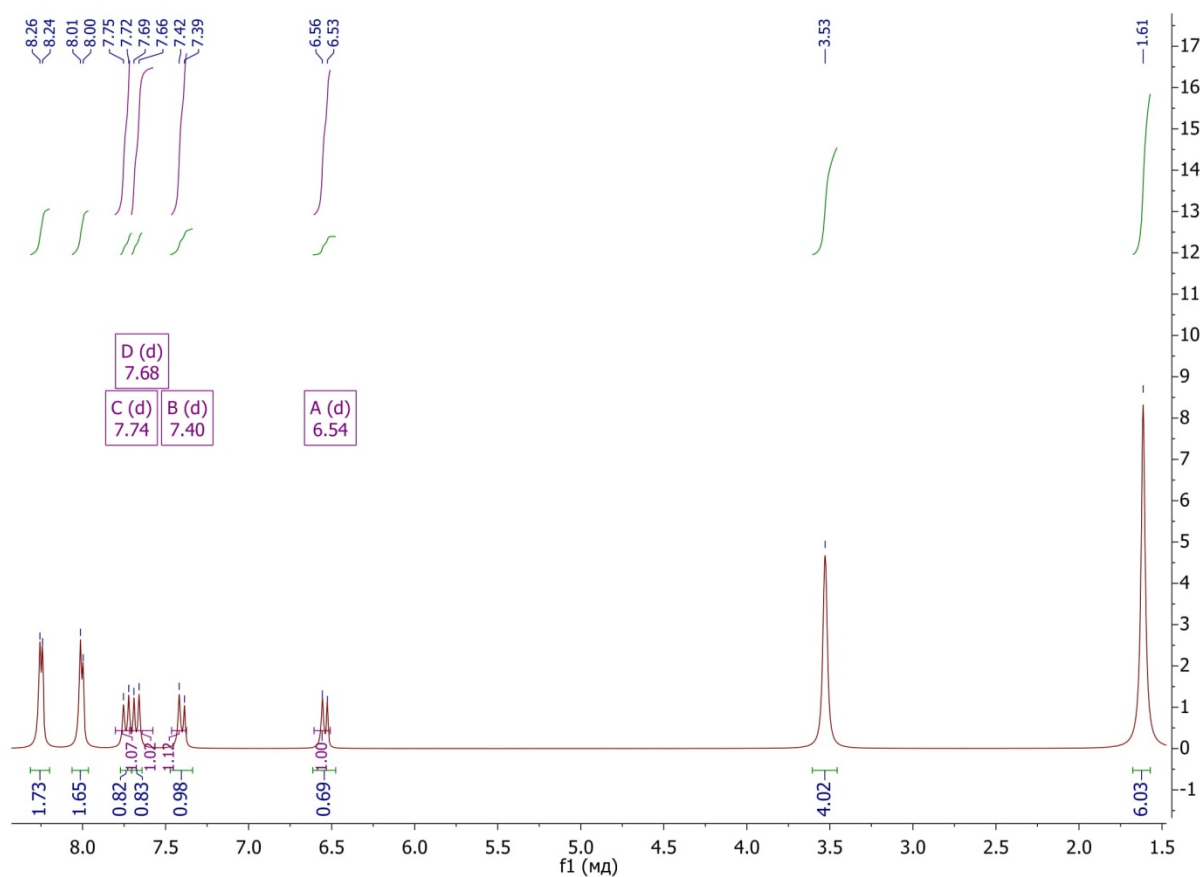
Mass spectrum of compound **5b**



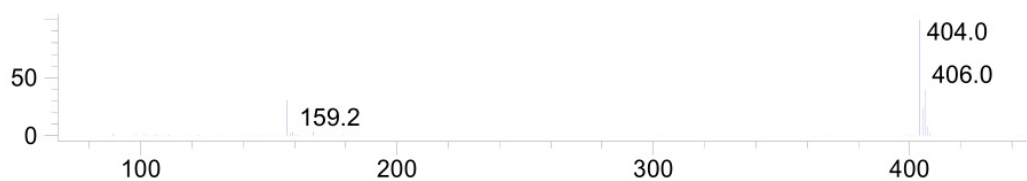
# 1-[4-Chloro-2-(1-piperidyl)thiazol-5-yl]-5-(4-nitrophenyl)penta-1,4-dien-3-one (5c)



## <sup>13</sup>C NMR spectrum of compound **5c**

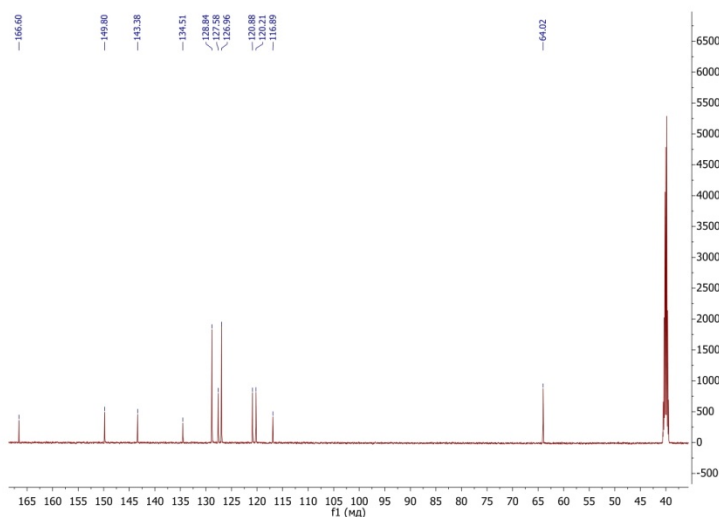


## <sup>1</sup>H NMR spectrum of compound **5c**

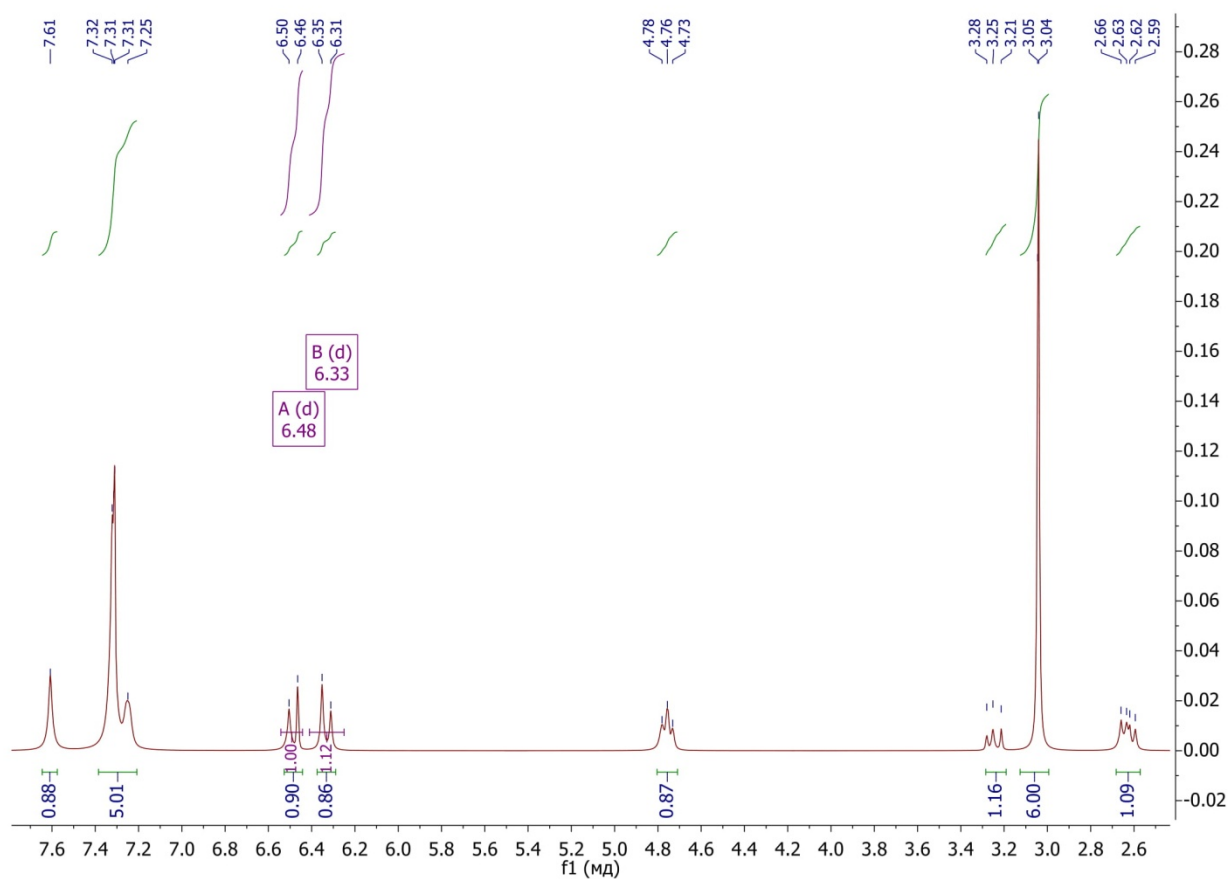


## Mass spectrum of compound **5c**

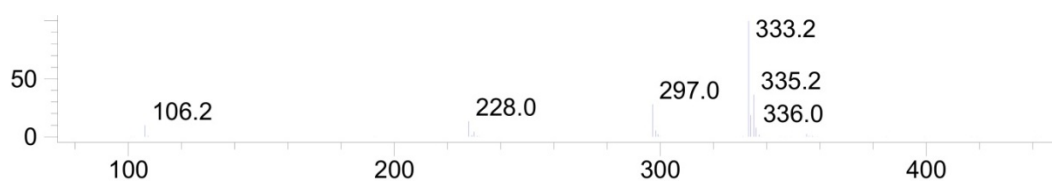
# 4-chloro-N,N-dimethyl-5-[2-(5-phenyl-4,5-dihydro-1H-pyrazol-3-yl)vinyl]thiazol-2-amine (6a)



<sup>13</sup>C NMR spectrum of compound **6a**

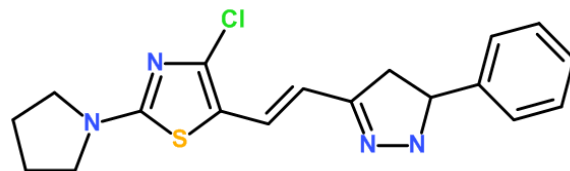
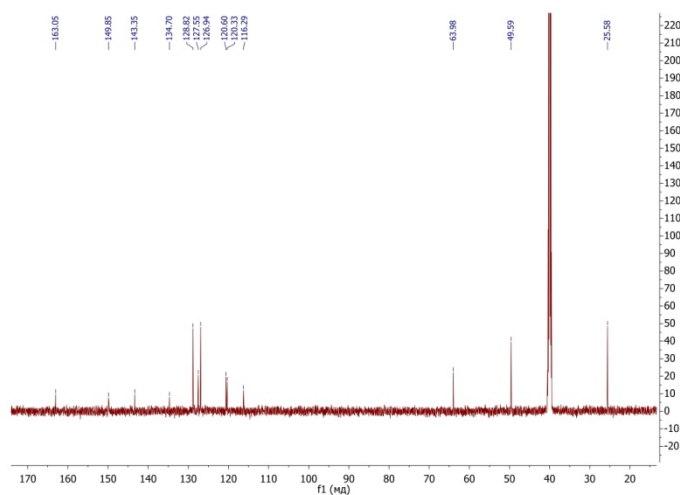


<sup>1</sup>H NMR spectrum of compound **6a**

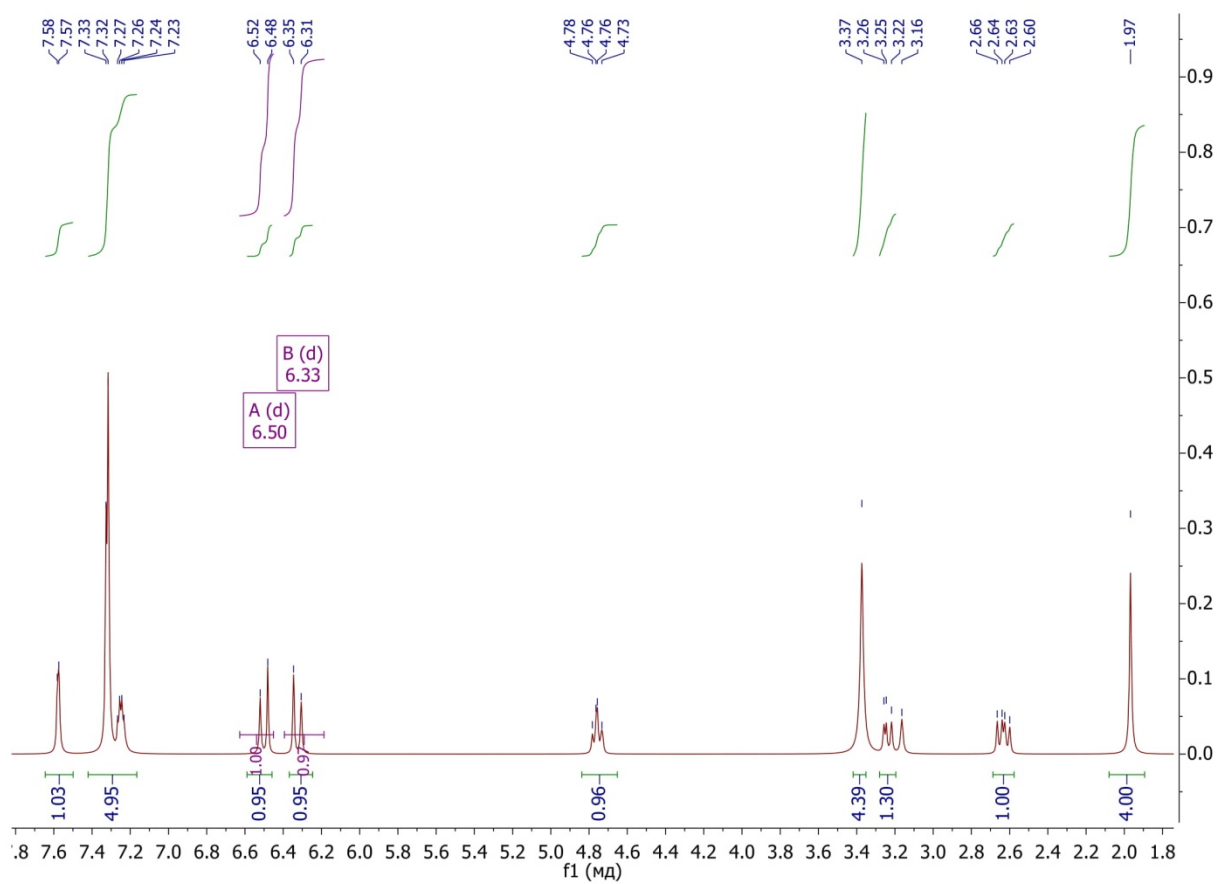


Mass spectrum of compound **6a**

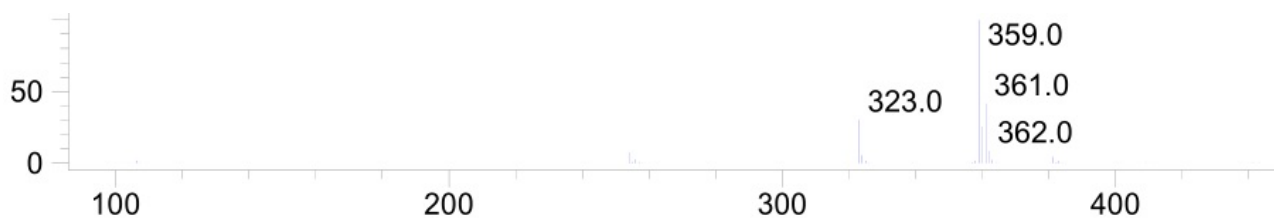
# 4-chloro-5-[2-(5-phenyl-4,5-dihydro-1H-pyrazol-3-yl)vinyl]-2-pyrrolidin-1-yl-thiazole (6b)



<sup>13</sup>C NMR spectrum of compound **6b**

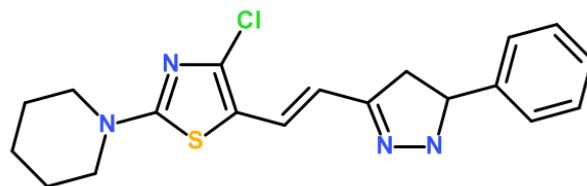
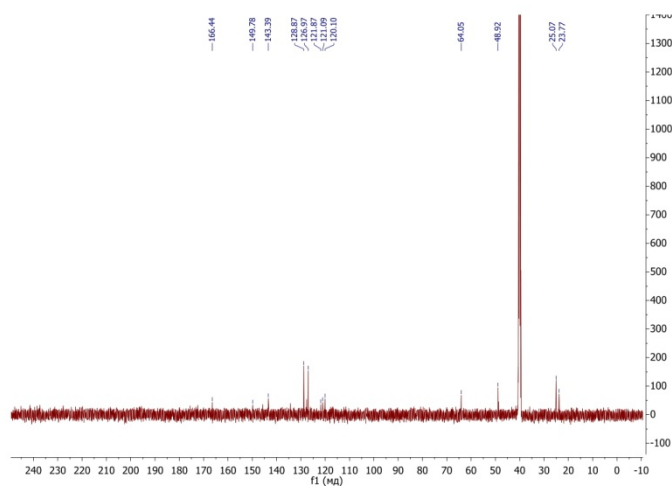


<sup>1</sup>H NMR spectrum of compound **6b**

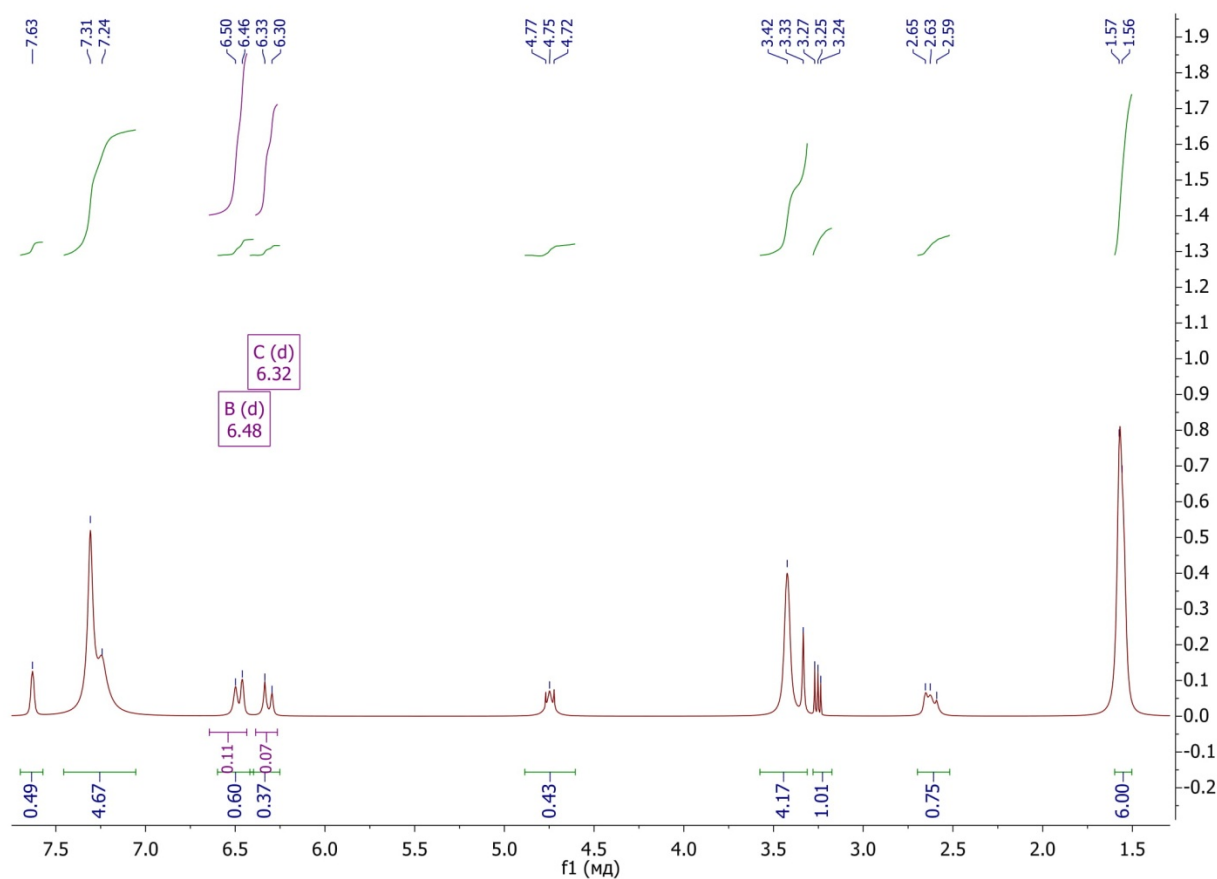


Mass spectrum of compound **6b**

# 4-chloro-5-[2-(5-phenyl-4,5-dihydro-1H-pyrazol-3-yl)vinyl]-2-(1-piperidyl)thiazole (6c)



$^{13}\text{C}$  NMR spectrum of compound **6c**

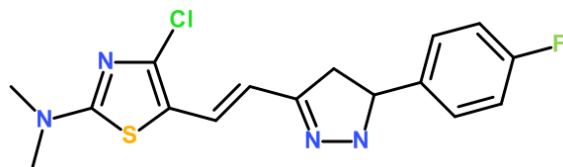
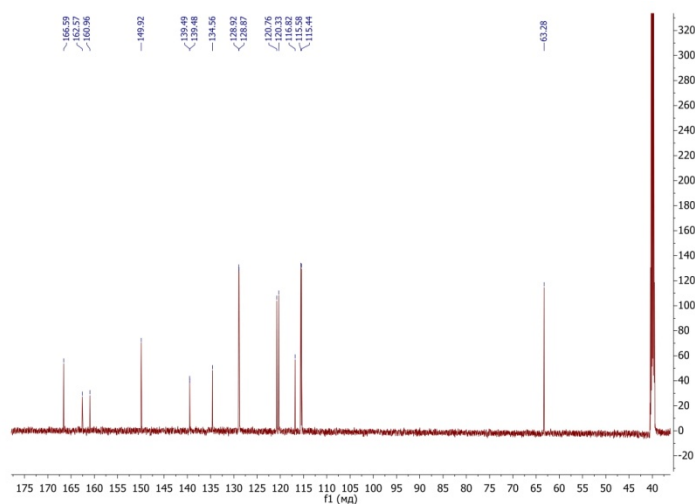


$^1\text{H}$  NMR spectrum of compound **6c**

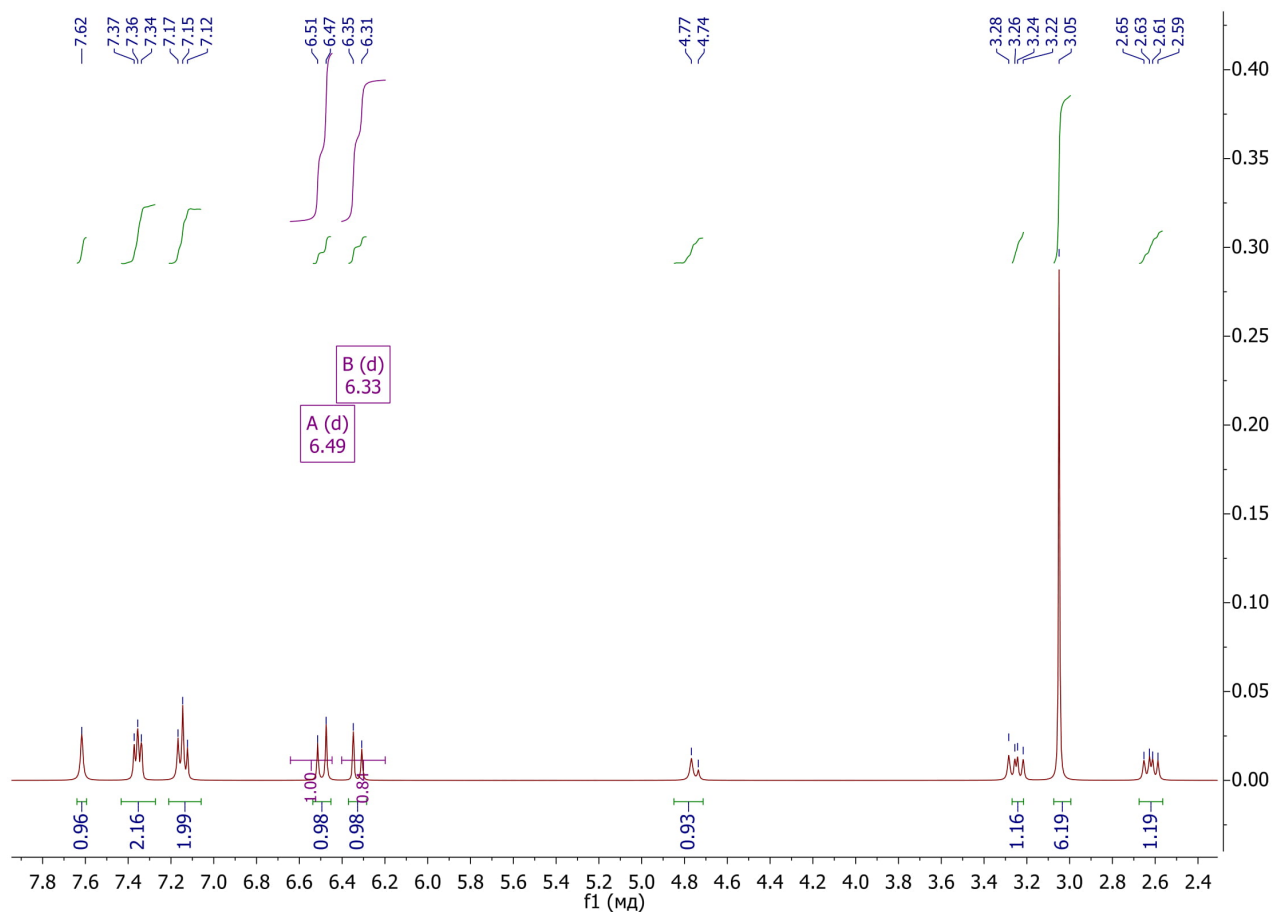


Mass spectrum of compound **6c**

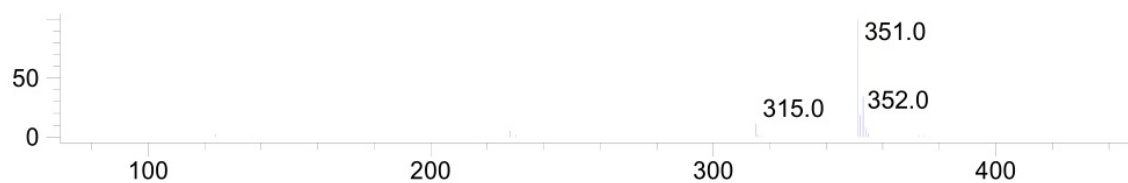
# 4-chloro-5-[2-[5-(4-fluorophenyl)-4,5-dihydro-1H-pyrazol-3-yl]vinyl]-N,N-dimethyl-thiazol-2-amine (7a)



<sup>13</sup>C NMR spectrum of compound 7a

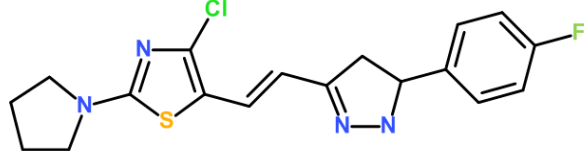
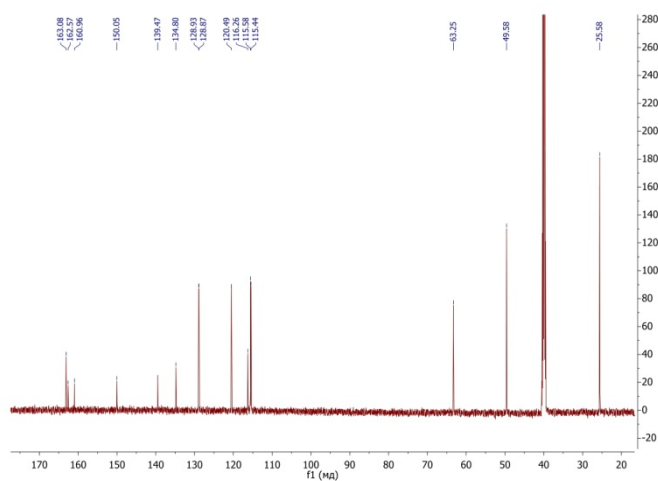


<sup>1</sup>H NMR spectrum of compound 7a

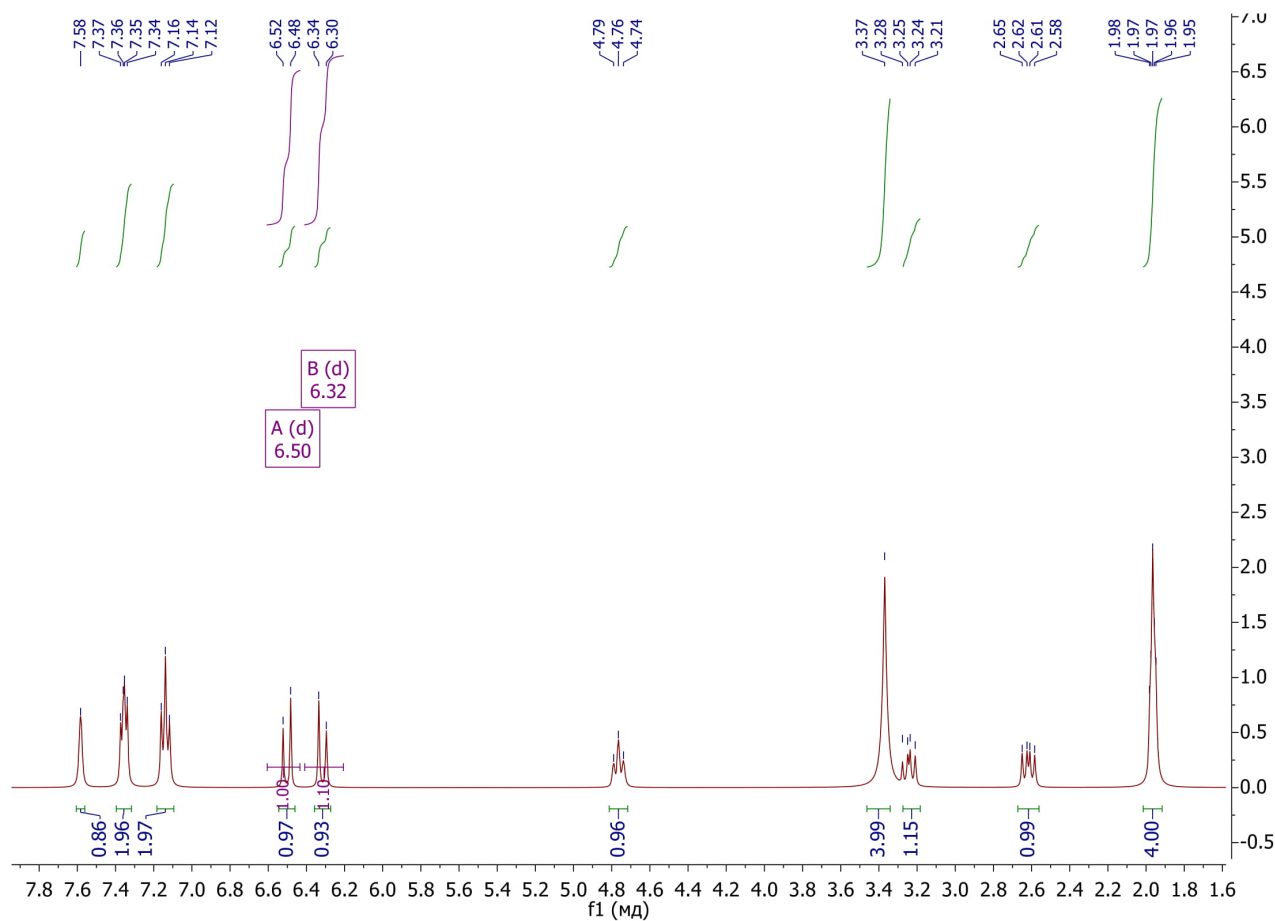


Mass spectrum of compound 7a

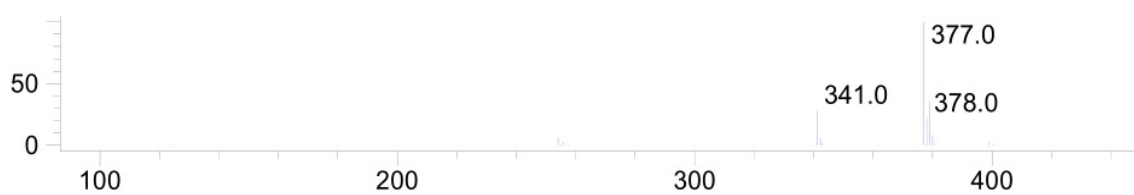
# 4-chloro-5-[2-[5-(4-fluorophenyl)-4,5-dihydro-1H-pyrazol-3-yl]vinyl]-2-pyrrolidin-1-yl-thiazole (7b)



<sup>13</sup>C NMR spectrum of compound **7b**

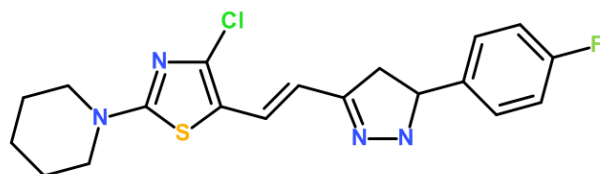
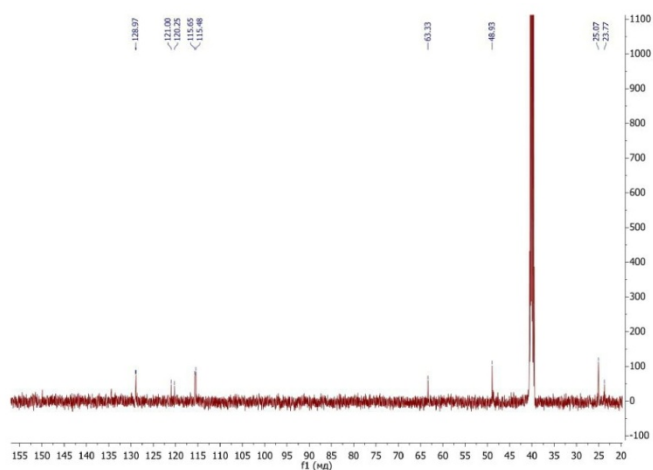


<sup>1</sup>H NMR spectrum of compound **7b**

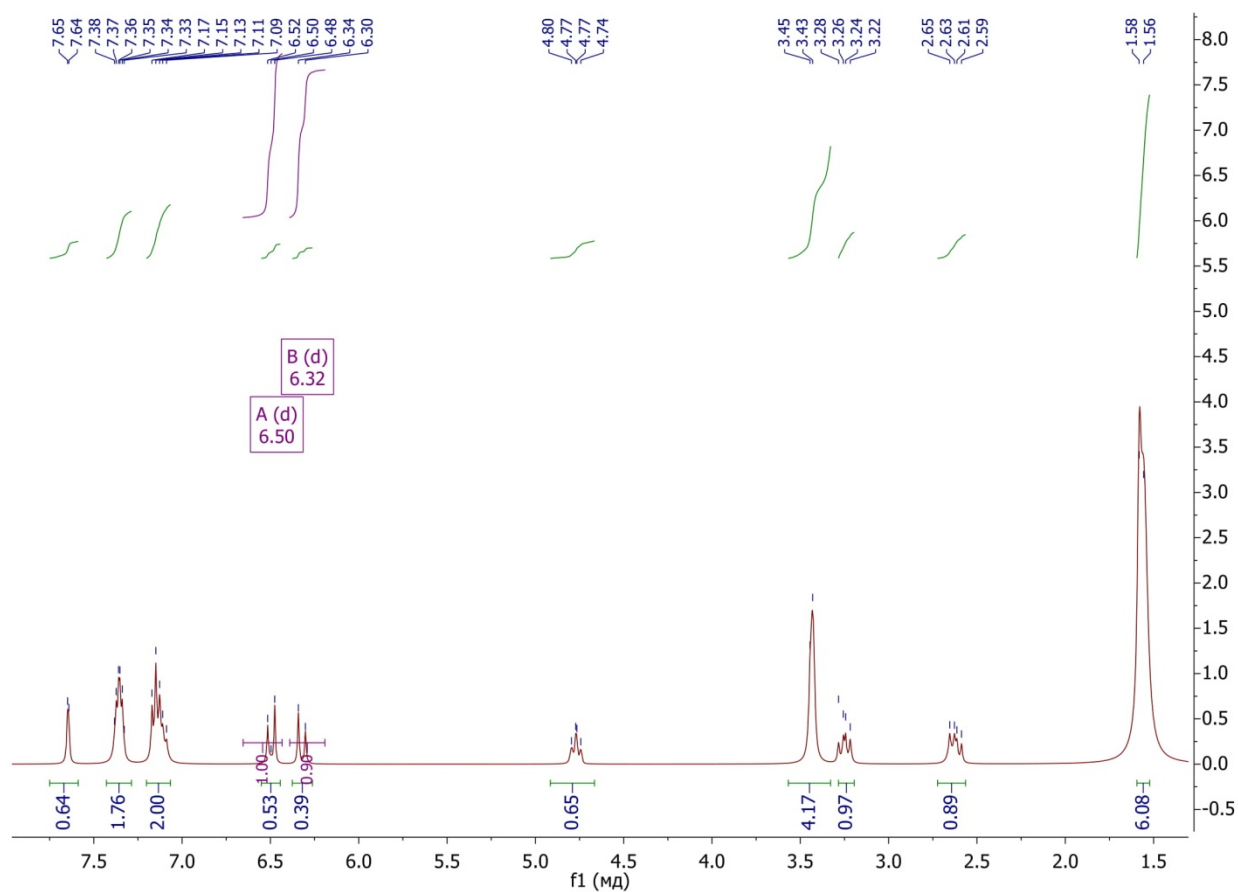


Mass spectrum of compound **7b**

# 4-chloro-5-[2-[5-(4-fluorophenyl)-4,5-dihydro-1H-pyrazol-3-yl]vinyl]-2-(1-piperidyl)thiazole (7c)



$^{13}\text{C}$  NMR spectrum of compound 7c

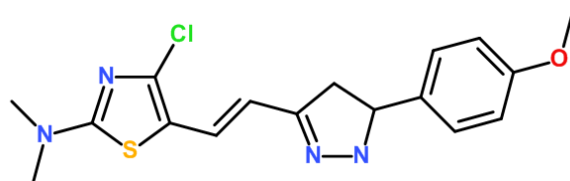
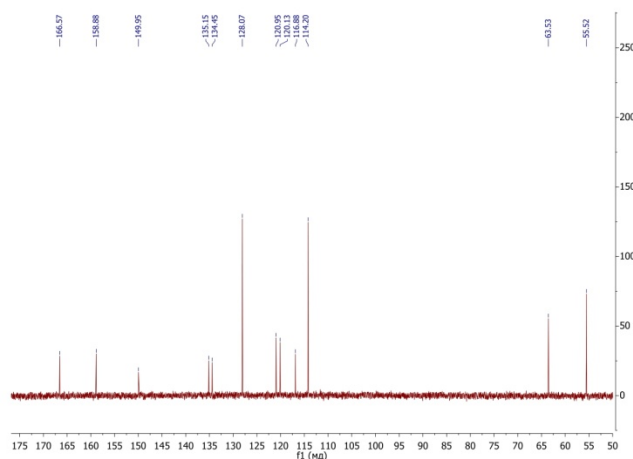


$^1\text{H}$  NMR spectrum of compound 7c

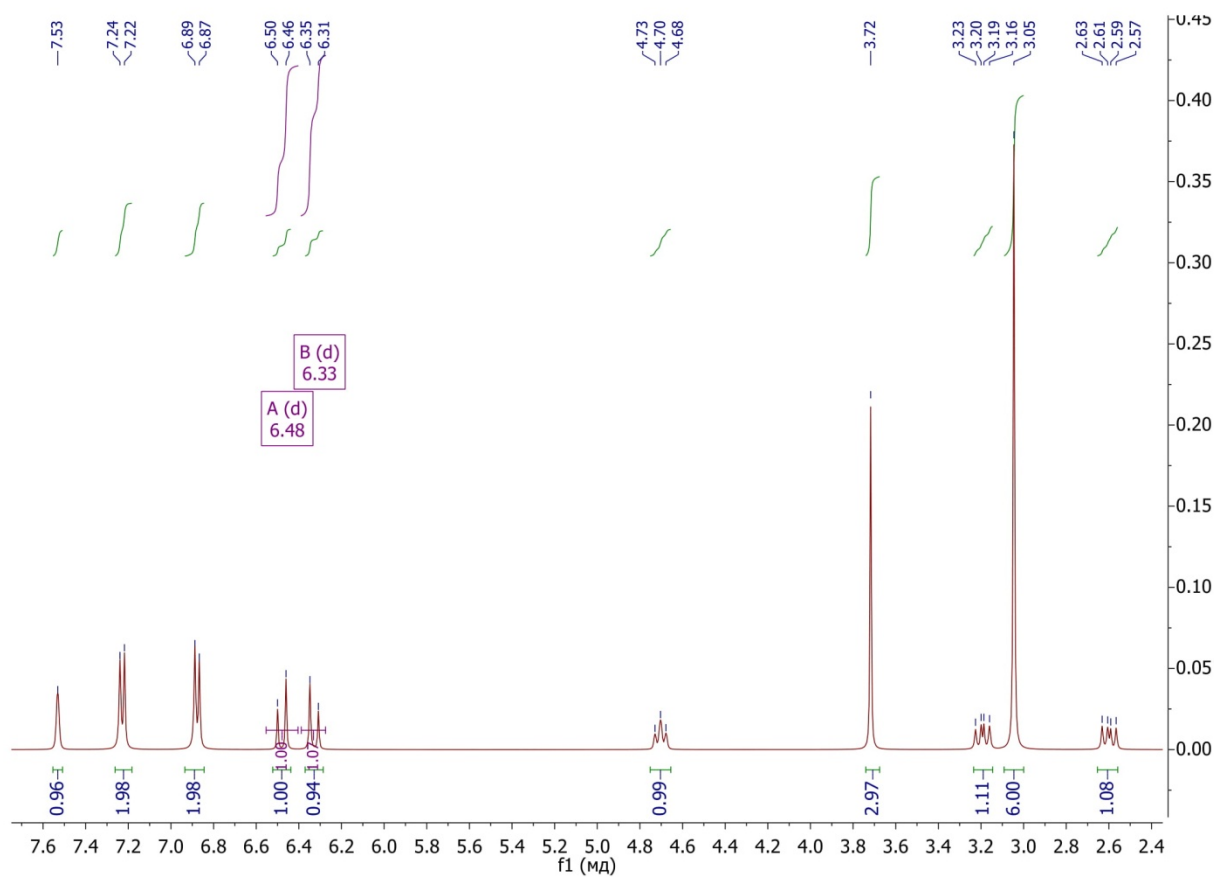


Mass spectrum of compound 7c

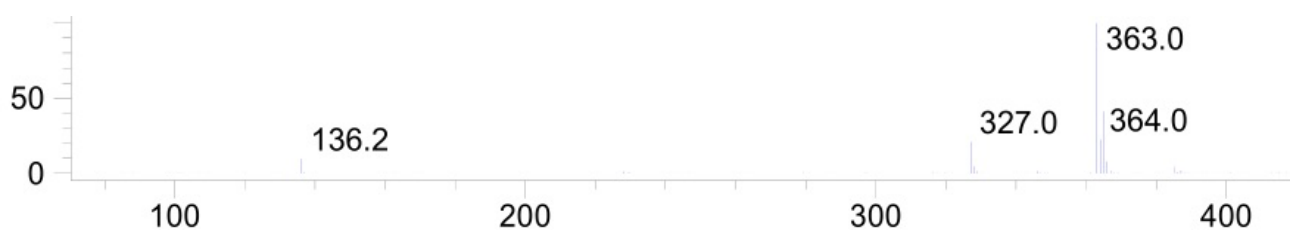
4-chloro-5-[2-[5-(4-methoxyphenyl)-4,5-dihydro-1H-pyrazol-3-yl]vinyl]-N,N-dimethyl-thiazol-2-amine (8a)



<sup>13</sup>C NMR spectrum of compound **8a**



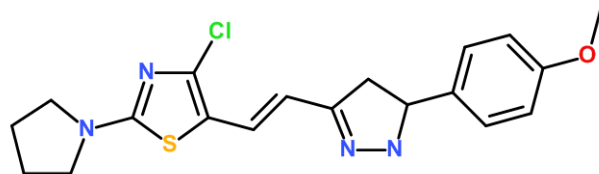
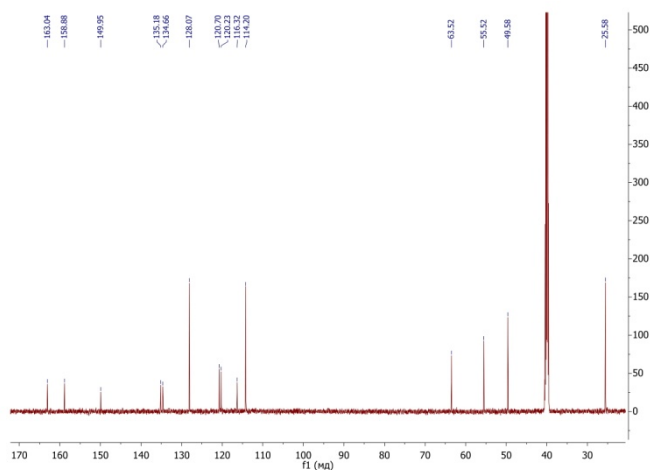
<sup>1</sup>H NMR spectrum of compound **8a**



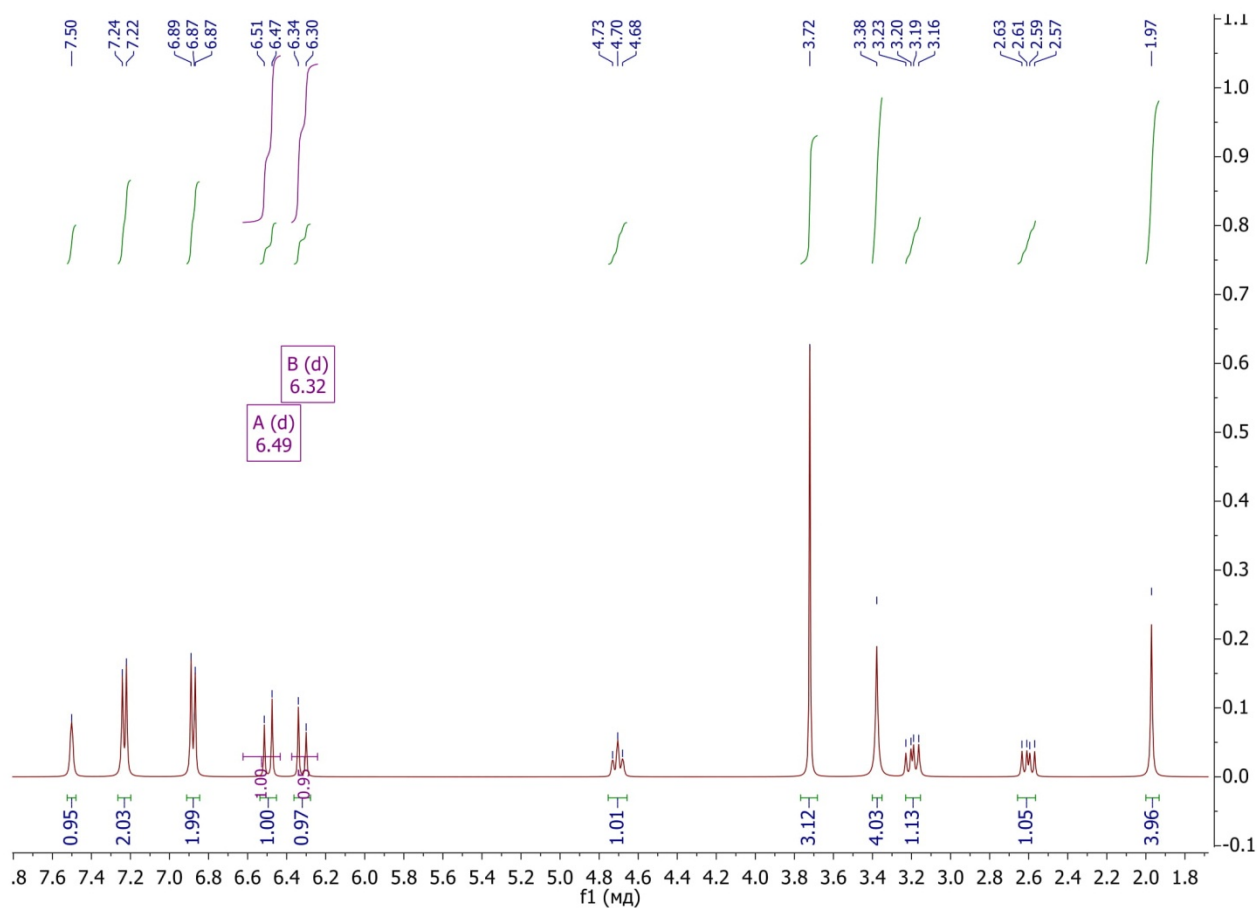
Mass spectrum of compound **8a**



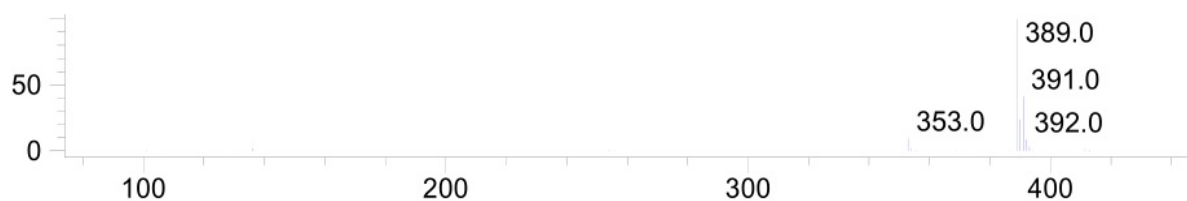
# 4-chloro-5-[2-[5-(4-methoxyphenyl)-4,5-dihydro-1H-pyrazol-3-yl]vinyl]-2-pyrrolidin-1-yl-thiazole (8b)



<sup>13</sup>C NMR spectrum of compound **8b**

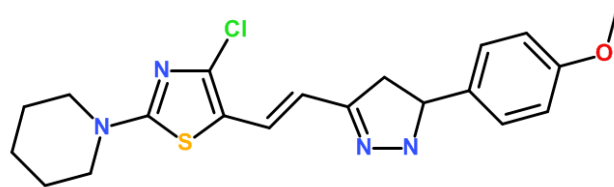
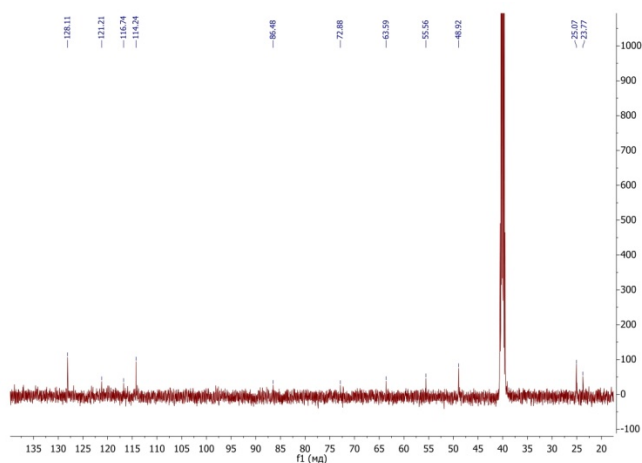


<sup>1</sup>H NMR spectrum of compound **8b**

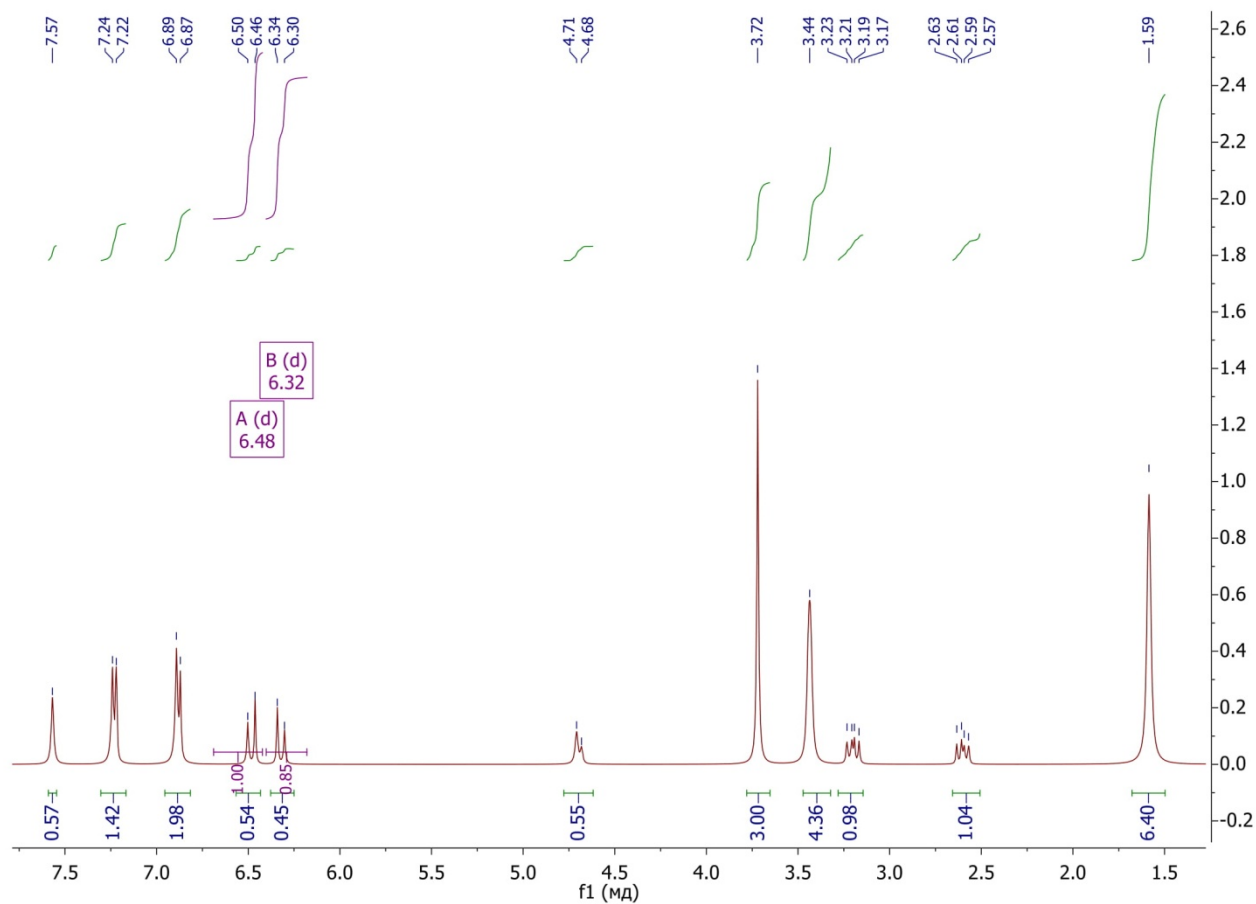


Mass spectrum of compound **8b**

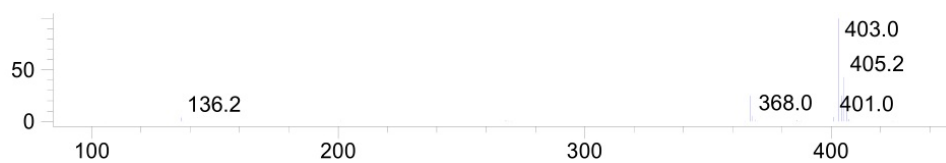
**4-chloro-5-[2-[5-(4-methoxyphenyl)-4,5-dihydro-1H-pyrazol-3-yl]vinyl]-2-(1-piperidyl)thiazole (8c)**



<sup>13</sup>C NMR spectrum of compound **8c**

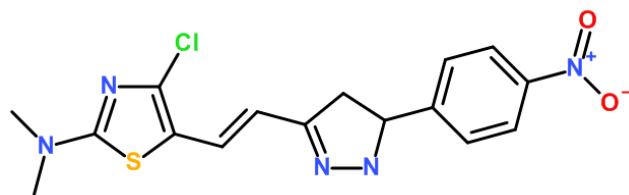
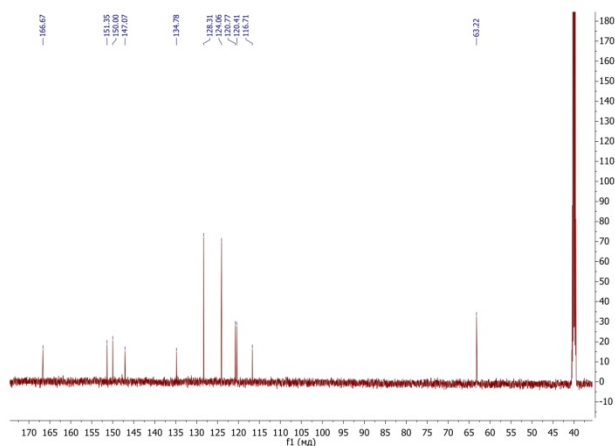


<sup>1</sup>H NMR spectrum of compound **8c**

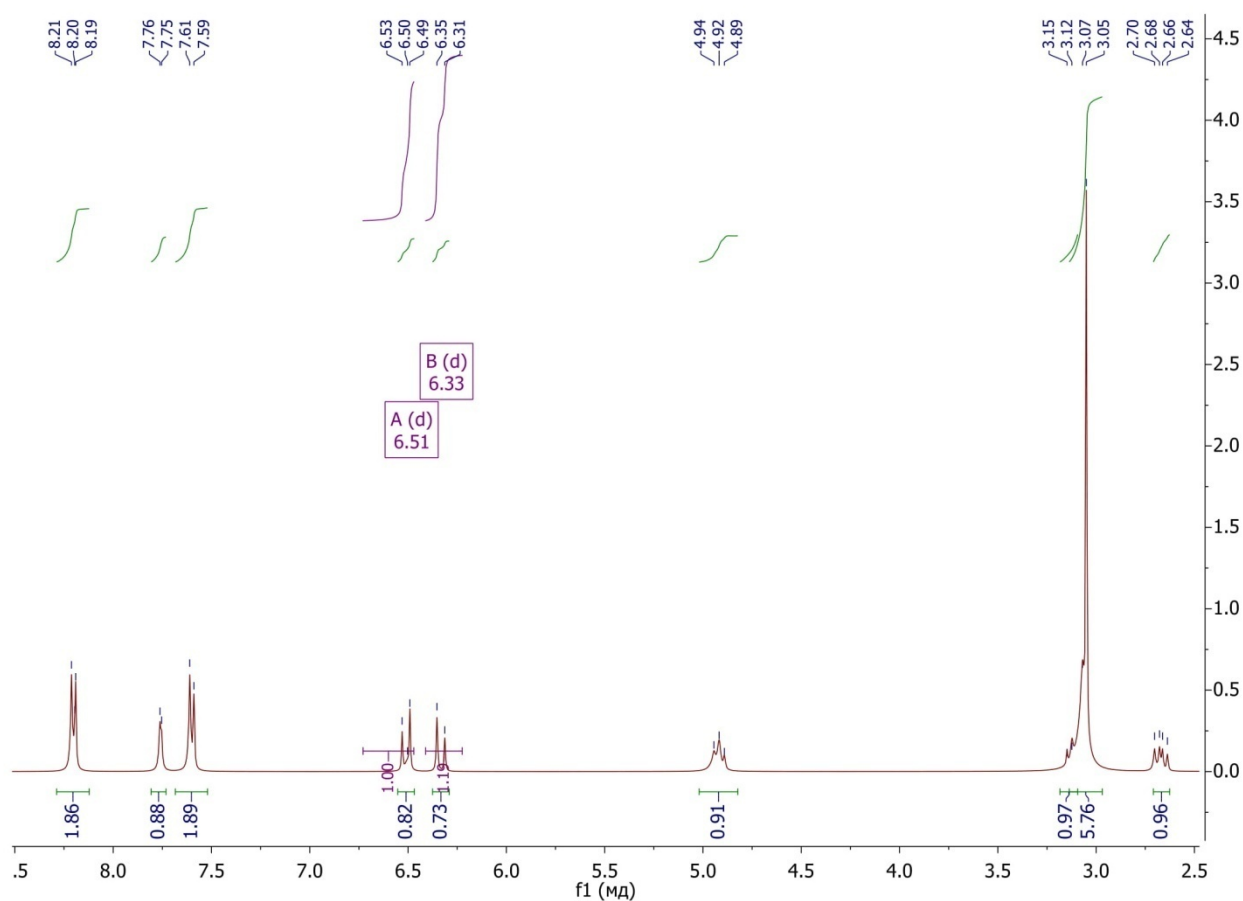


Mass spectrum of compound **8c**

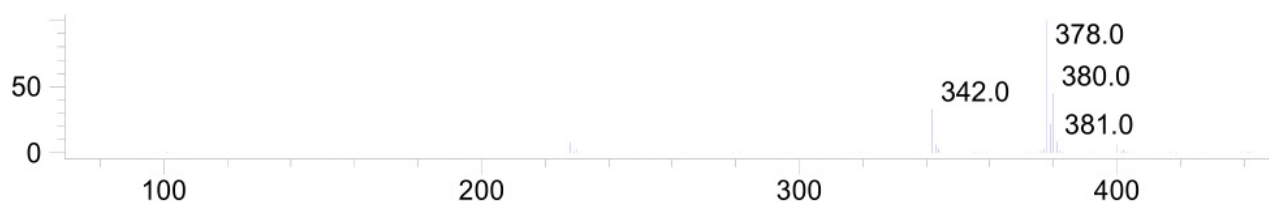
**4-chloro-N,N-dimethyl-5-[2-[5-(4-nitrophenyl)-4,5-dihydro-1H-pyrazol-3-yl]vinyl]thiazol-2-amine (9a)**



$^{13}\text{C}$  NMR spectrum of compound **9a**

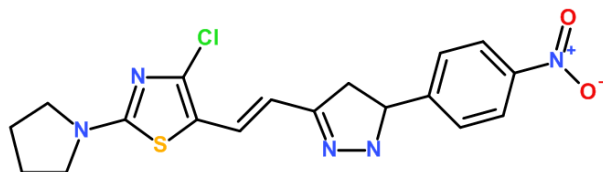
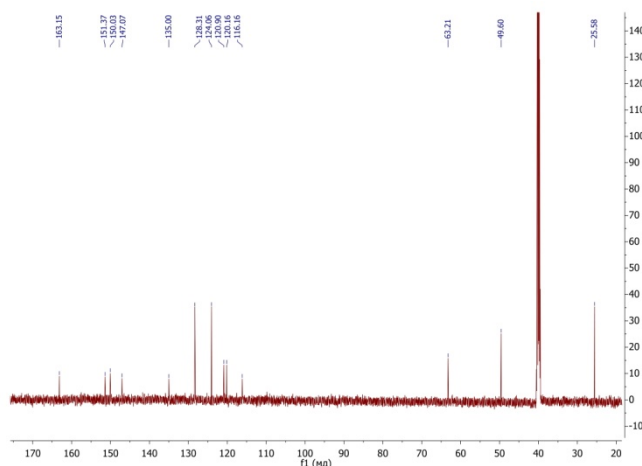


$^1\text{H}$  NMR spectrum of compound **9a**

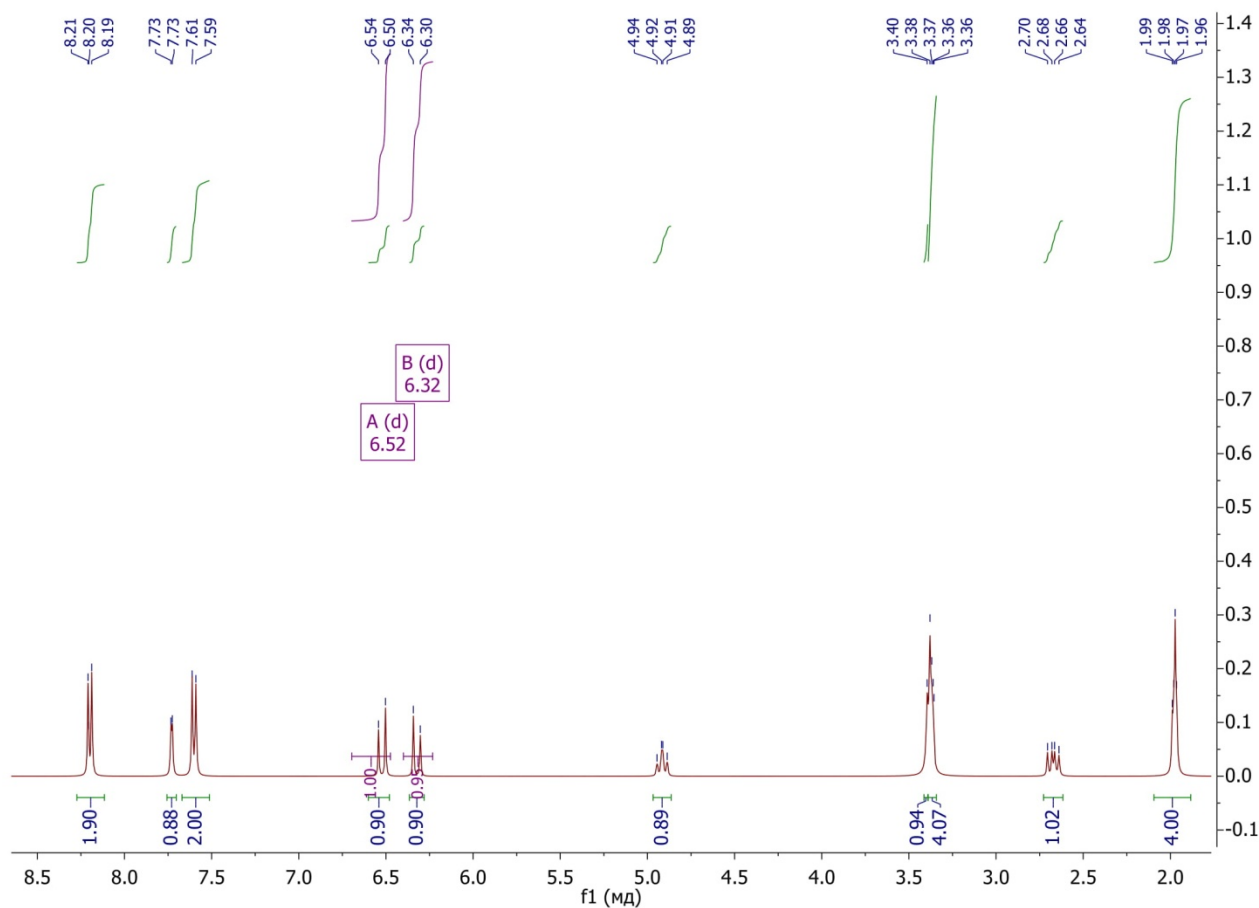


Mass spectrum of compound **9a**

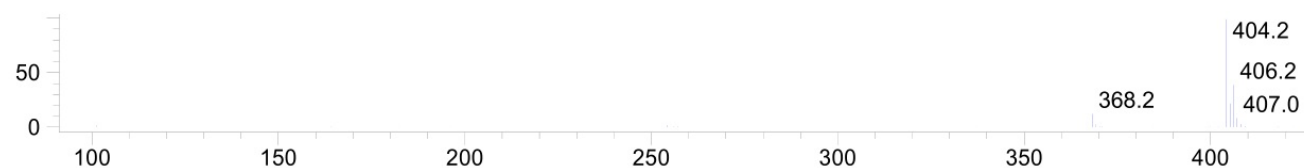
# 4-chloro-5-[2-[5-(4-nitrophenyl)-4,5-dihydro-1H-pyrazol-3-yl]vinyl]-2-pyrrolidin-1-yl-thiazole (9b)



<sup>13</sup>C NMR spectrum of compound **9b**

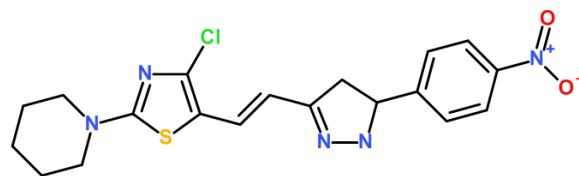
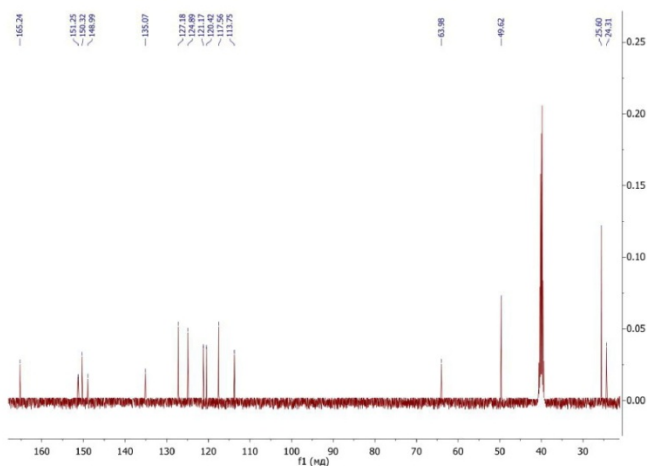


<sup>1</sup>H NMR spectrum of compound **9b**

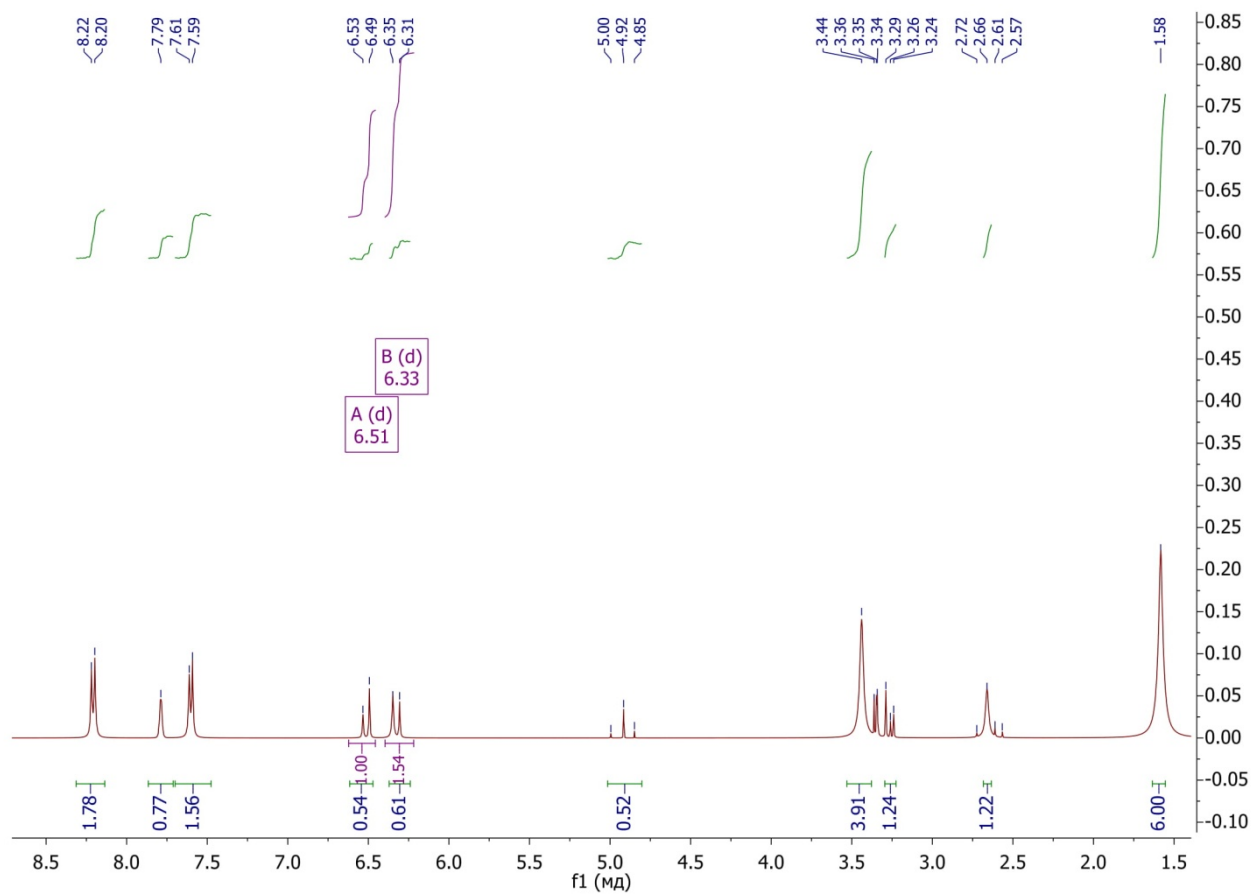


Mass spectrum of compound **9b**

# 4-chloro-5-[2-[5-(4-nitrophenyl)-4,5-dihydro-1H-pyrazol-3-yl]vinyl]-2-(1-piperidyl)thiazole (9c)



<sup>13</sup>C NMR spectrum of compound **9c**



<sup>1</sup>H NMR spectrum of compound **9c**



Mass spectrum of compound **9c**