

# **Metal Free Synthesis of Carbamoylated Chroman-4-Ones via Cascade Radical Annulation of 2-(Allyloxy)arylaldehydes with Oxamic Acids**

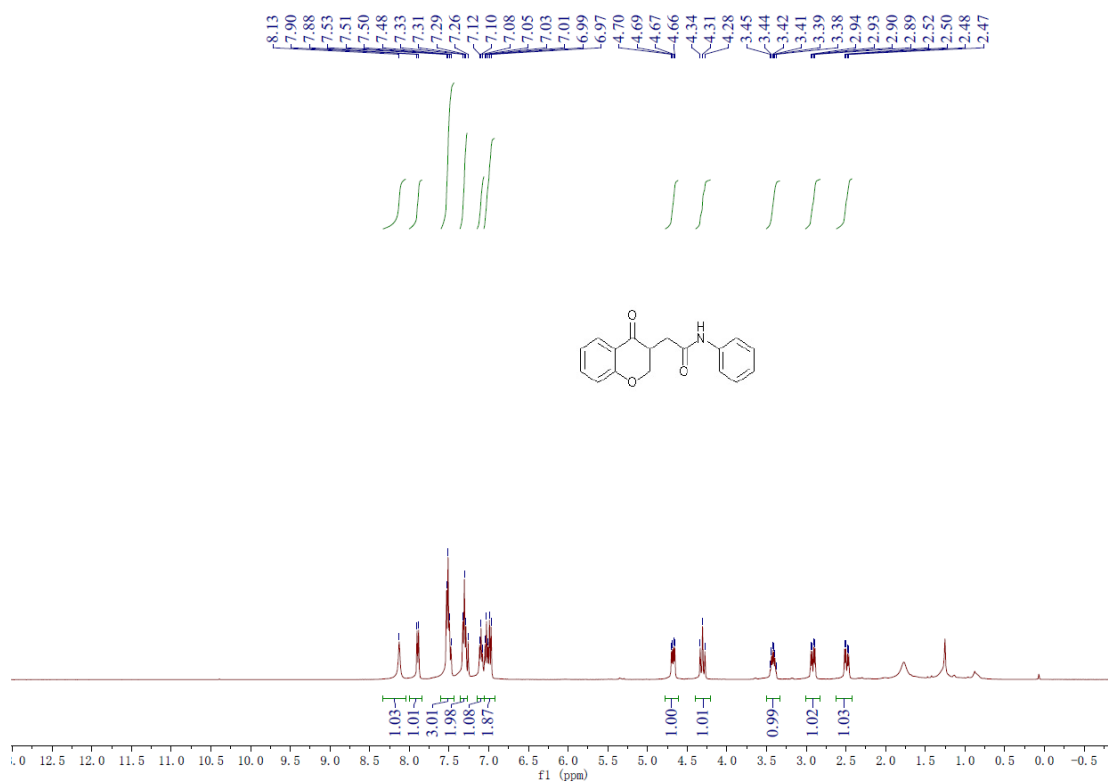
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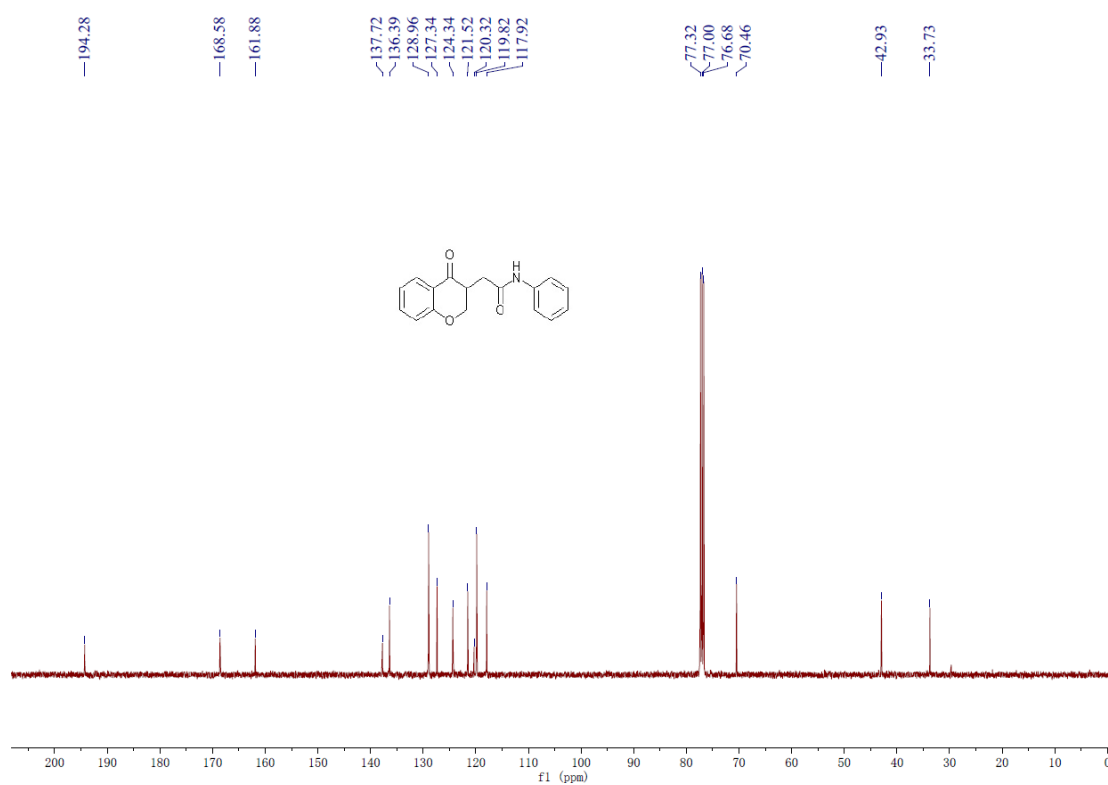
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# <sup>1</sup>H and <sup>13</sup>C NMR spectra of products

## 2-(4-oxochroman-3-yl)-*N*-phenylacetamide (3aa)

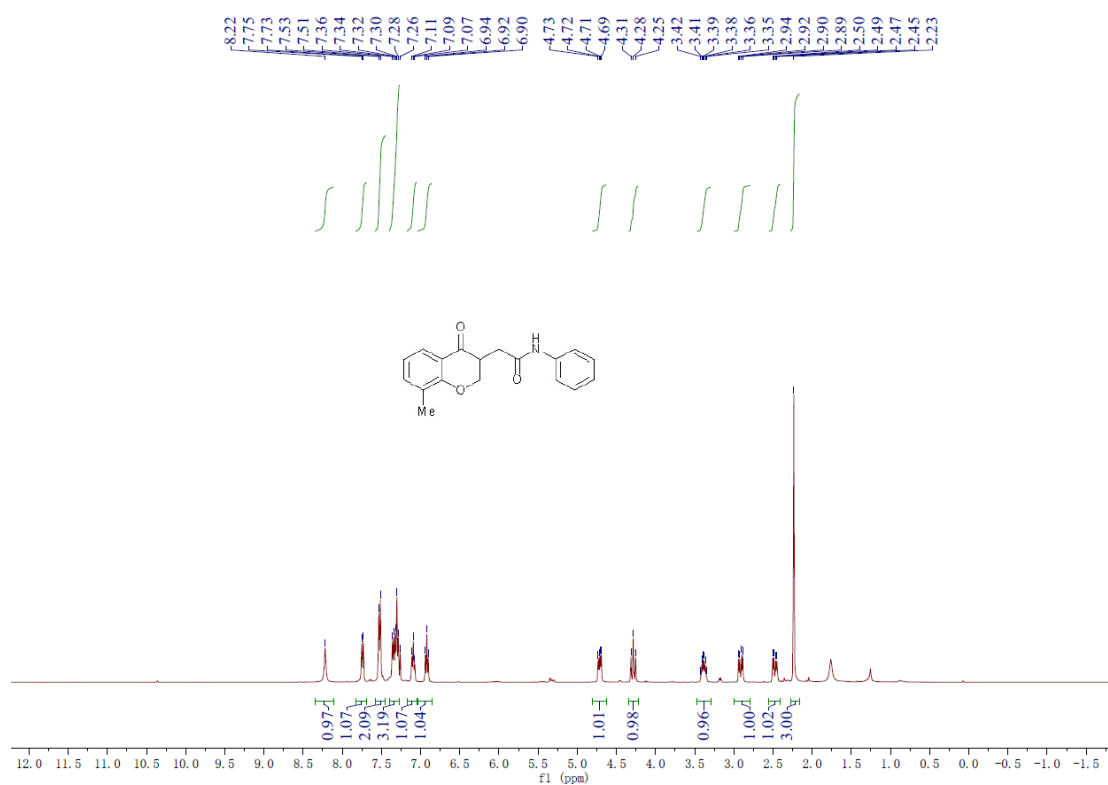


<sup>1</sup>H spectra of 3aa

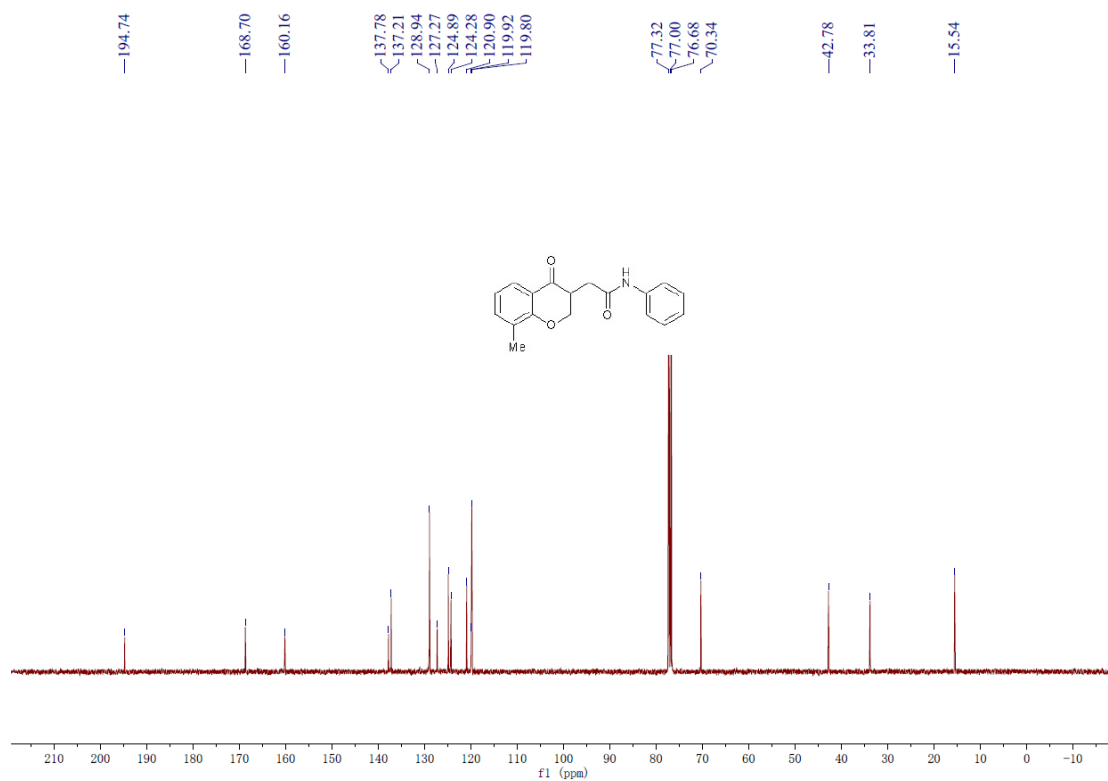


<sup>13</sup>C spectra of 3aa

**2-(8-methyl-4-oxochroman-3-yl)-N-phenylacetamide (3ba)**

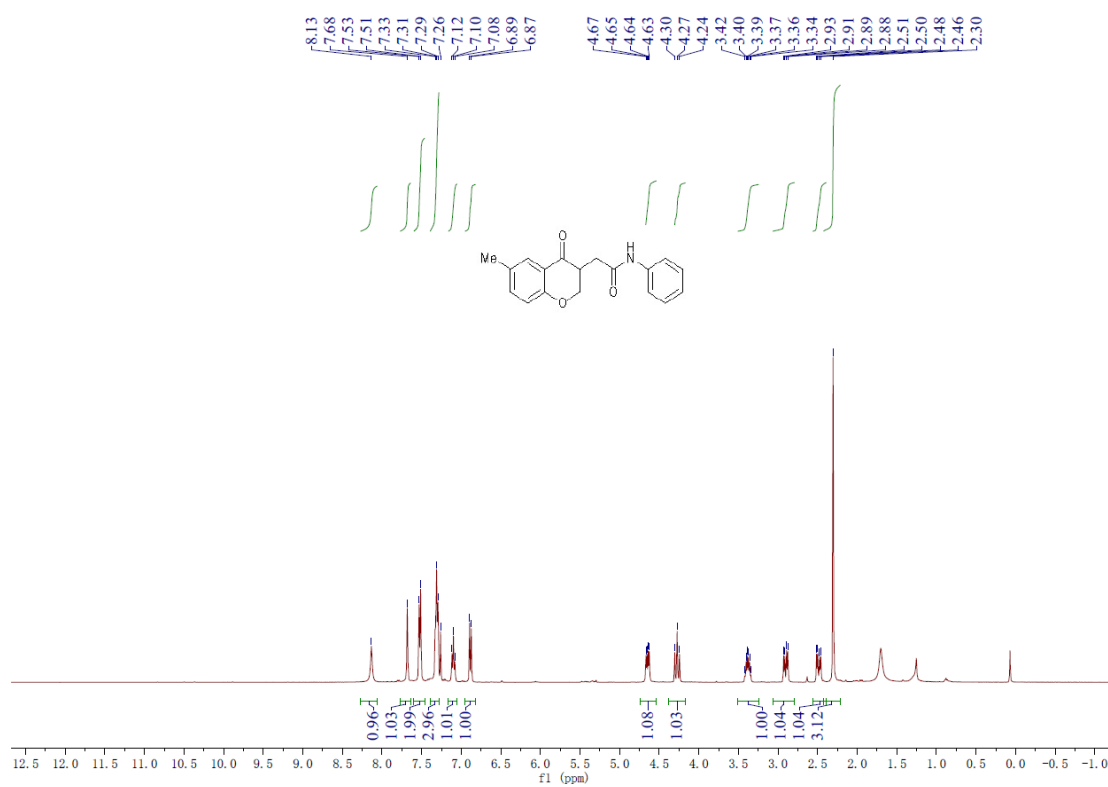


**<sup>1</sup>H spectra of 3ba**

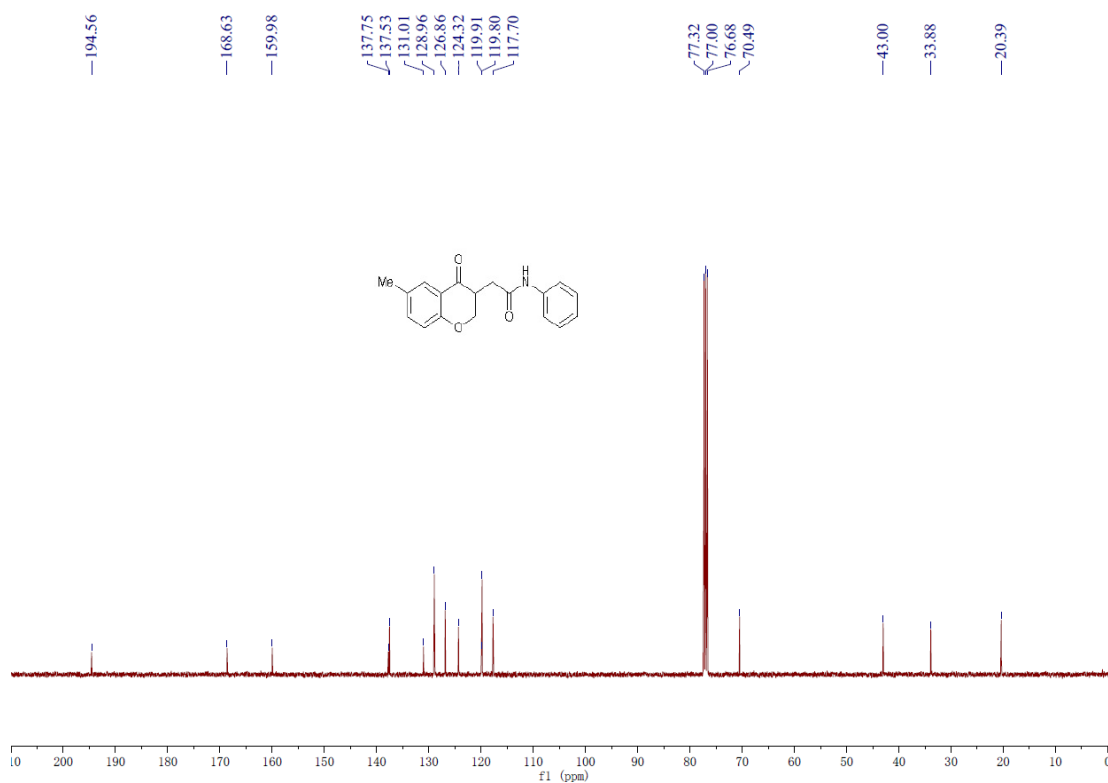


**<sup>13</sup>C spectra of 3ba**

**2-(6-methyl-4-oxochroman-3-yl)-N-phenylacetamide (3ca)**

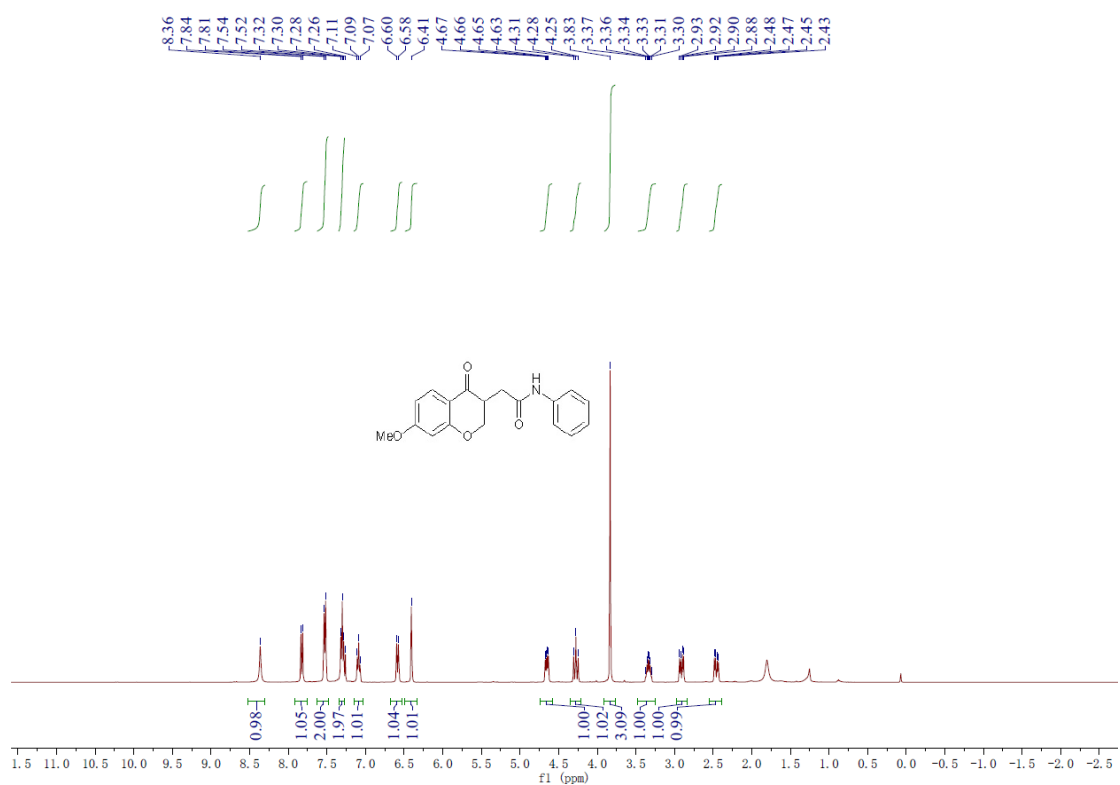


<sup>1</sup>H spectra of **3ca**

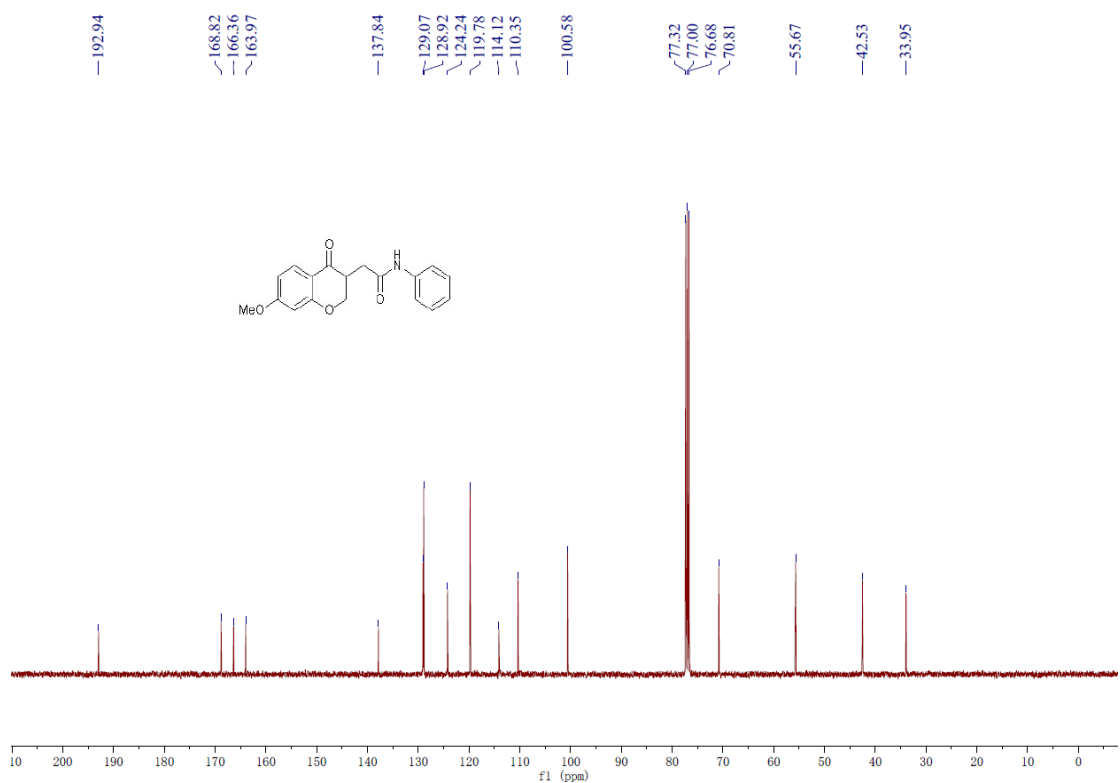


<sup>13</sup>C spectra of **3ca**

**2-(7-methoxy-4-oxochroman-3-yl)-N-phenylacetamide (3da)**

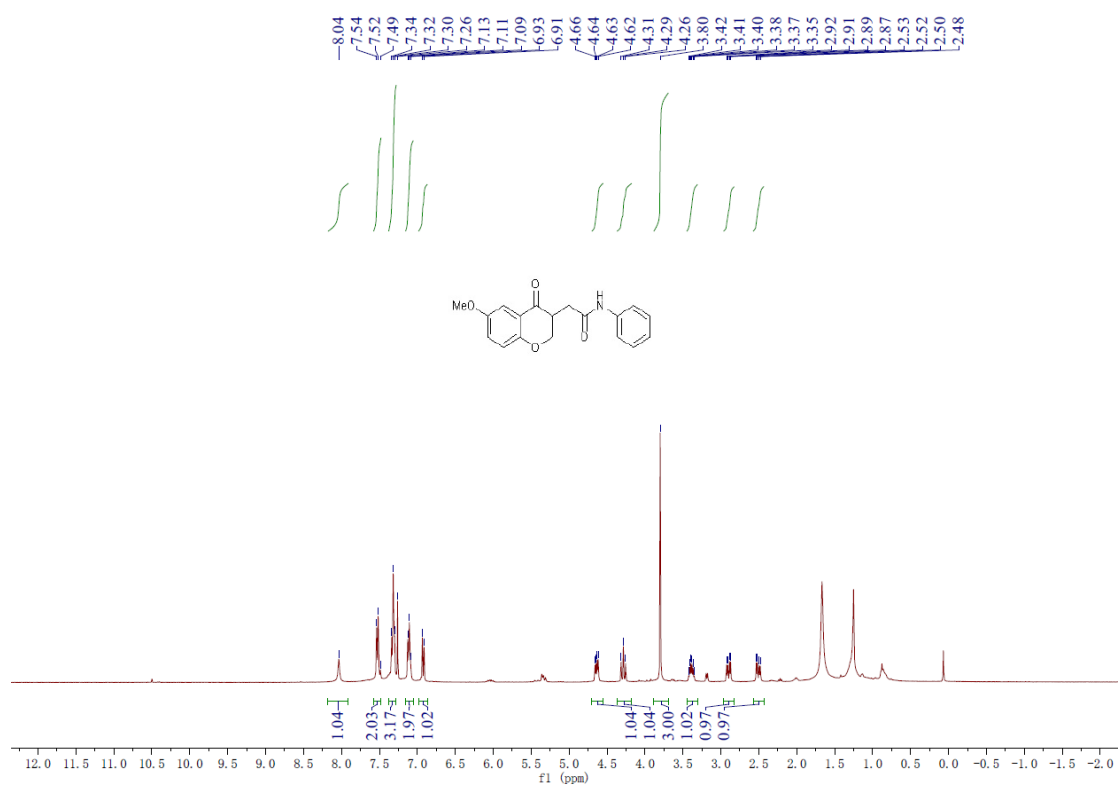


<sup>1</sup>H spectra of **3da**

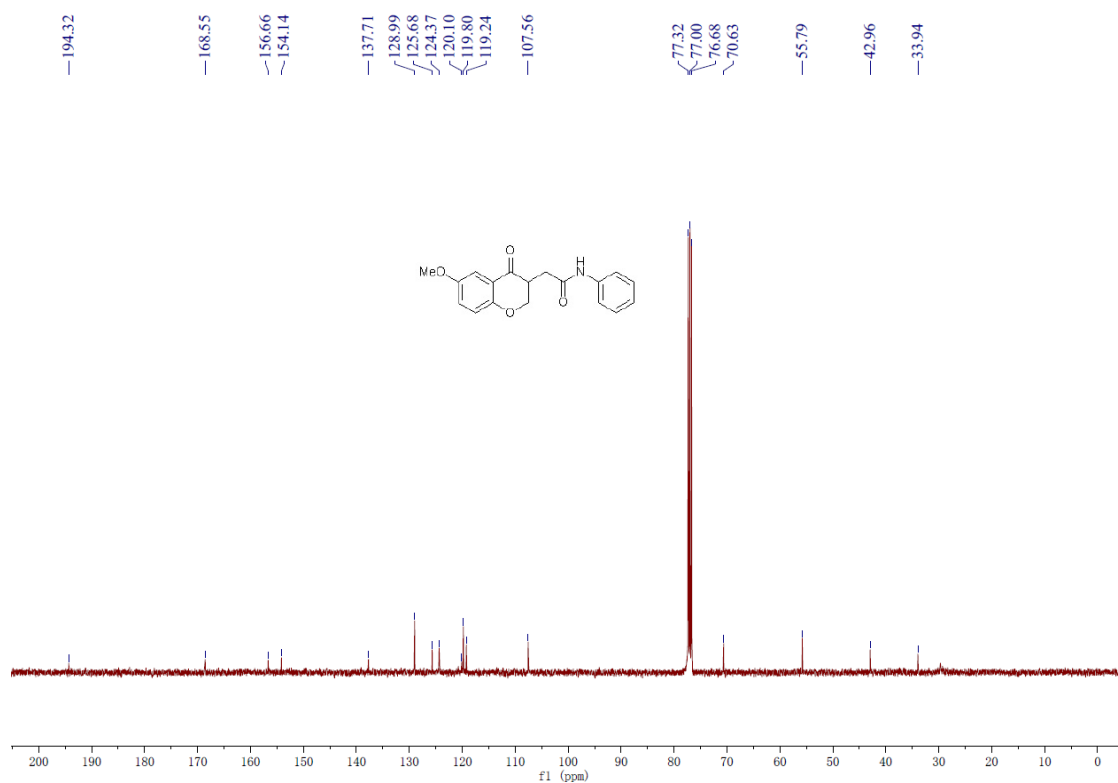


<sup>13</sup>C spectra of **3da**

## 2-(6-methoxy-4-oxochroman-3-yl)-*N*-phenylacetamide (3ea)

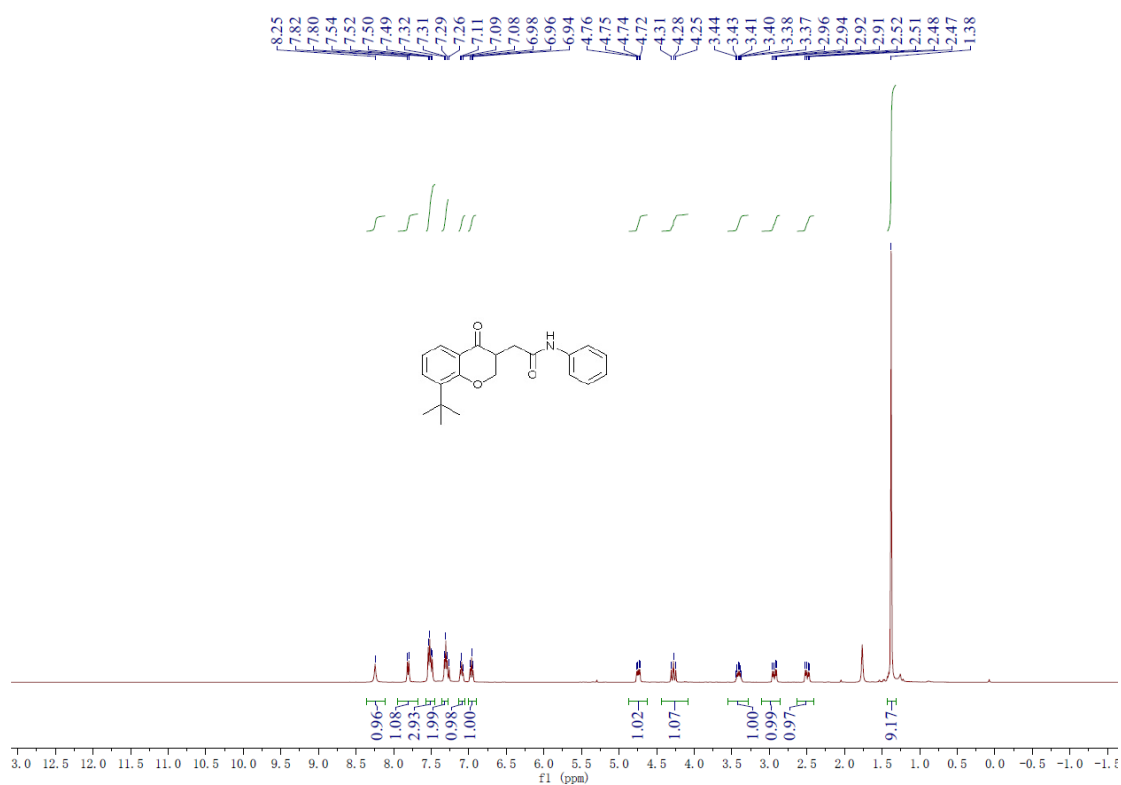


<sup>1</sup>H spectra of 3ea

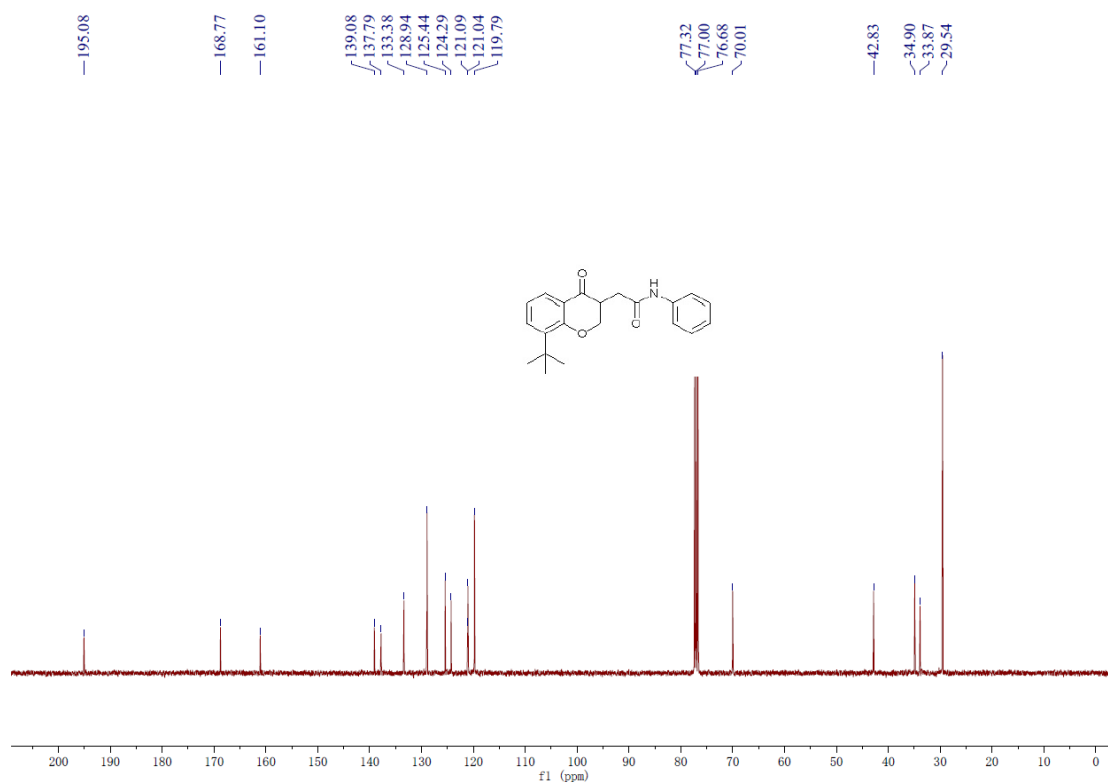


<sup>13</sup>C spectra of 3ea

**2-(8-(tert-butyl)-4-oxochroman-3-yl)-N-phenylacetamide (3fa)**

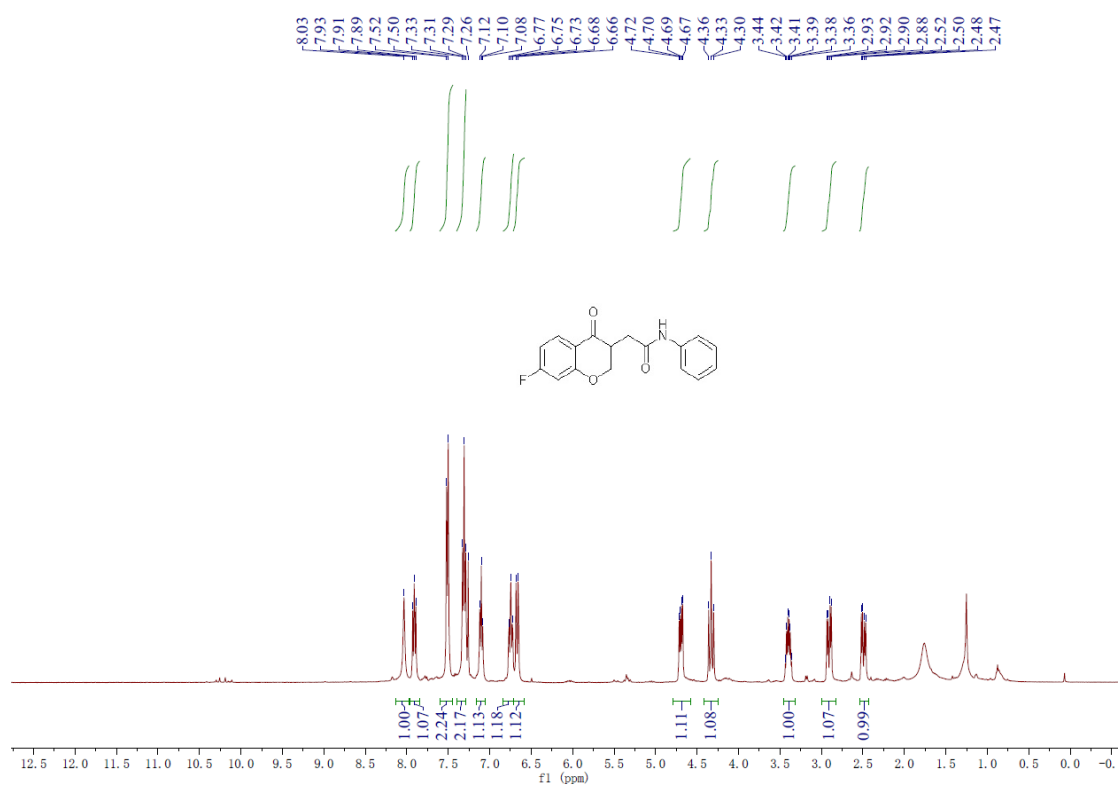


<sup>1</sup>H spectra of 3fa

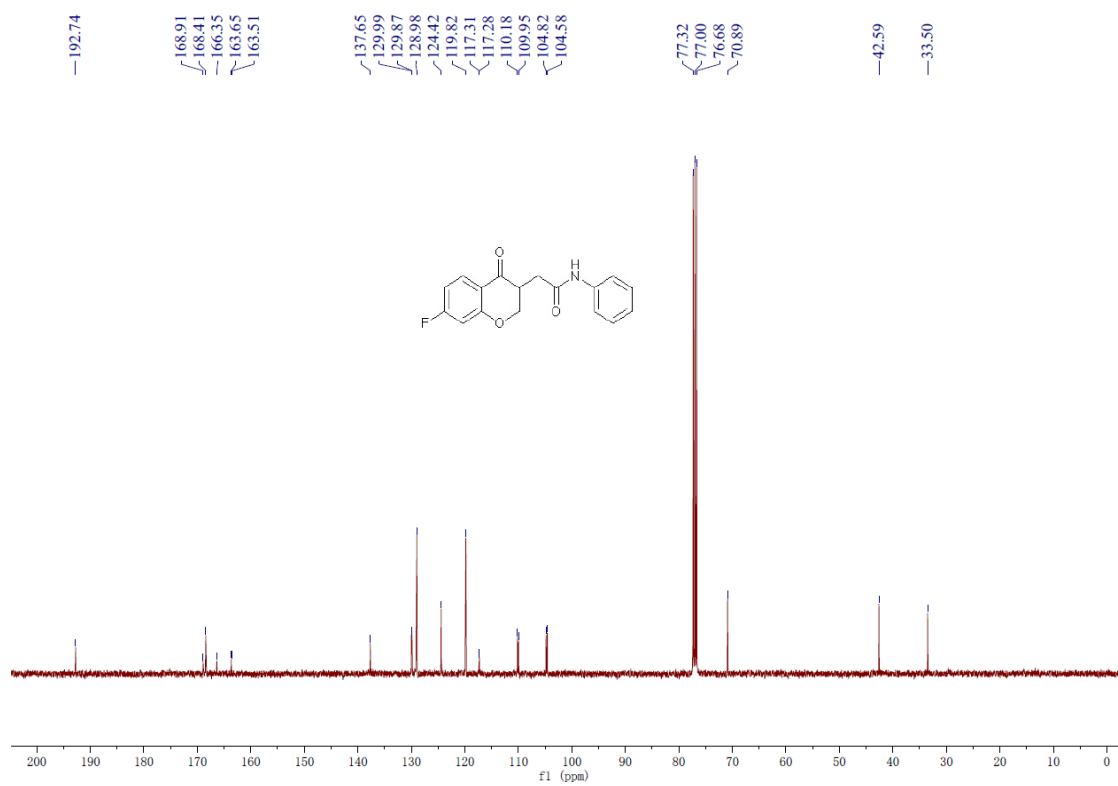


<sup>13</sup>C spectra of 3fa

**2-(7-fluoro-4-oxochroman-3-yl)-N-phenylacetamide (3ga)**



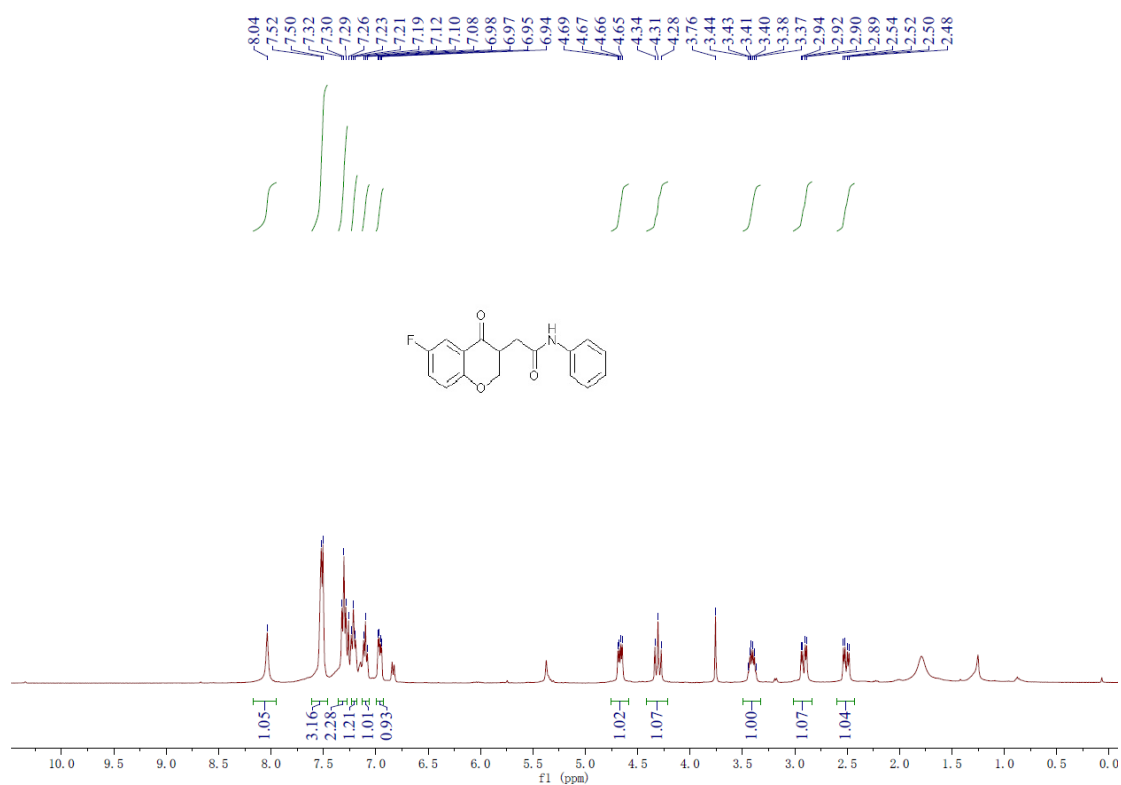
<sup>1</sup>H spectra of 3ga



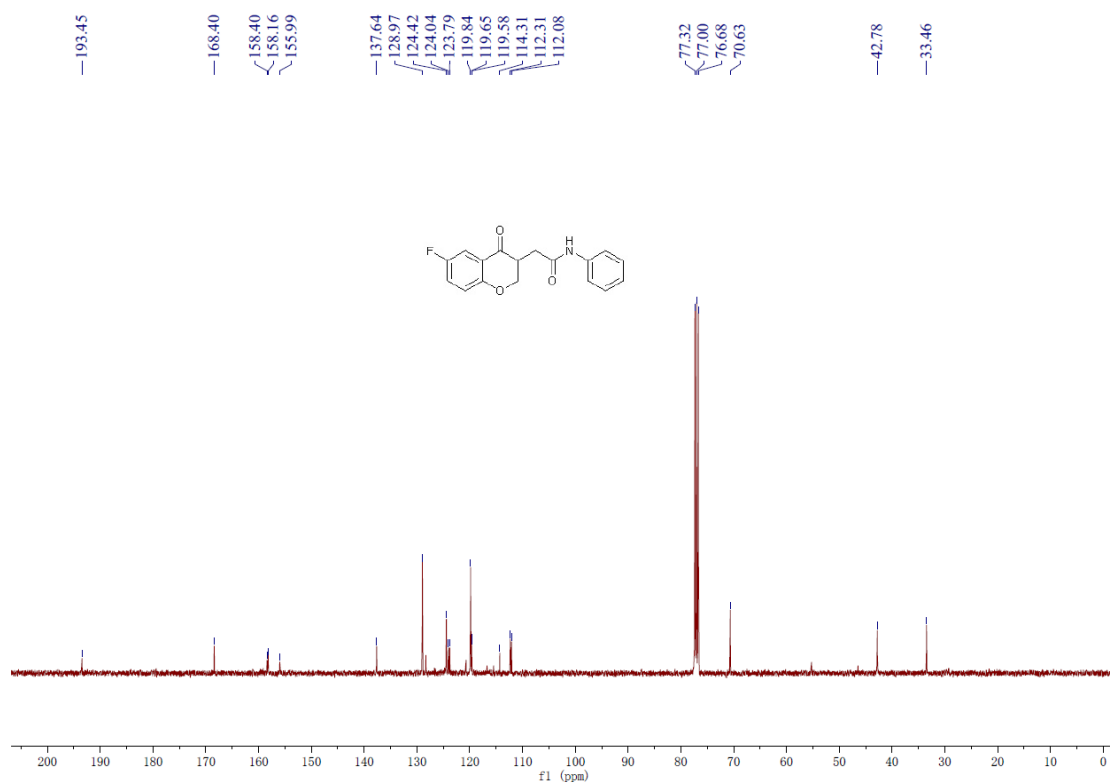
<sup>13</sup>C spectra of 3ga



**2-(6-fluoro-4-oxochroman-3-yl)-N-phenylacetamide (3ha)**

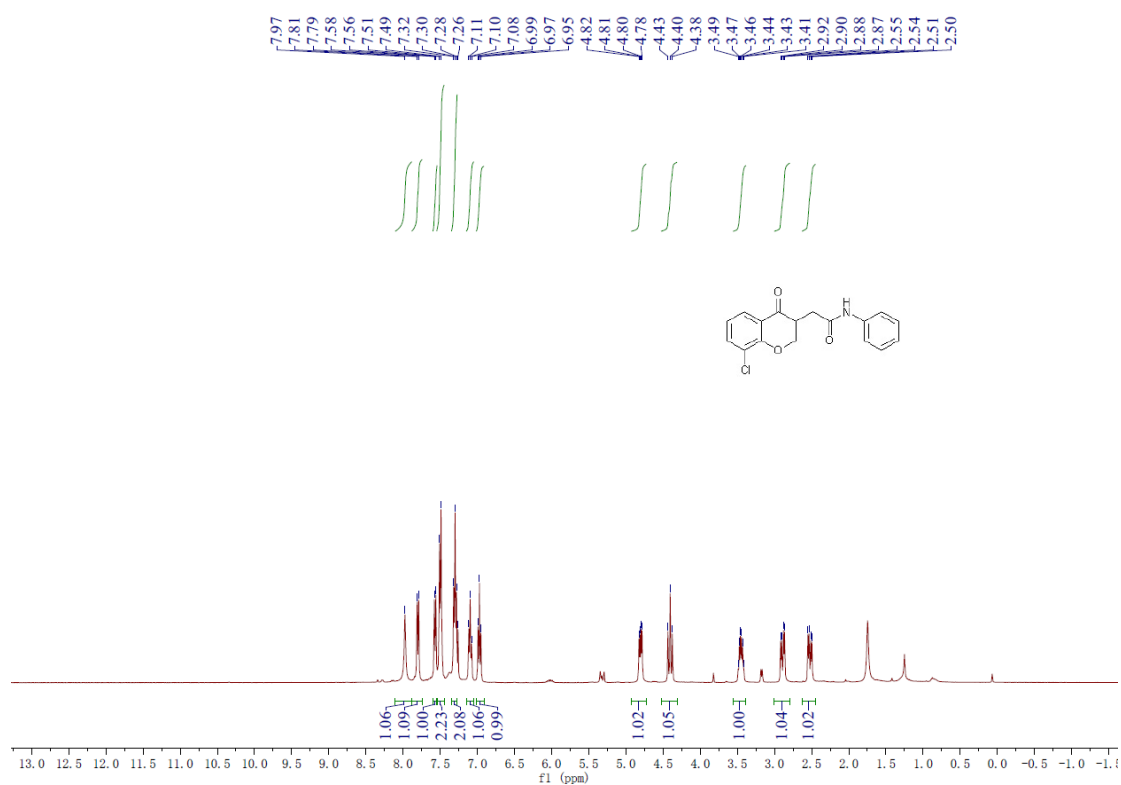


<sup>1</sup>H spectra of 3ha

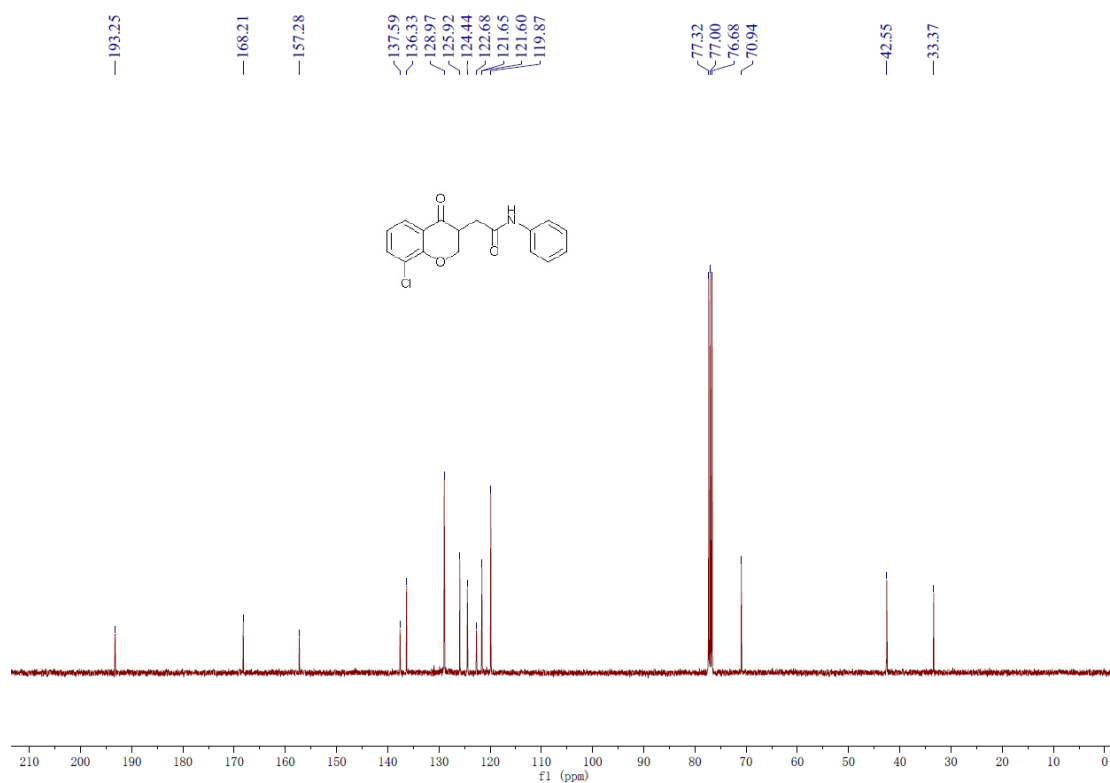


<sup>13</sup>C spectra of 3ha

**2-(8-chloro-4-oxochroman-3-yl)-*N*-phenylacetamide (3ia)**

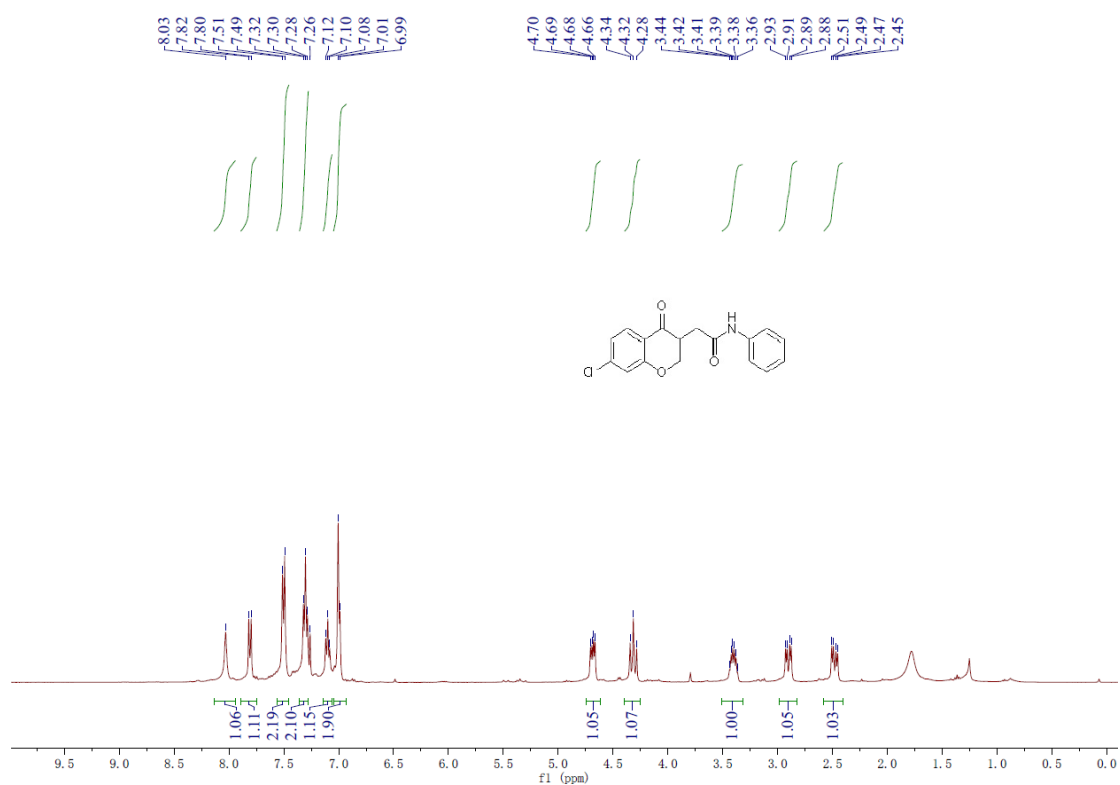


<sup>1</sup>H spectra of 3ia

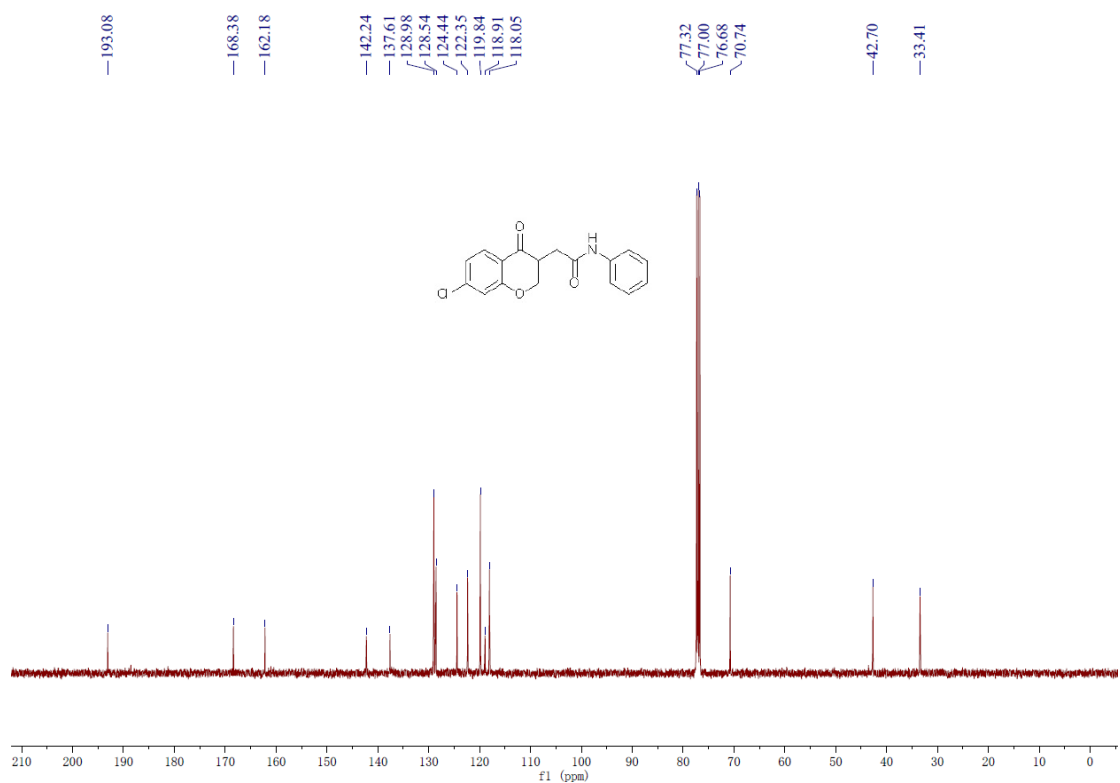


<sup>13</sup>C spectra of 3ia

**2-(7-chloro-4-oxochroman-3-yl)-*N*-phenylacetamide (3ja)**

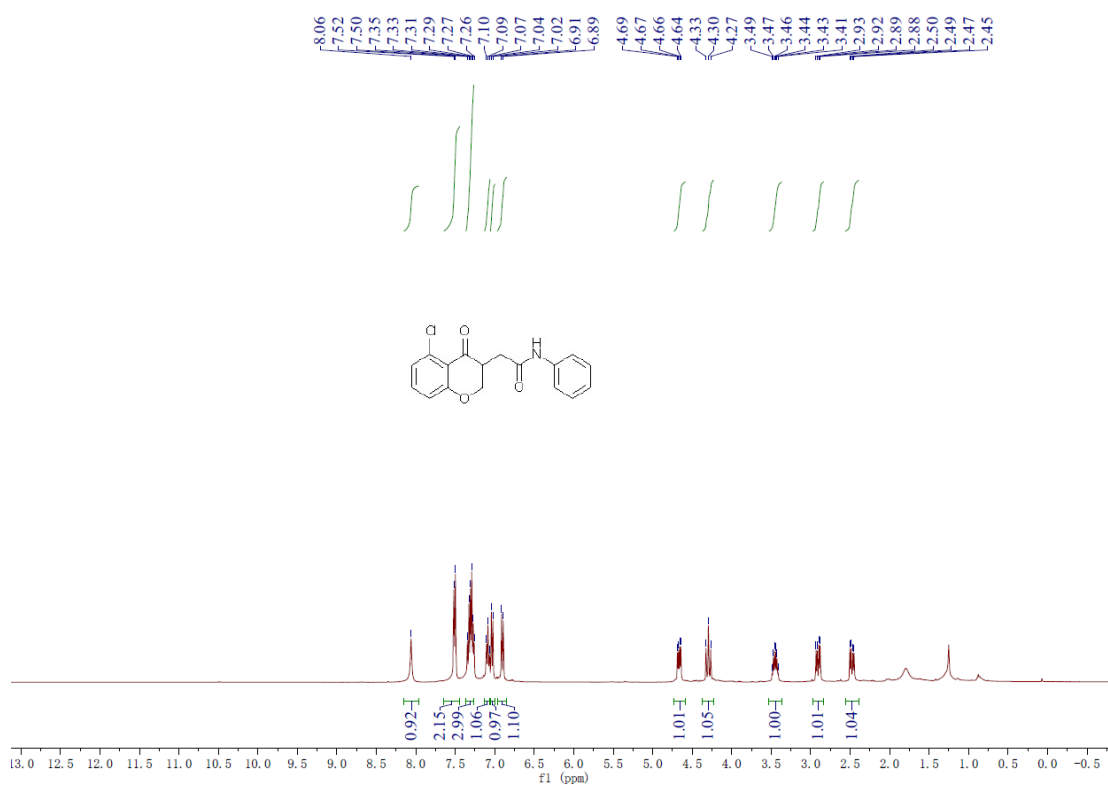


<sup>1</sup>H spectra of 3ja

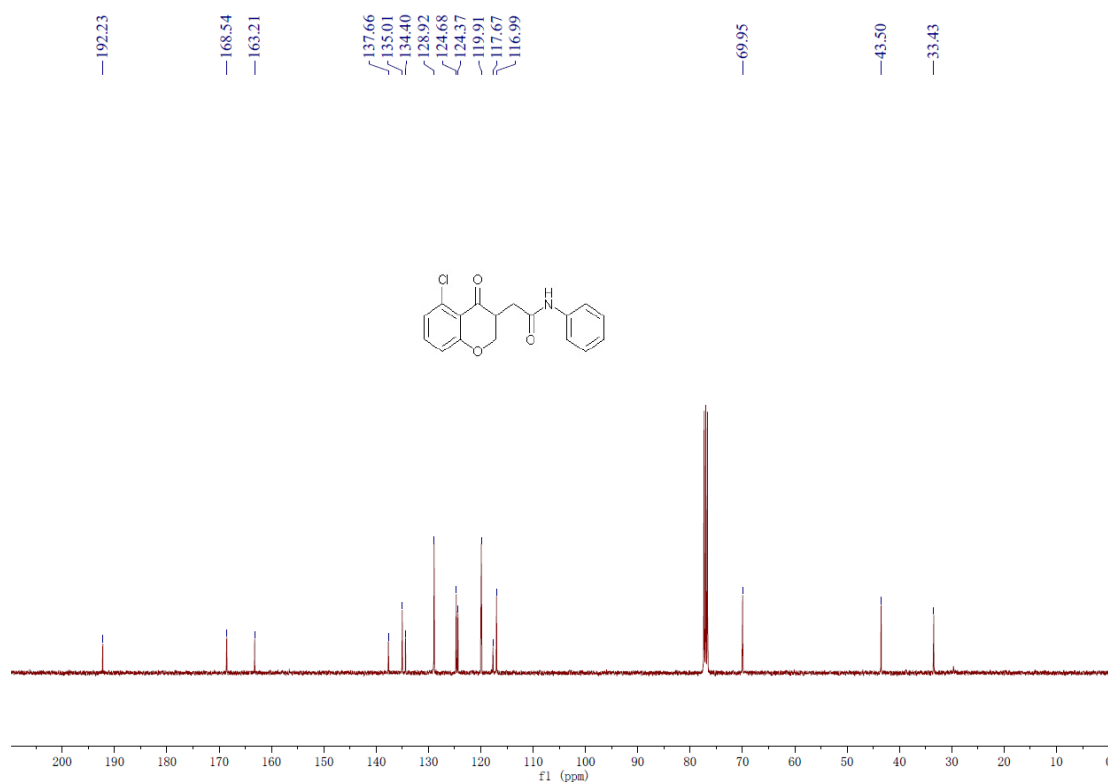


<sup>13</sup>C spectra of 3ja

**2-(5-chloro-4-oxochroman-3-yl)-*N*-phenylacetamide (3ka)**

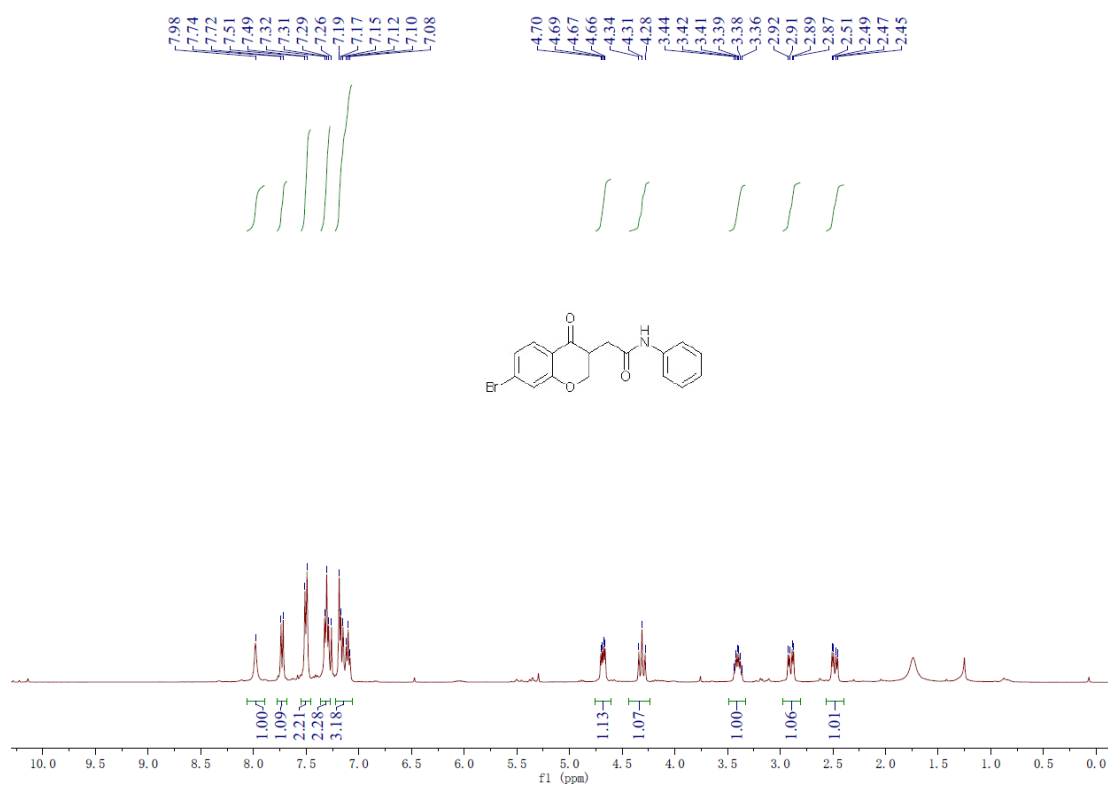


<sup>1</sup>H spectra of **3ka**

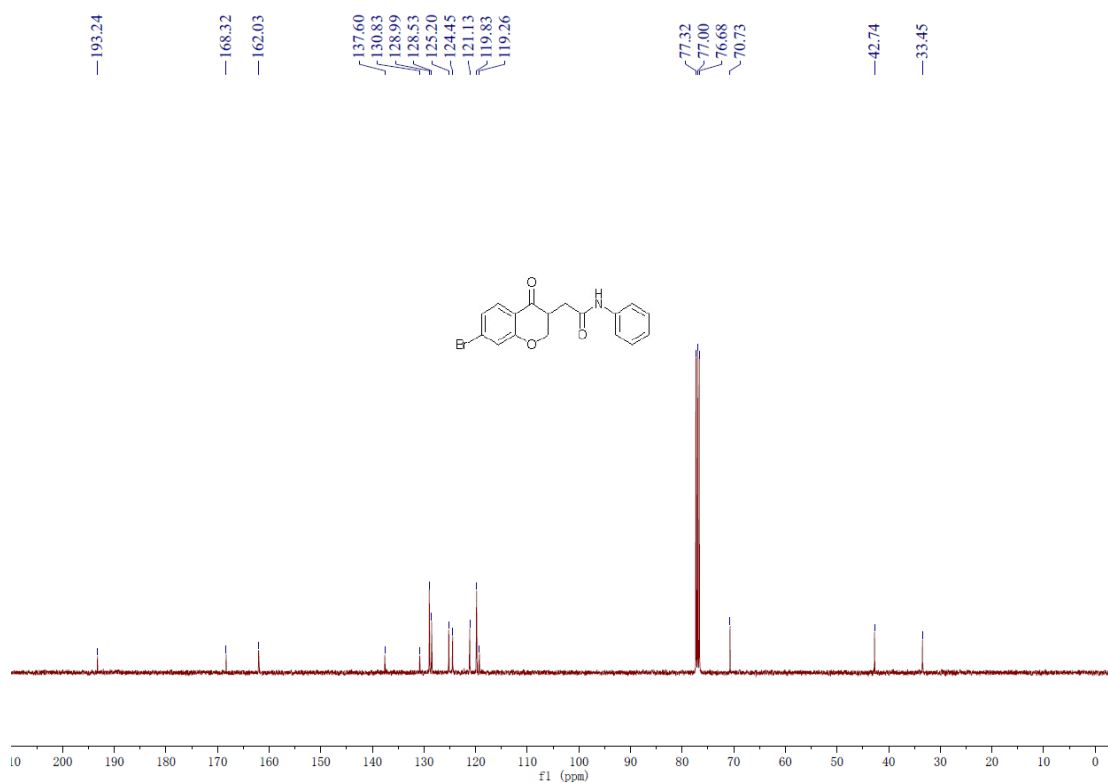


<sup>13</sup>C spectra of **3ka**

**2-(7-bromo-4-oxochroman-3-yl)-N-phenylacetamide (3la)**

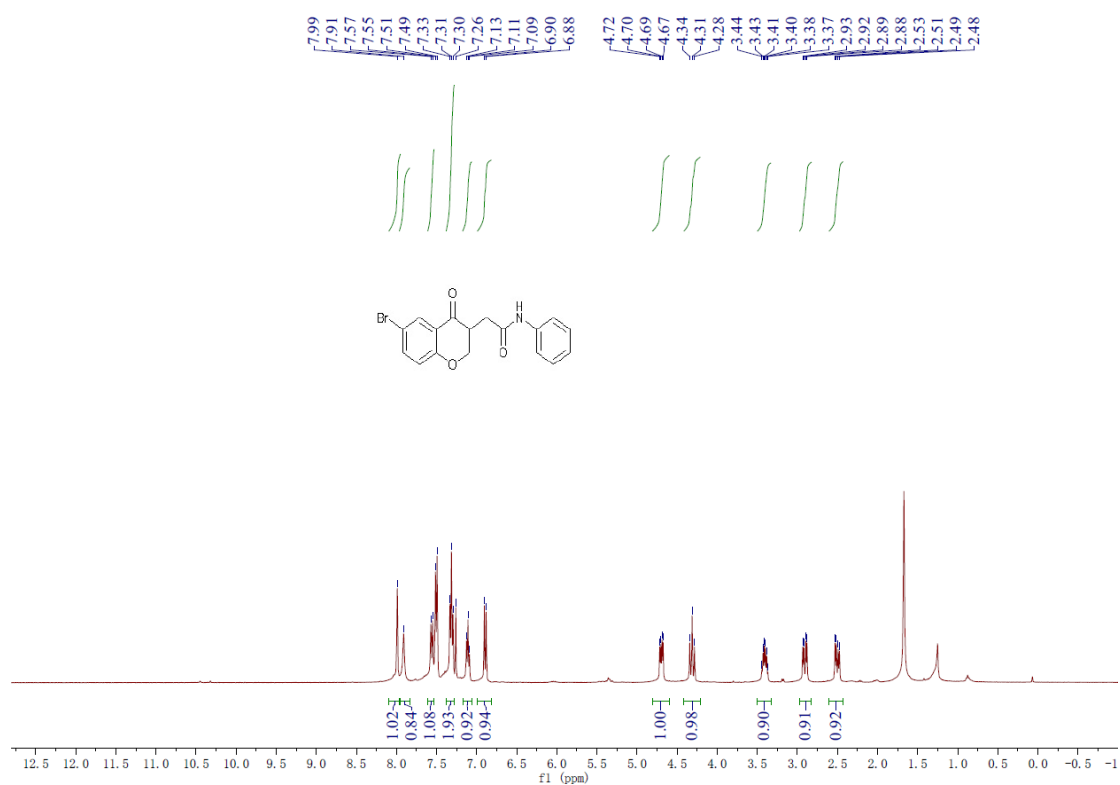


<sup>1</sup>H spectra of 3la

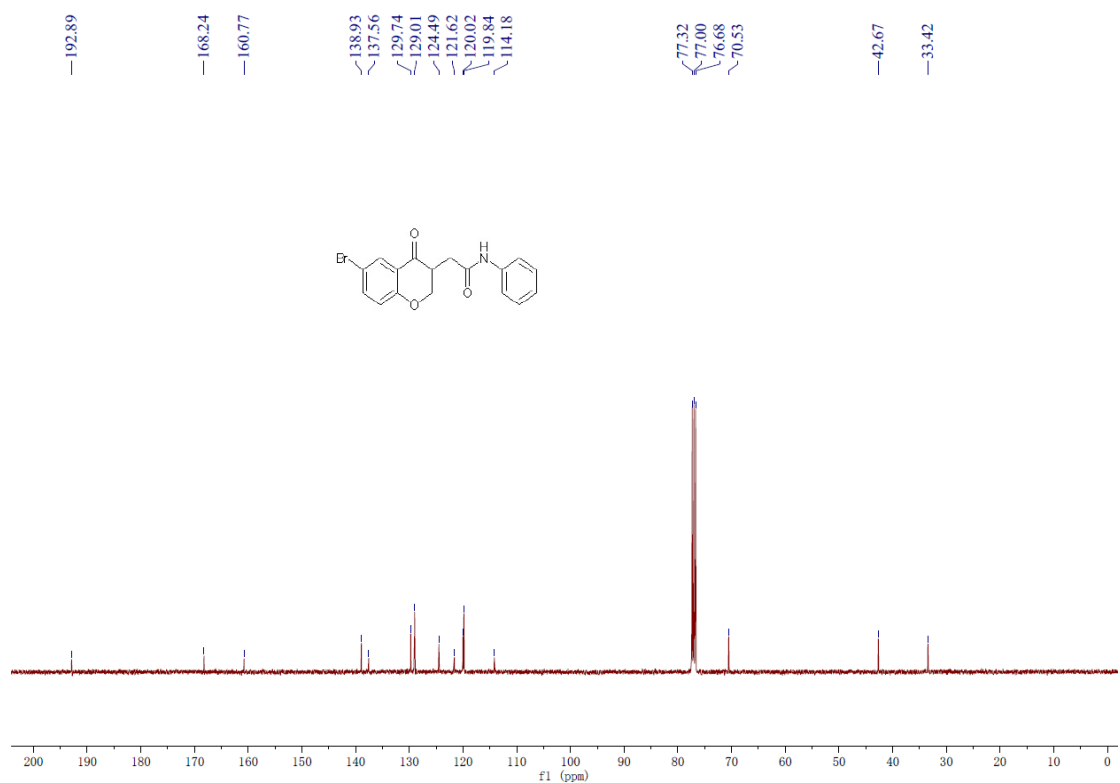


<sup>13</sup>C spectra of 3la

**2-(6-bromo-4-oxochroman-3-yl)-N-phenylacetamide (3ma)**

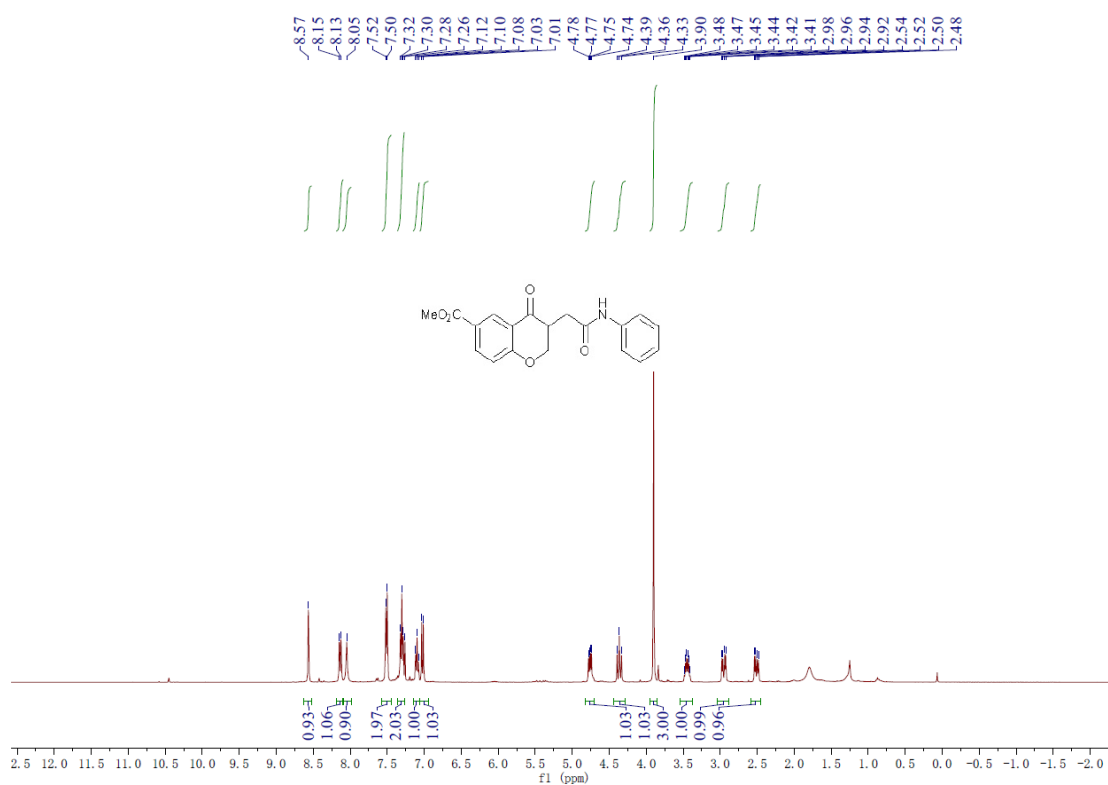


<sup>1</sup>H spectra of 3ma

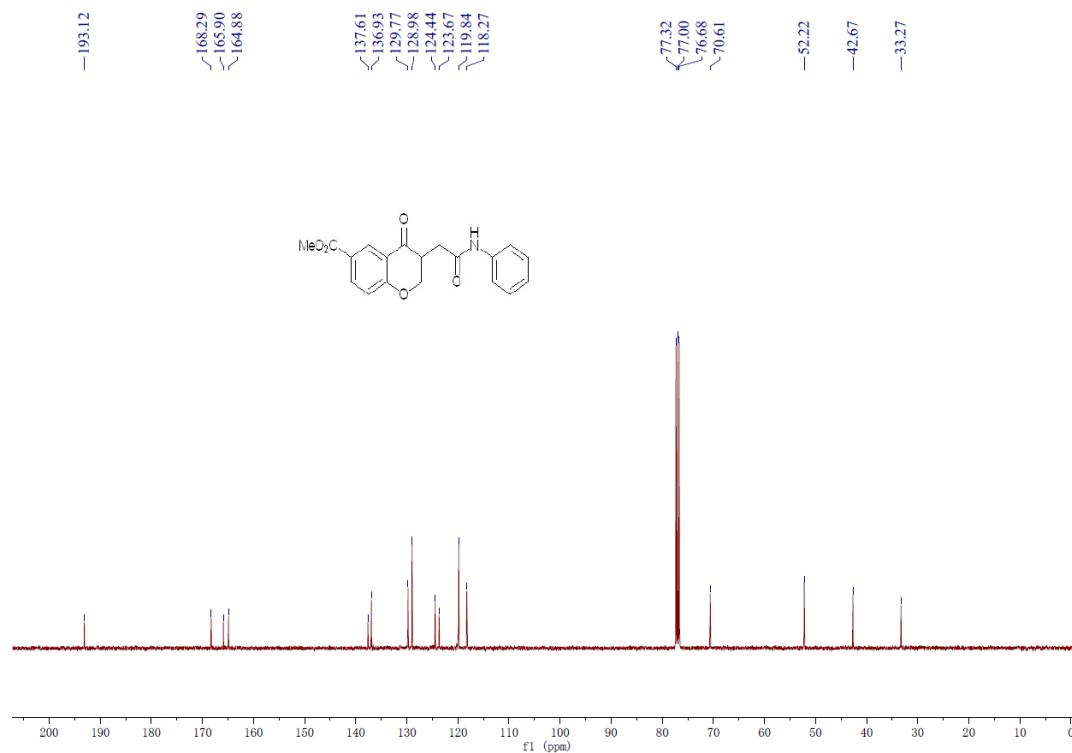


<sup>13</sup>C spectra of 3ma

**methyl 4-oxo-3-(2-oxo-2-(phenylamino)ethyl)chroman-6-carboxylate (3na)**

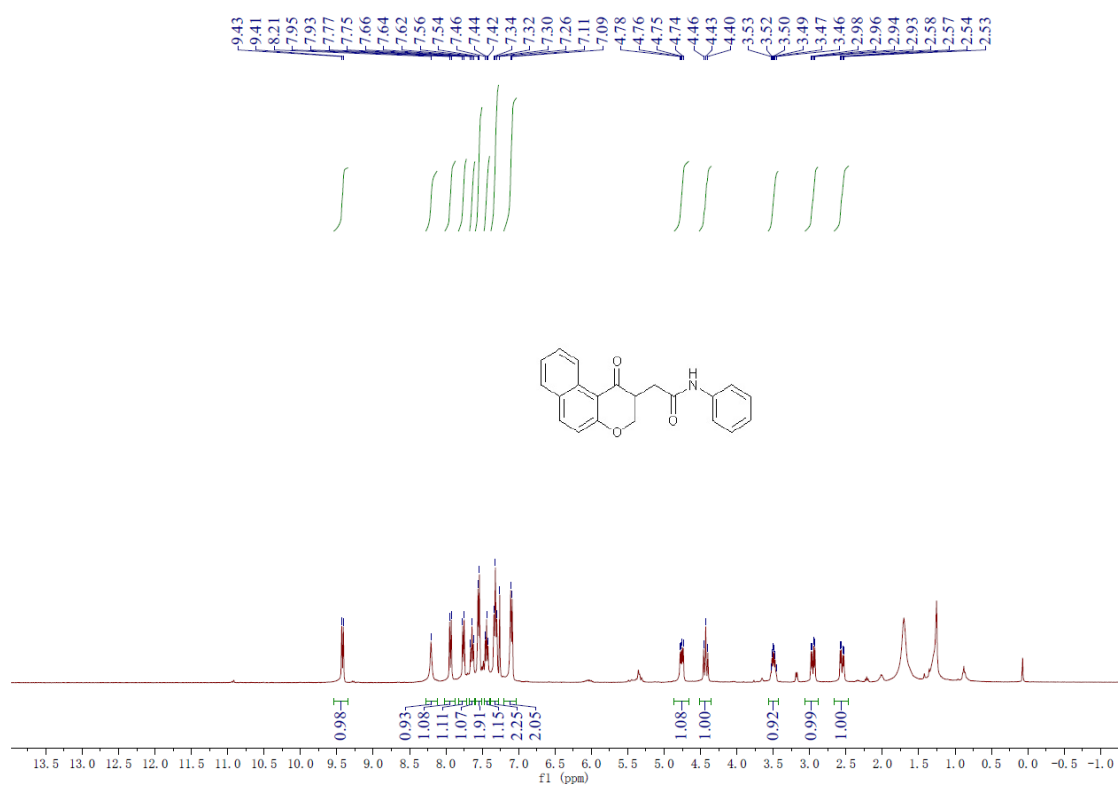


<sup>1</sup>H spectra of **3na**

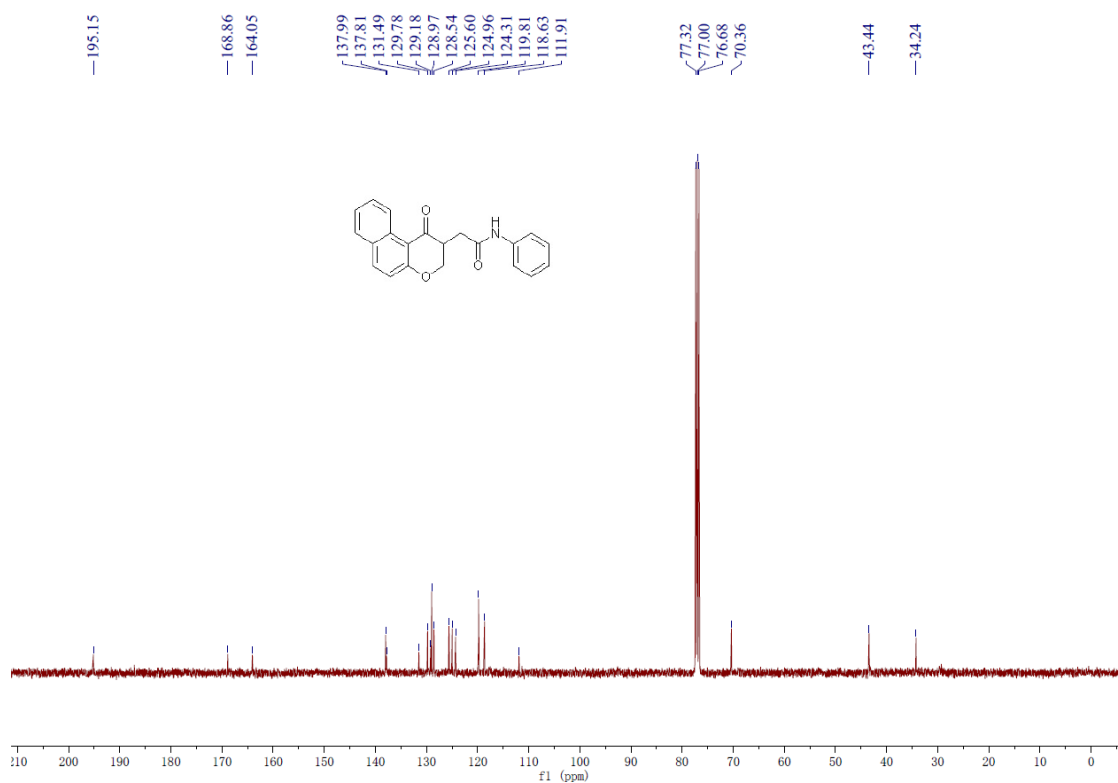


<sup>13</sup>C spectra of **3na**

**2-(1-oxo-2,3-dihydro-1H-benzo[f]chromen-2-yl)-N-phenylacetamide (30a)**



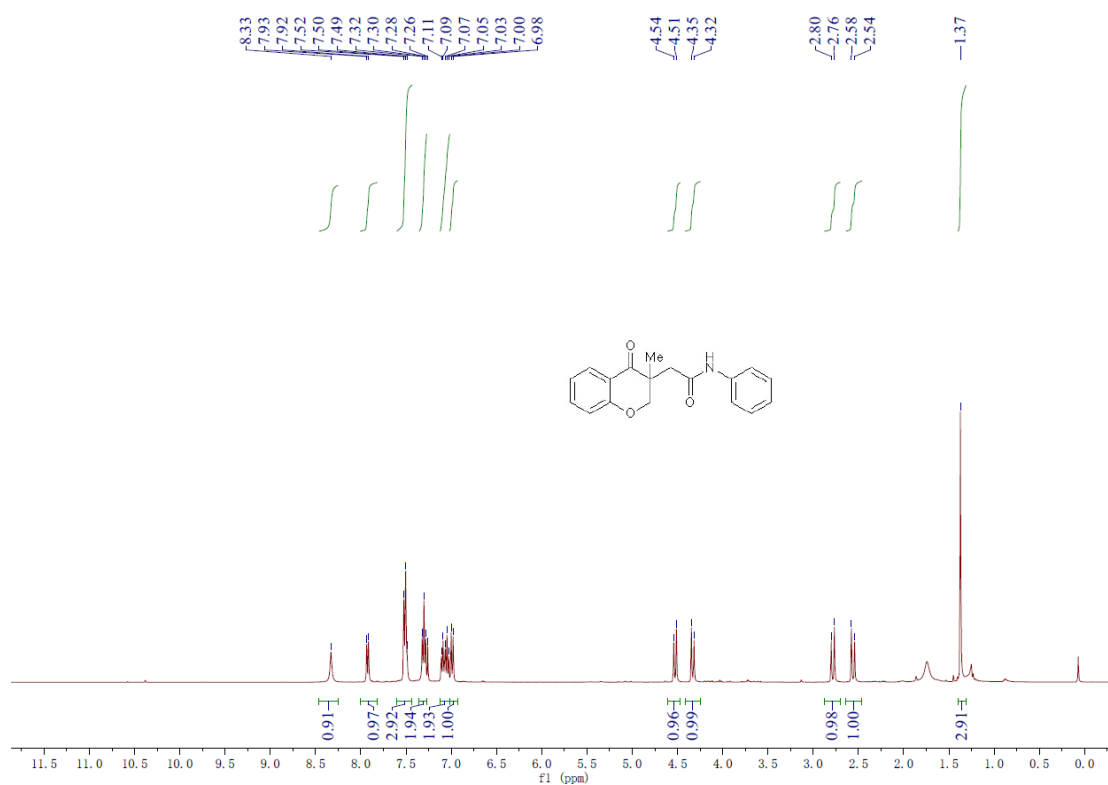
<sup>1</sup>H spectra of 30a



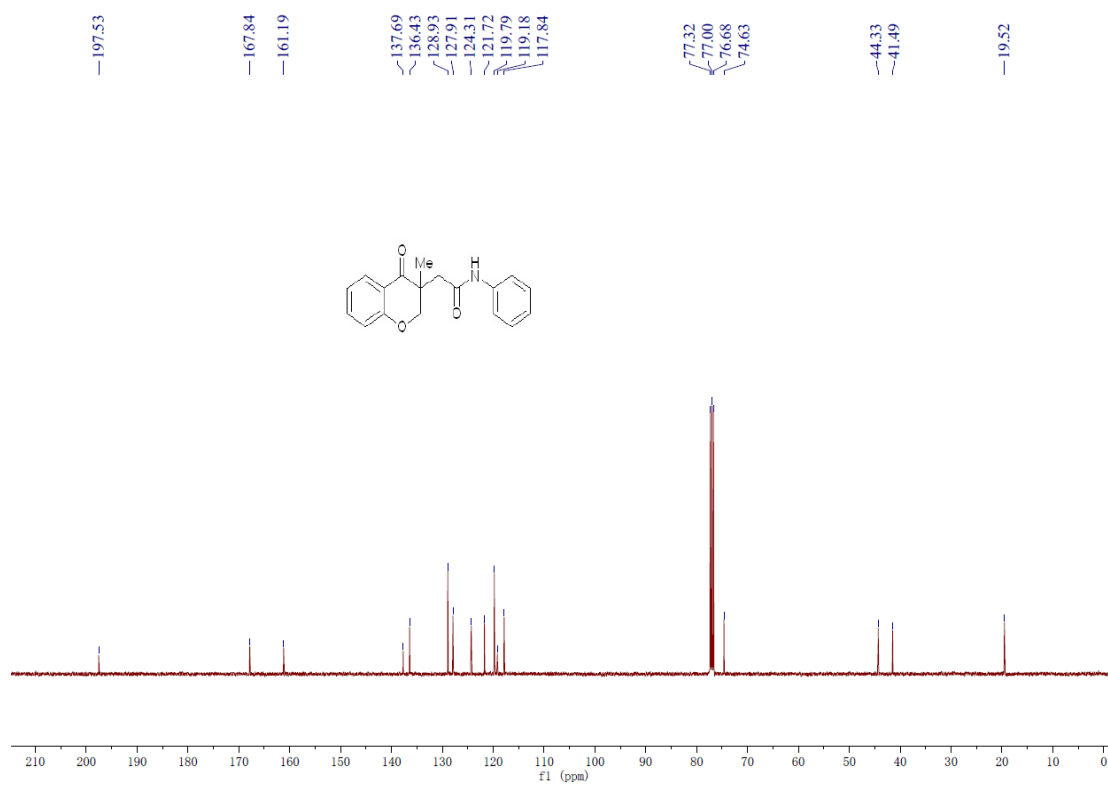
<sup>13</sup>C spectra of 30a



**2-(3-methyl-4-oxochroman-3-yl)-N-phenylacetamide (3pa)**

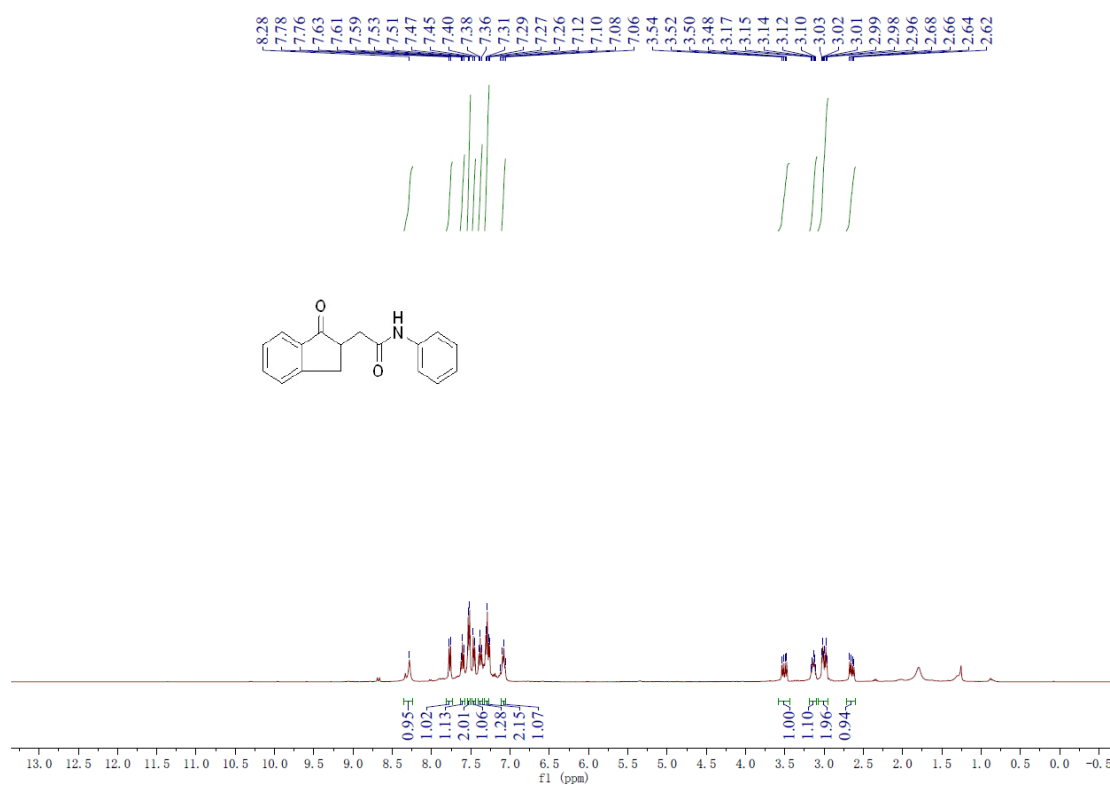


<sup>1</sup>H spectra of 3pa

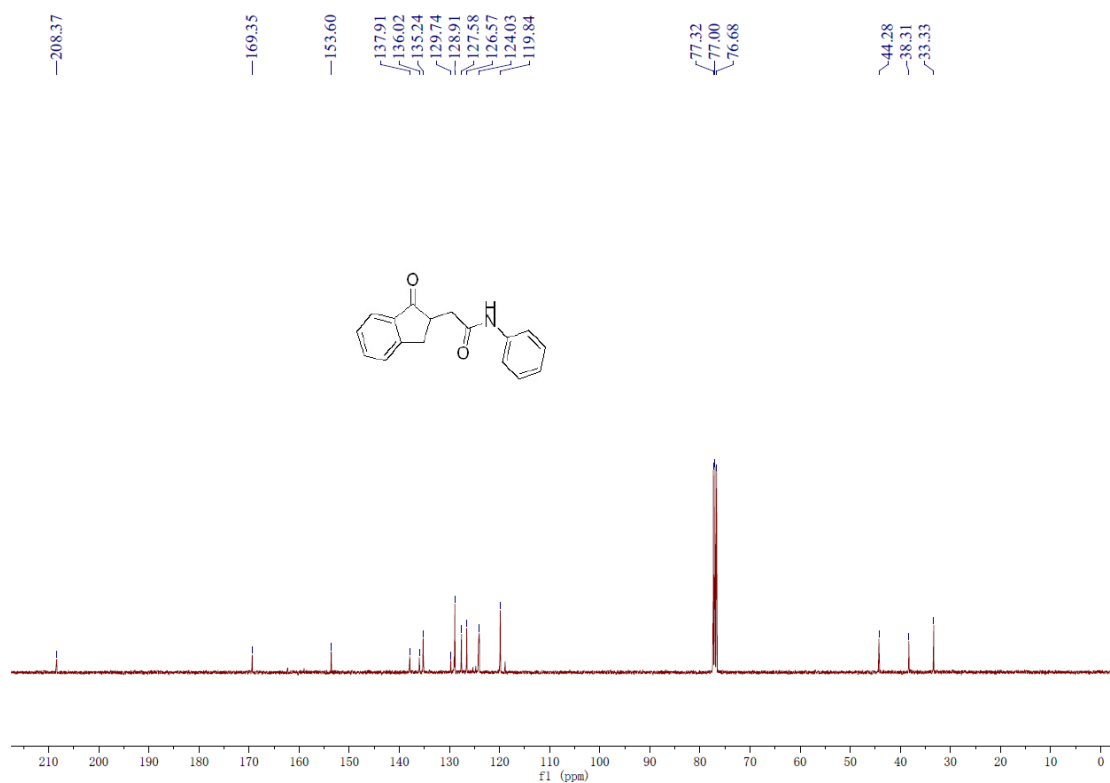


<sup>13</sup>C spectra of 3pa

**2-(1-oxo-2,3-dihydro-1H-inden-2-yl)-N-phenylacetamide (3qa)**

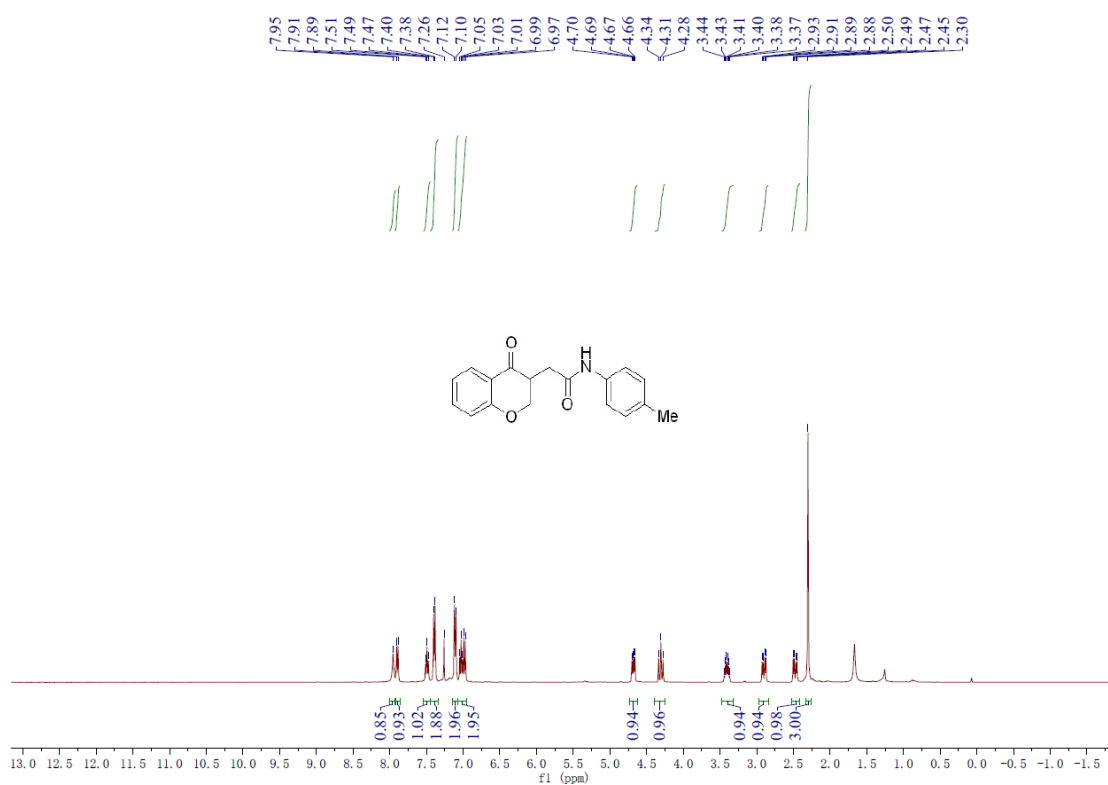


<sup>1</sup>H spectra of 3qa

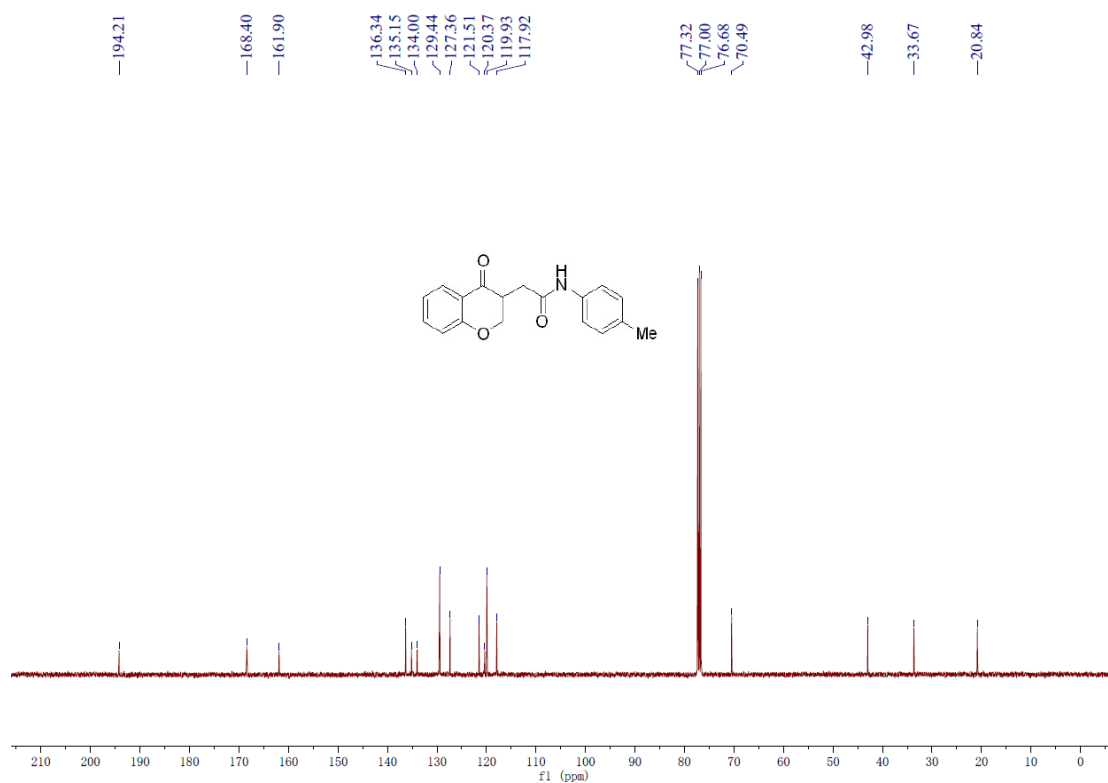


<sup>13</sup>C spectra of 3qa

**2-(4-oxochroman-3-yl)-N-(p-tolyl)acetamide (3ab)**

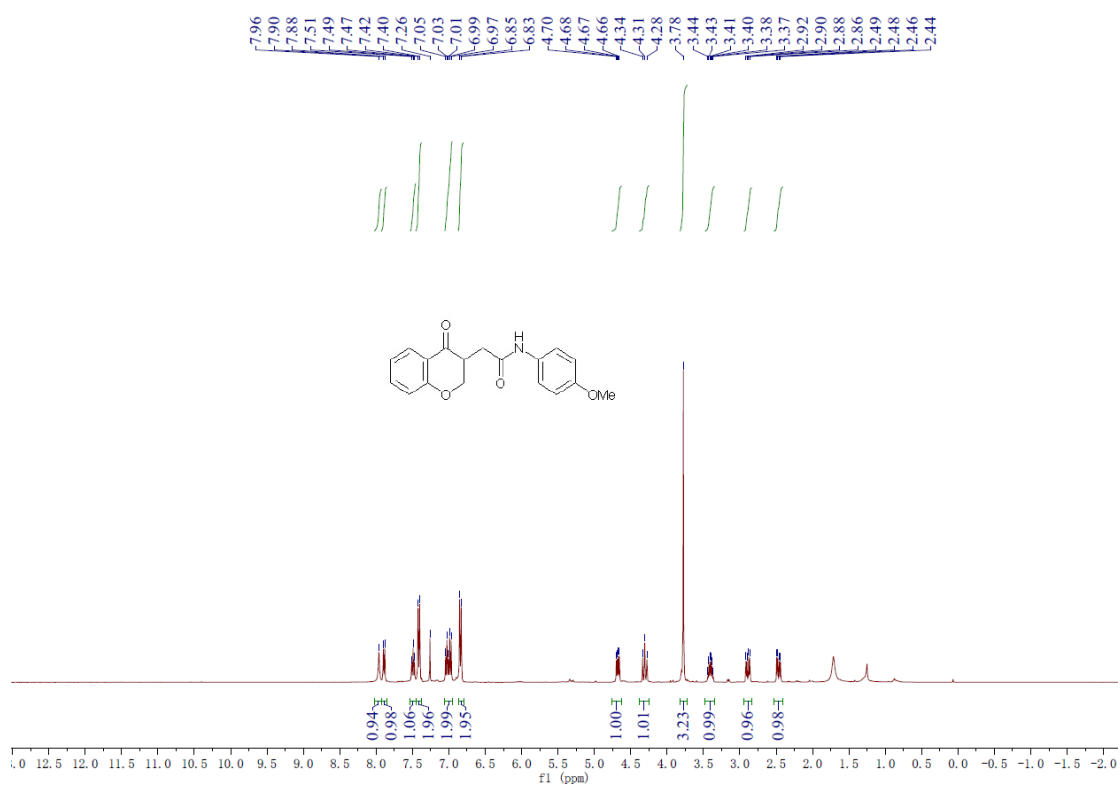


<sup>1</sup>H spectra of **3ab**

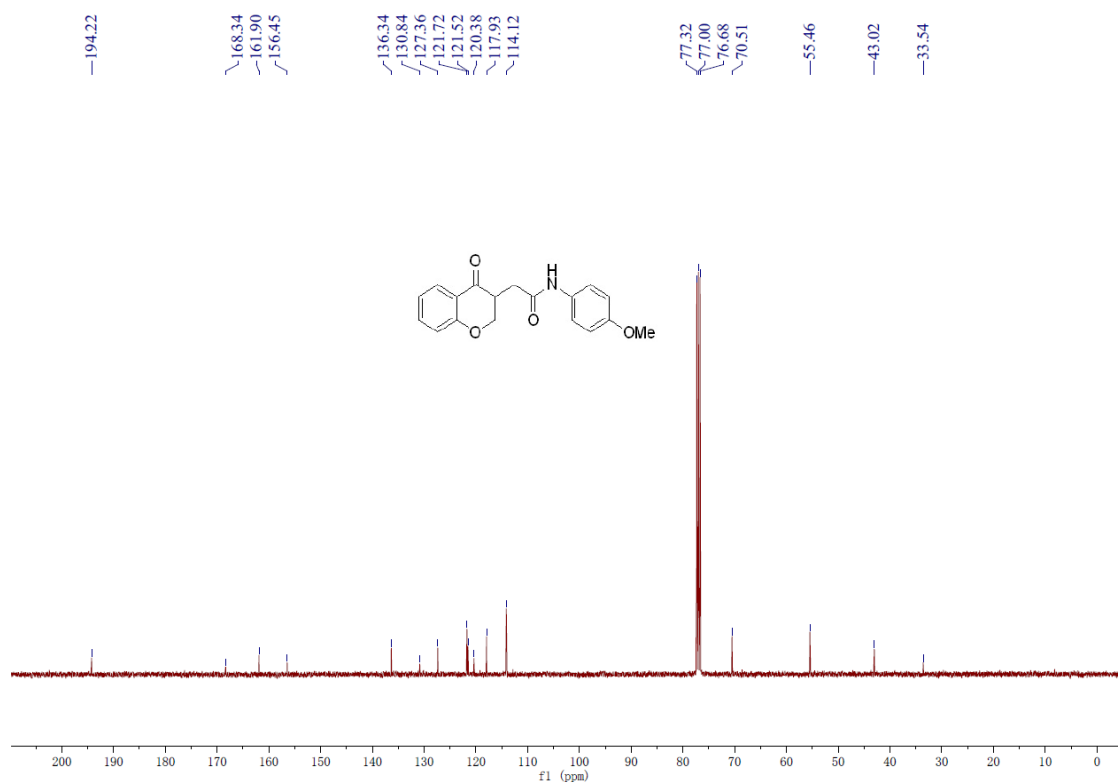


<sup>13</sup>C spectra of **3ab**

***N*-(4-methoxyphenyl)-2-(4-oxochroman-3-yl)acetamide (3ac)**

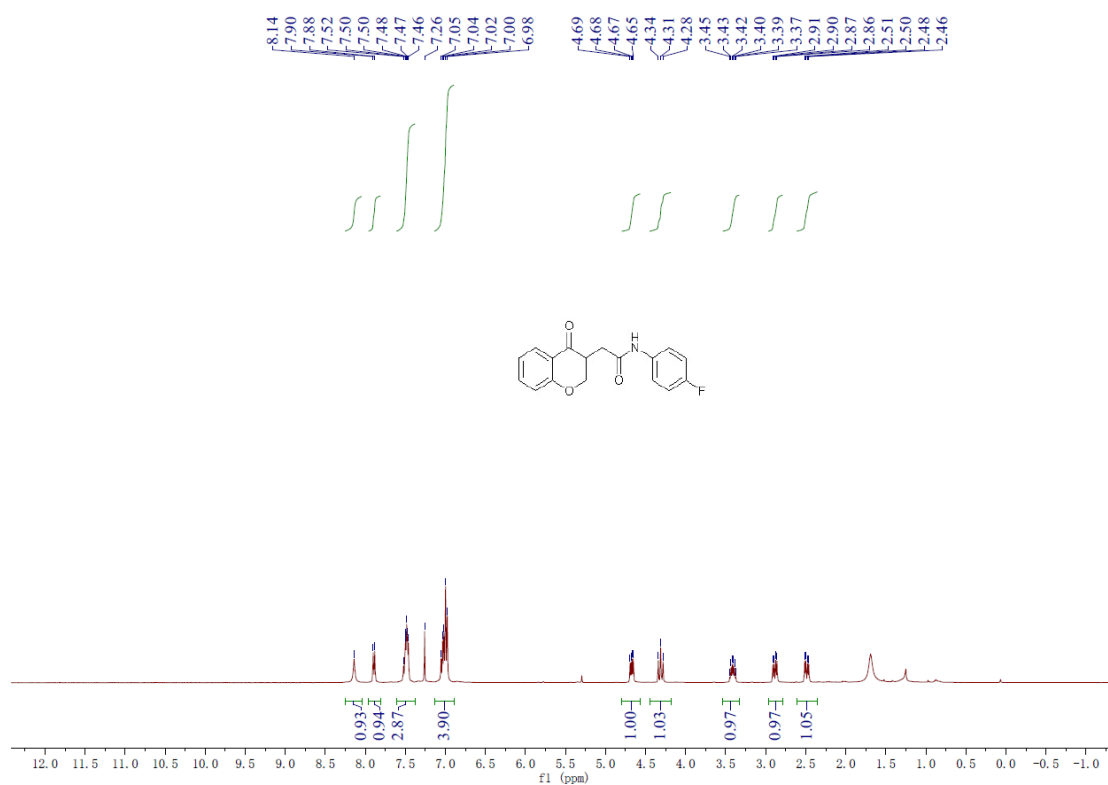


<sup>1</sup>H spectra of **3ac**

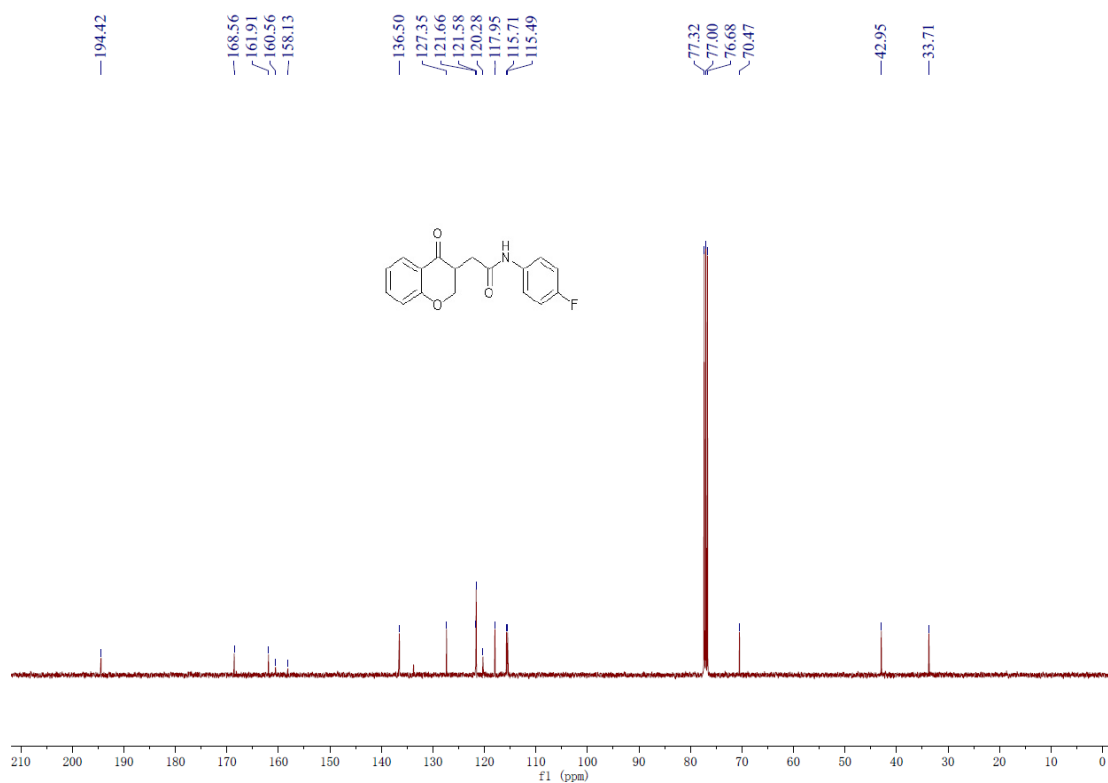


<sup>13</sup>C spectra of **3ac**

***N*-(4-fluorophenyl)-2-(4-oxochroman-3-yl)acetamide (3ad)**

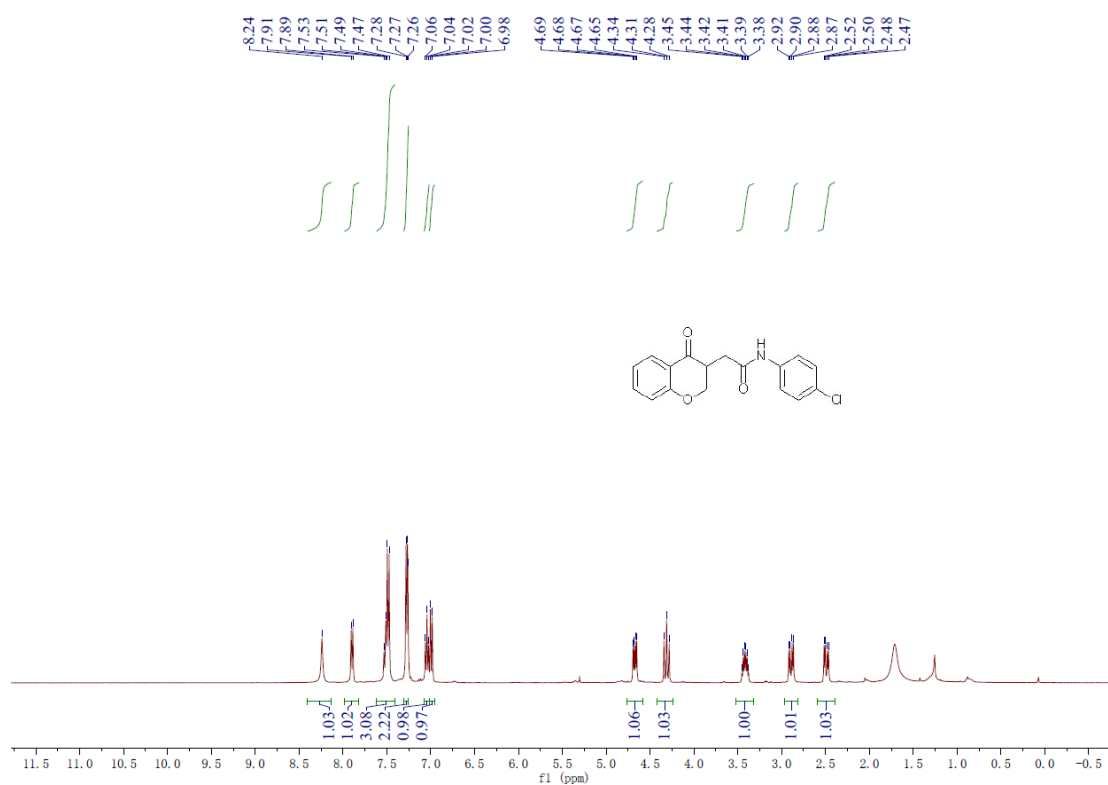


<sup>1</sup>H spectra of 3ad

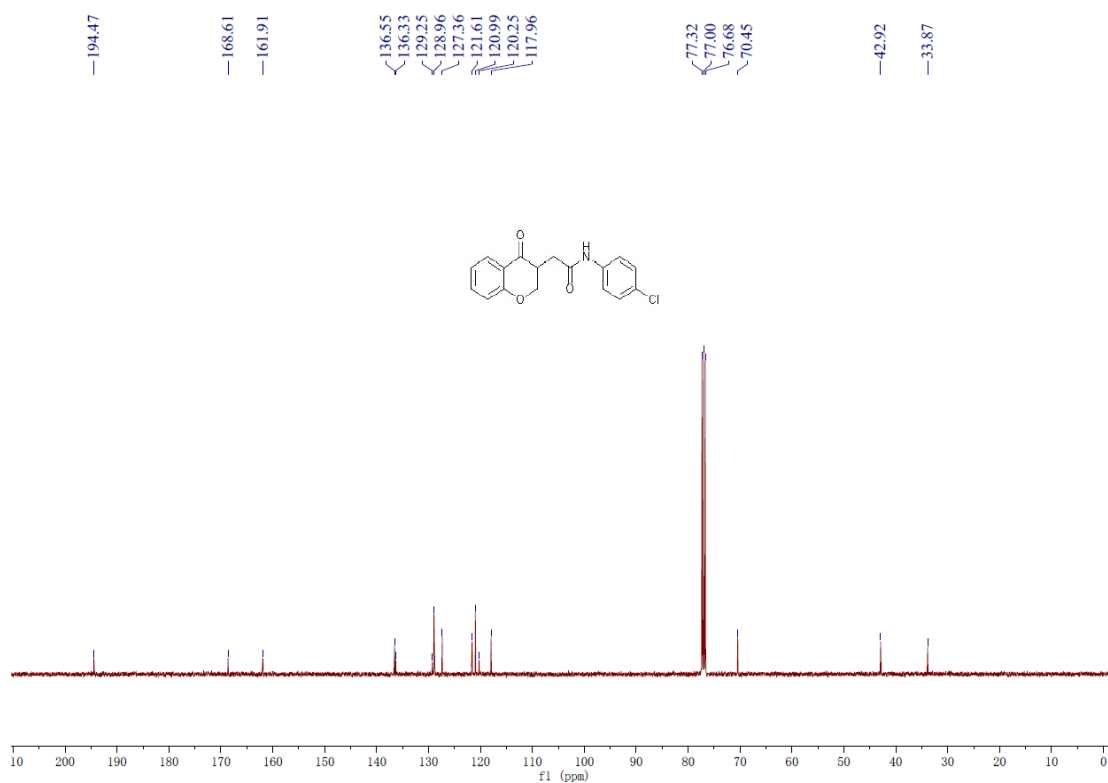


<sup>13</sup>C spectra of 3ad

***N*-(4-chlorophenyl)-2-(4-oxochroman-3-yl)acetamide (3ae)**

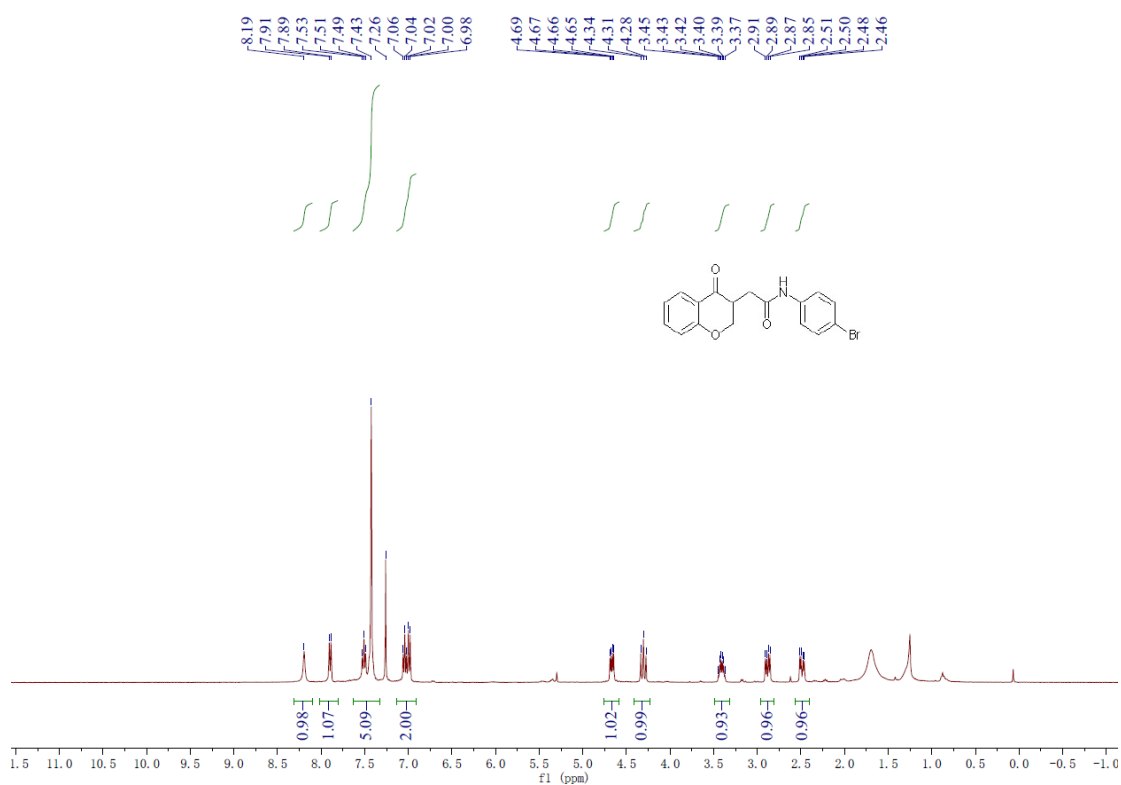


<sup>1</sup>H spectra of 3ae

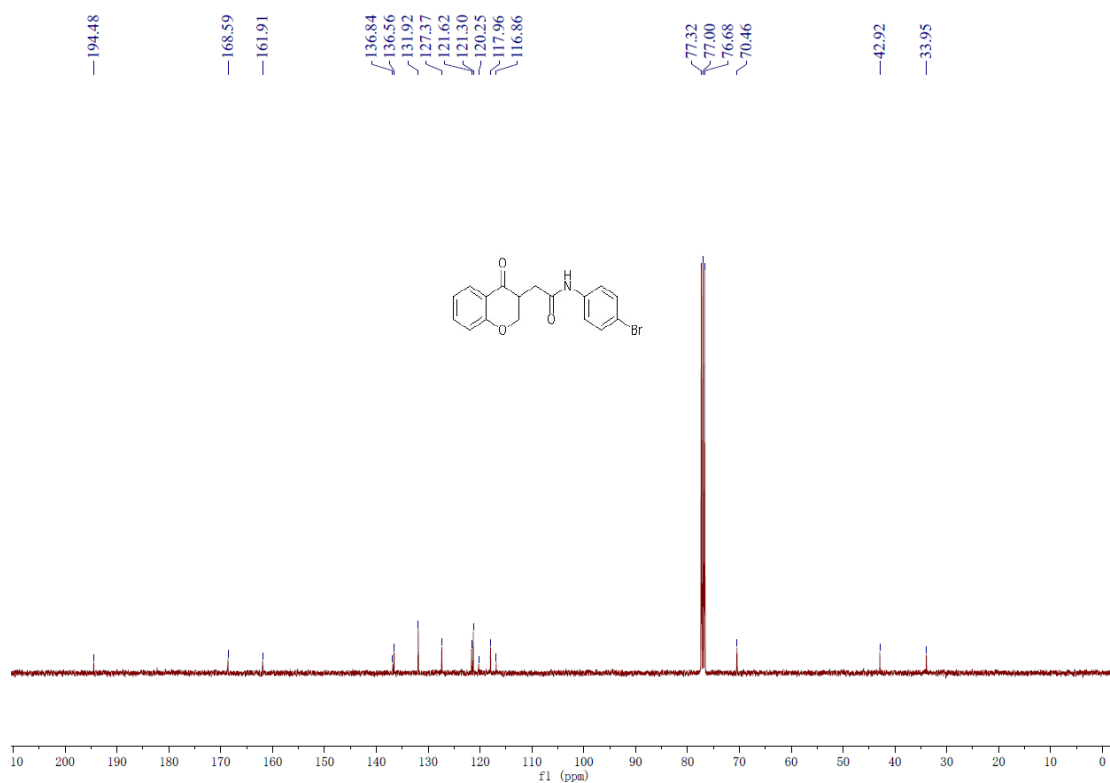


<sup>13</sup>C spectra of 3ae

***N*-(4-bromophenyl)-2-(4-oxochroman-3-yl)acetamide (3af)**

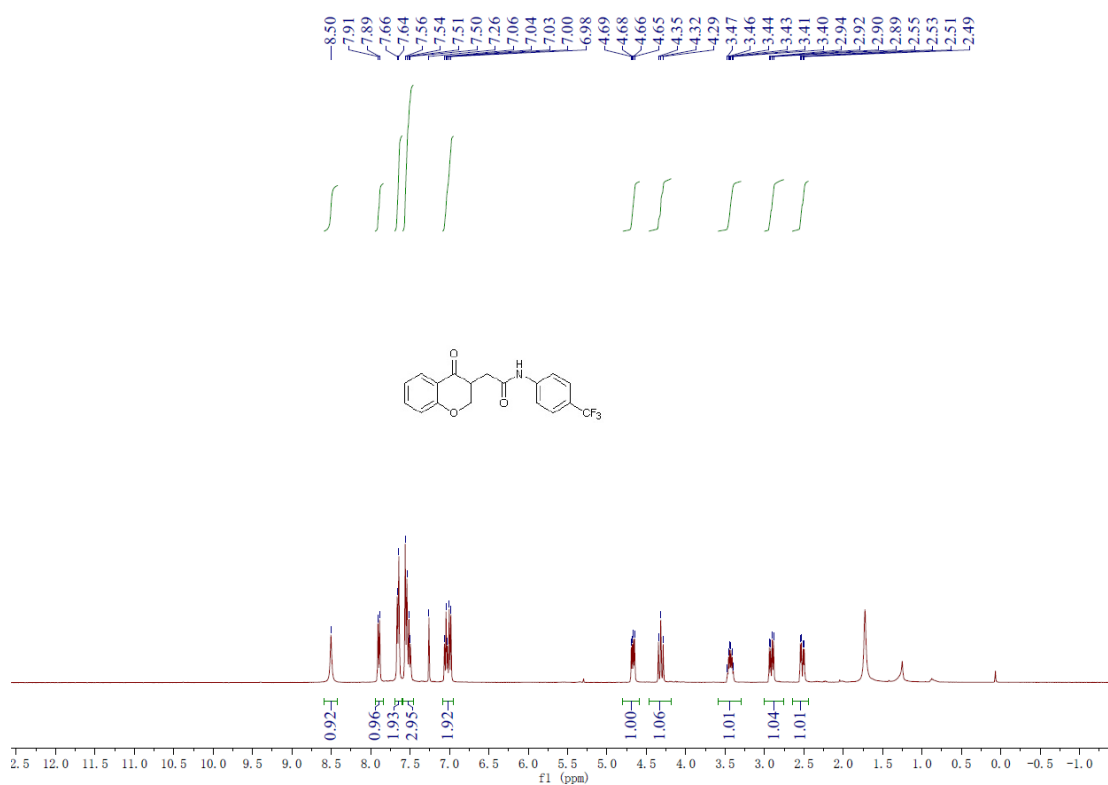


<sup>1</sup>H spectra of **3af**

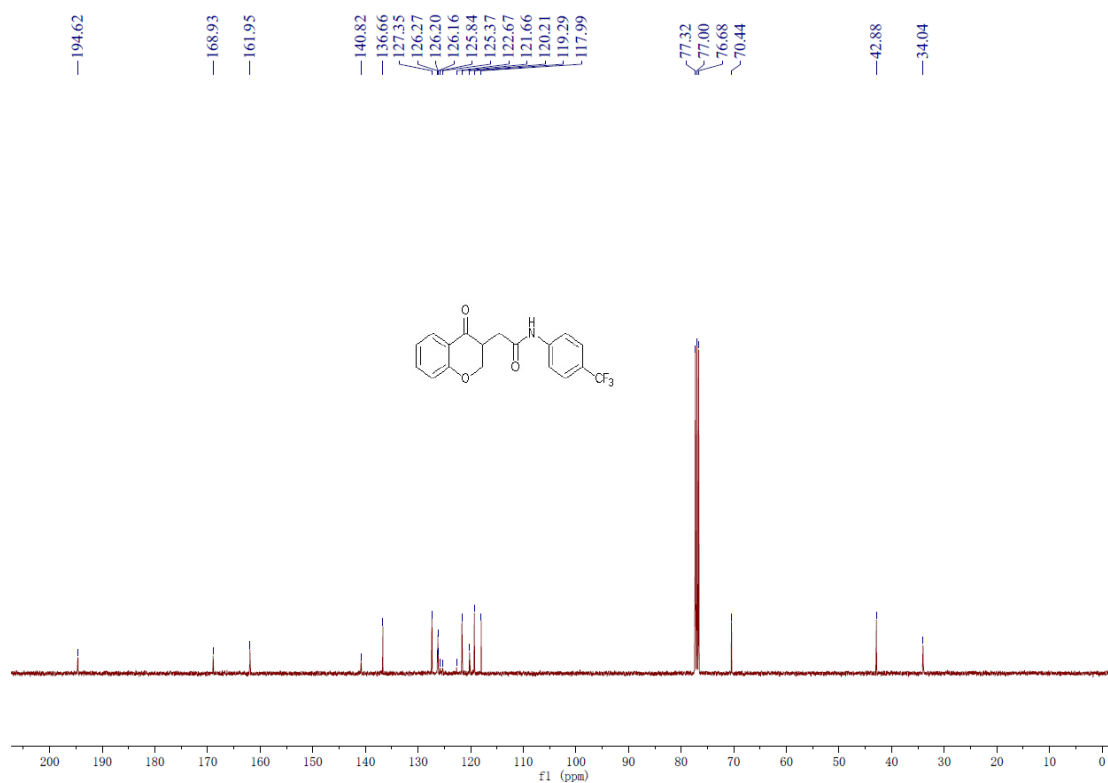


<sup>13</sup>C spectra of **3af**

**2-(4-oxochroman-3-yl)-N-(4-(trifluoromethyl)phenyl)acetamide (3ag)**



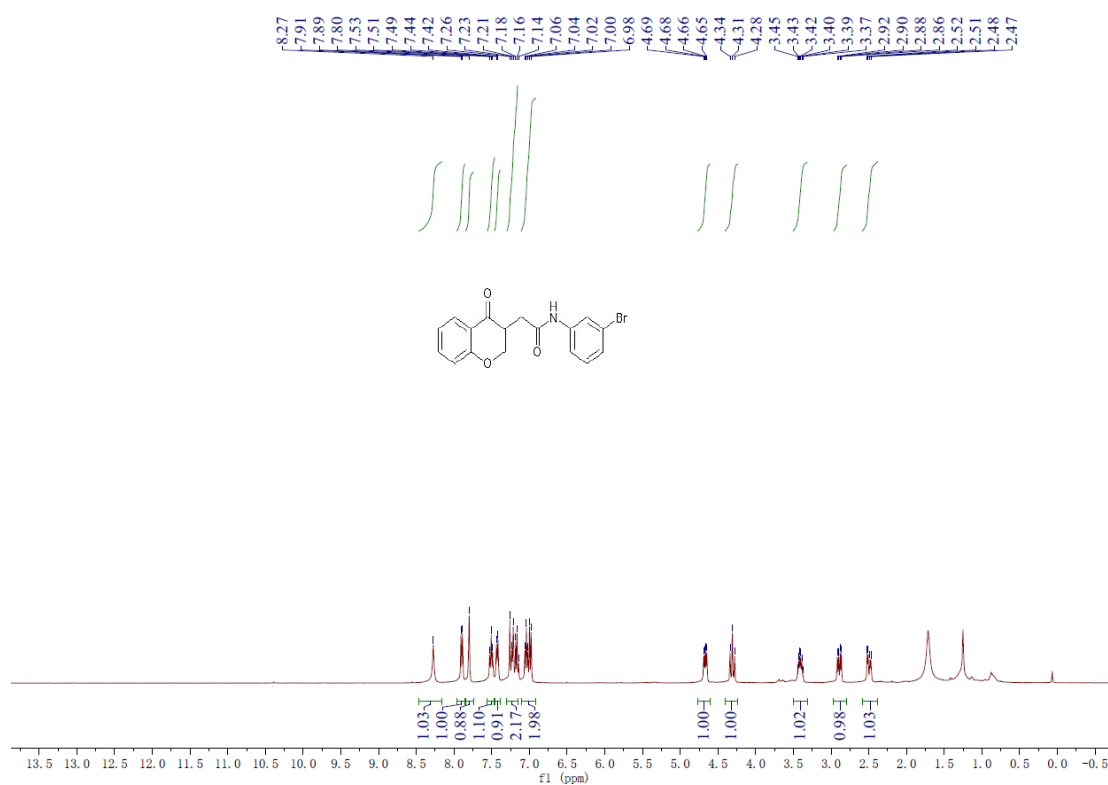
<sup>1</sup>H spectra of 3ag



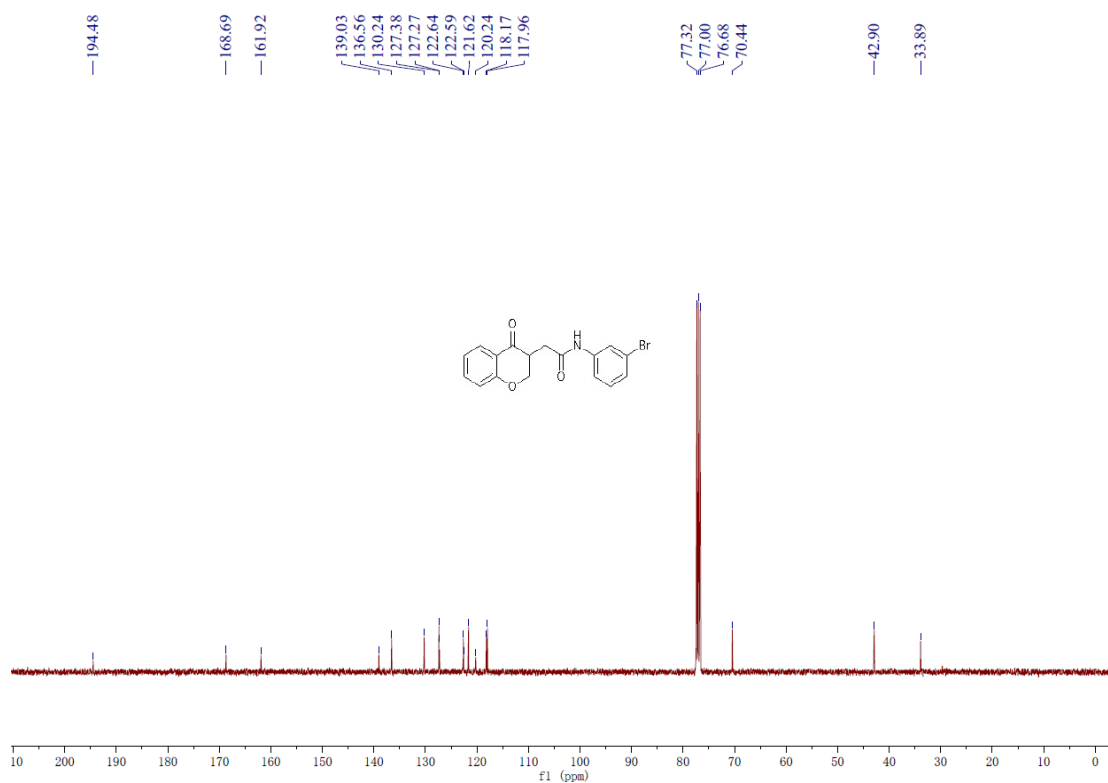
<sup>13</sup>C spectra of 3ag



***N*-(3-bromophenyl)-2-(4-oxochroman-3-yl)acetamide (3ah)**

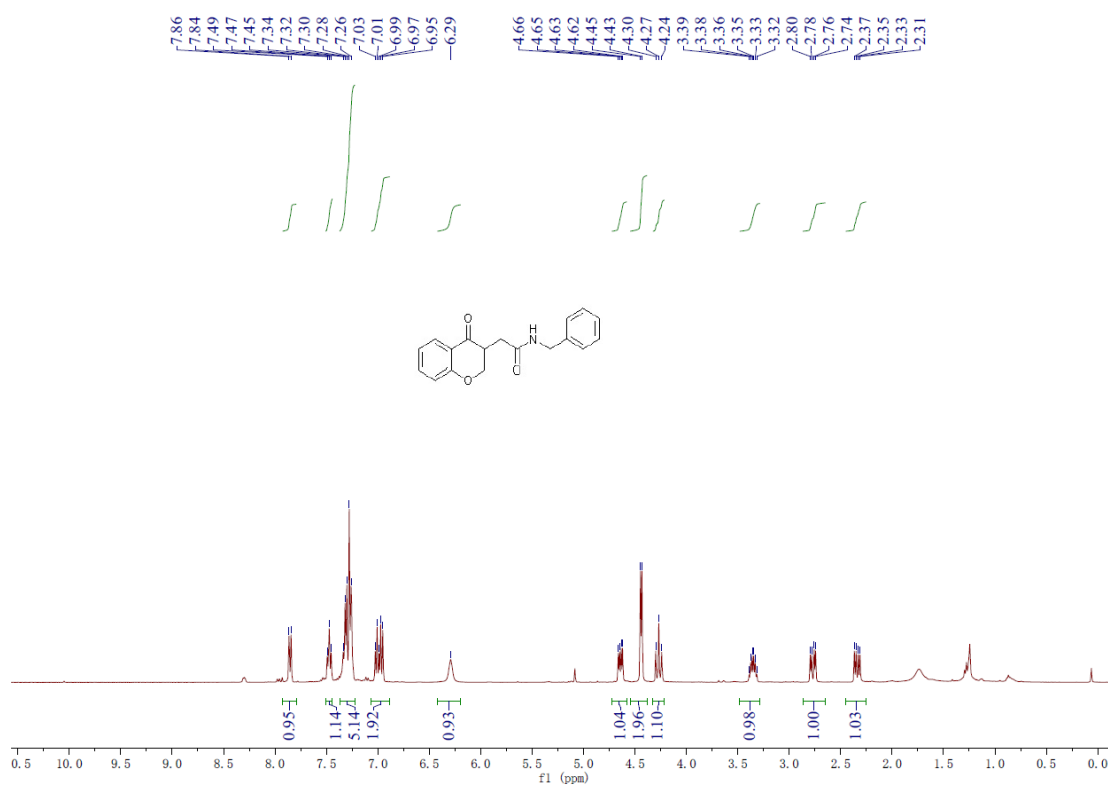


<sup>1</sup>H spectra of **3ah**

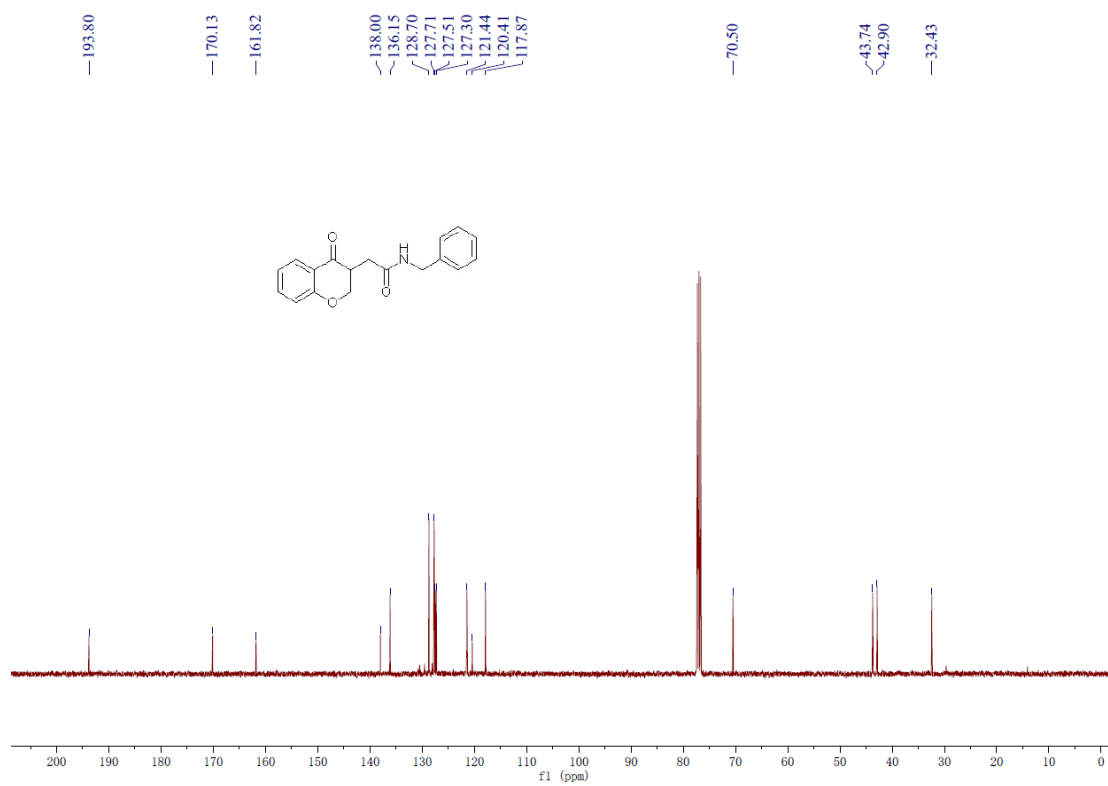


<sup>13</sup>C spectra of **3ah**

**N-benzyl-2-(4-oxochroman-3-yl)acetamide (3ai)**

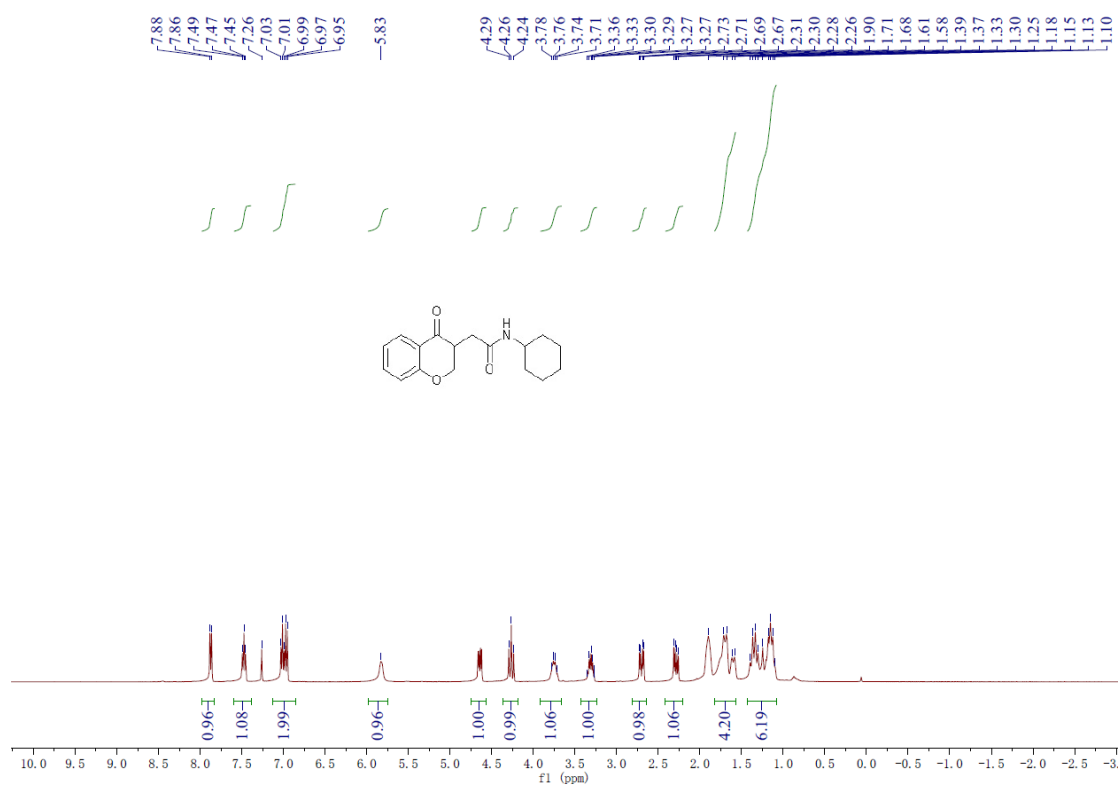


<sup>1</sup>H spectra of **3ai**

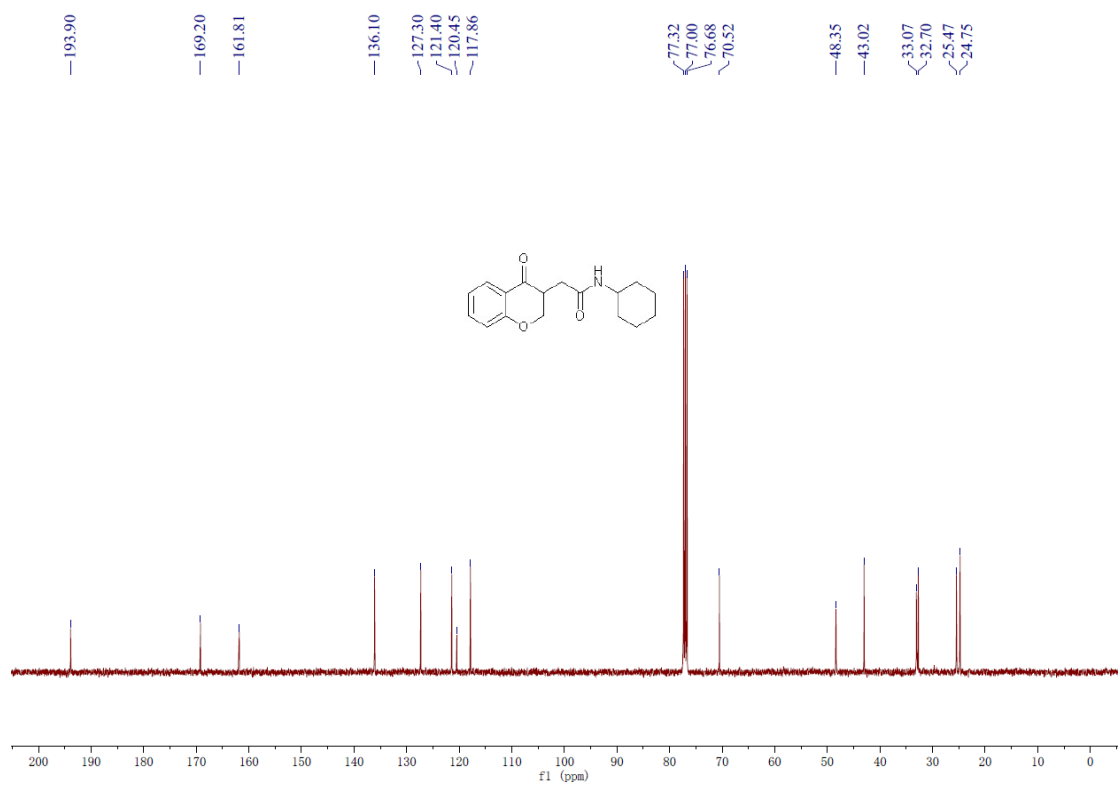


<sup>13</sup>C spectra of **3ai**

***N*-cyclohexyl-2-(4-oxochroman-3-yl)acetamide (3aj)**

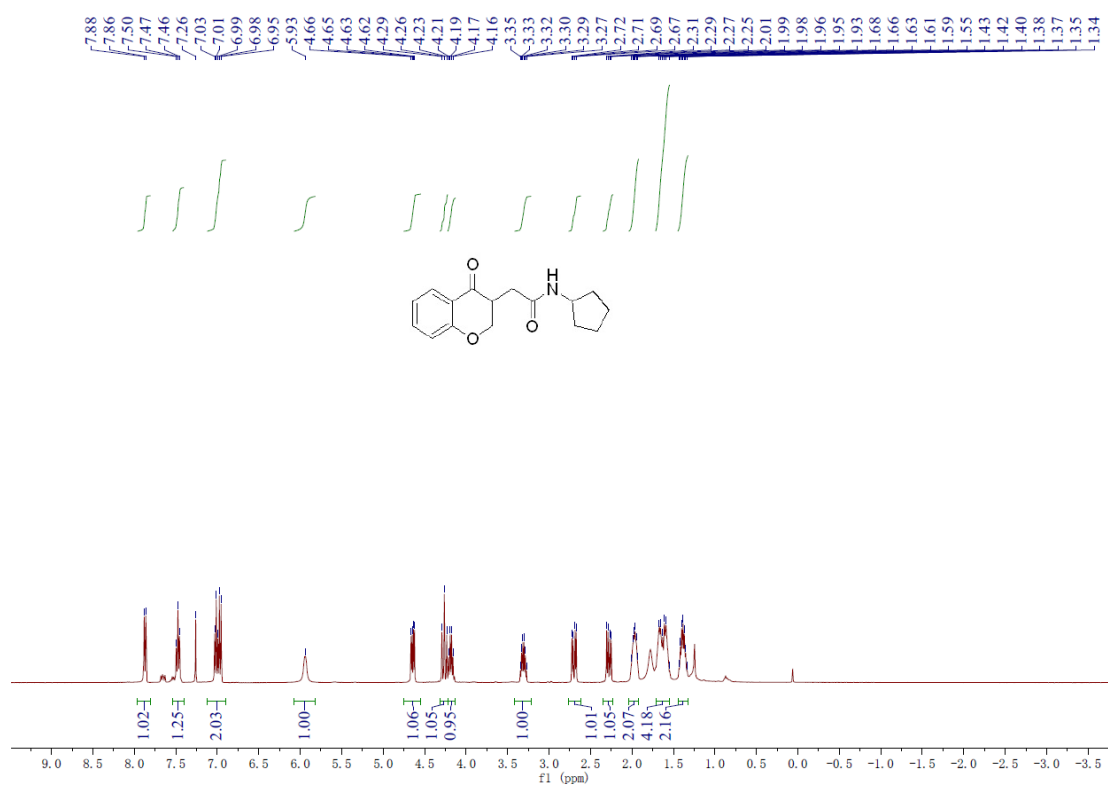


<sup>1</sup>H spectra of **3aj**

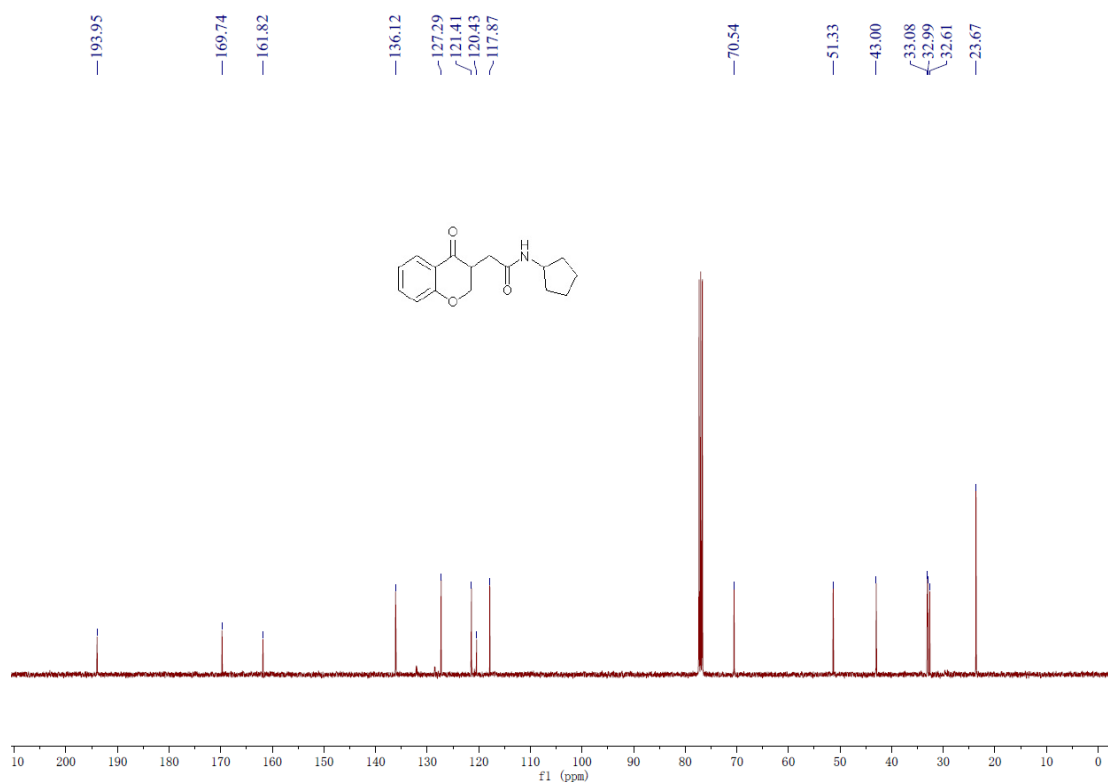


<sup>13</sup>C spectra of **3aj**

**N-cyclopentyl-2-(4-oxochroman-3-yl)acetamide (3ak)**

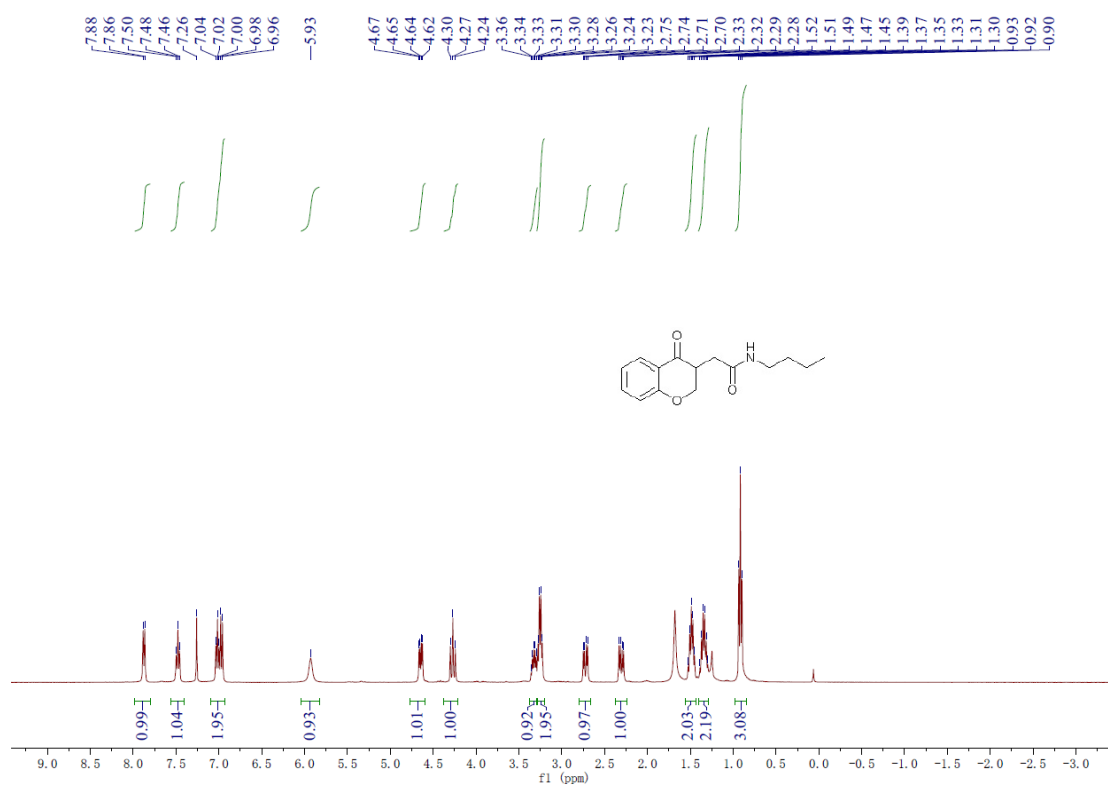


<sup>1</sup>H spectra of 3ak

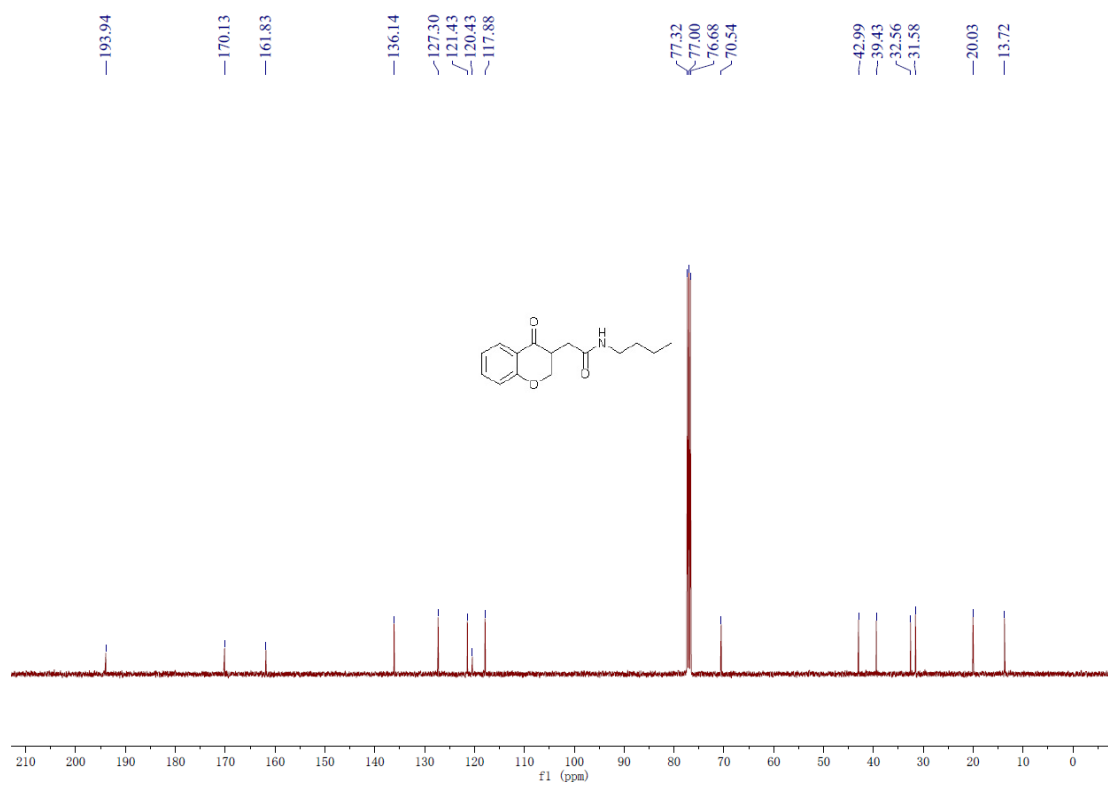


<sup>13</sup>C spectra of 3ak

**N-butyl-2-(4-oxochroman-3-yl)acetamide (3al)**

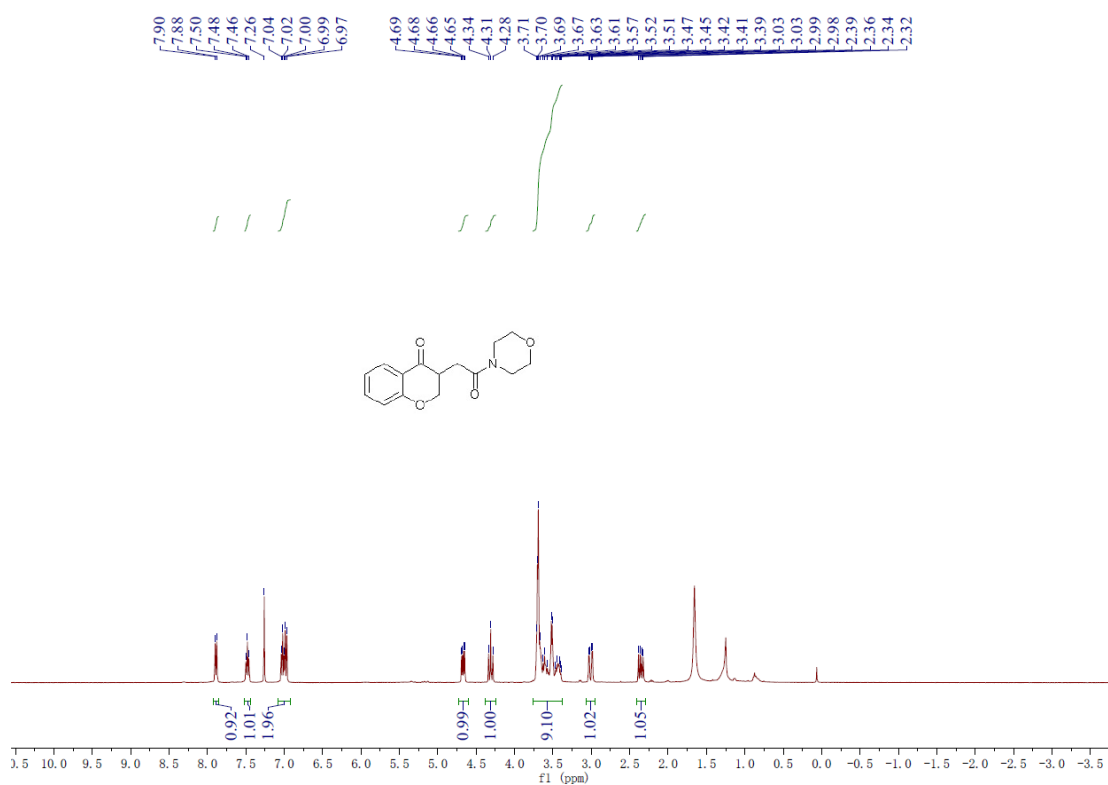


**<sup>1</sup>H spectra of 3al**

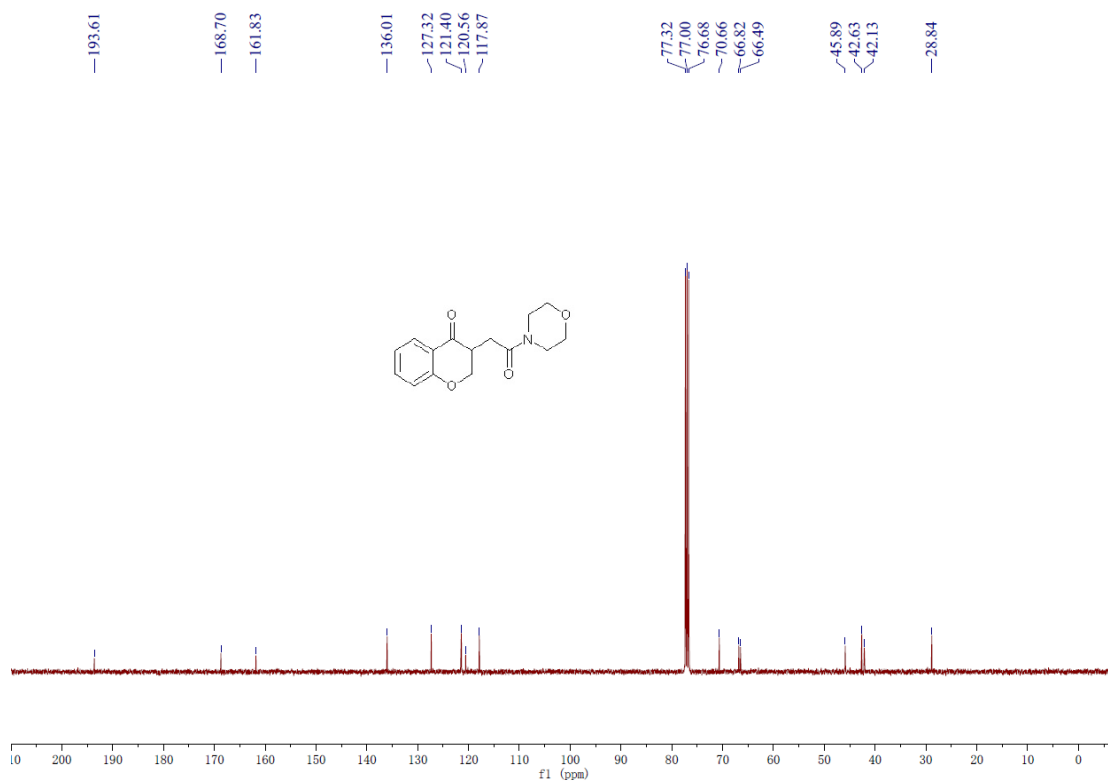


**<sup>13</sup>C spectra of 3al**

### 3-(2-morpholino-2-oxoethyl)chroman-4-one (3am)

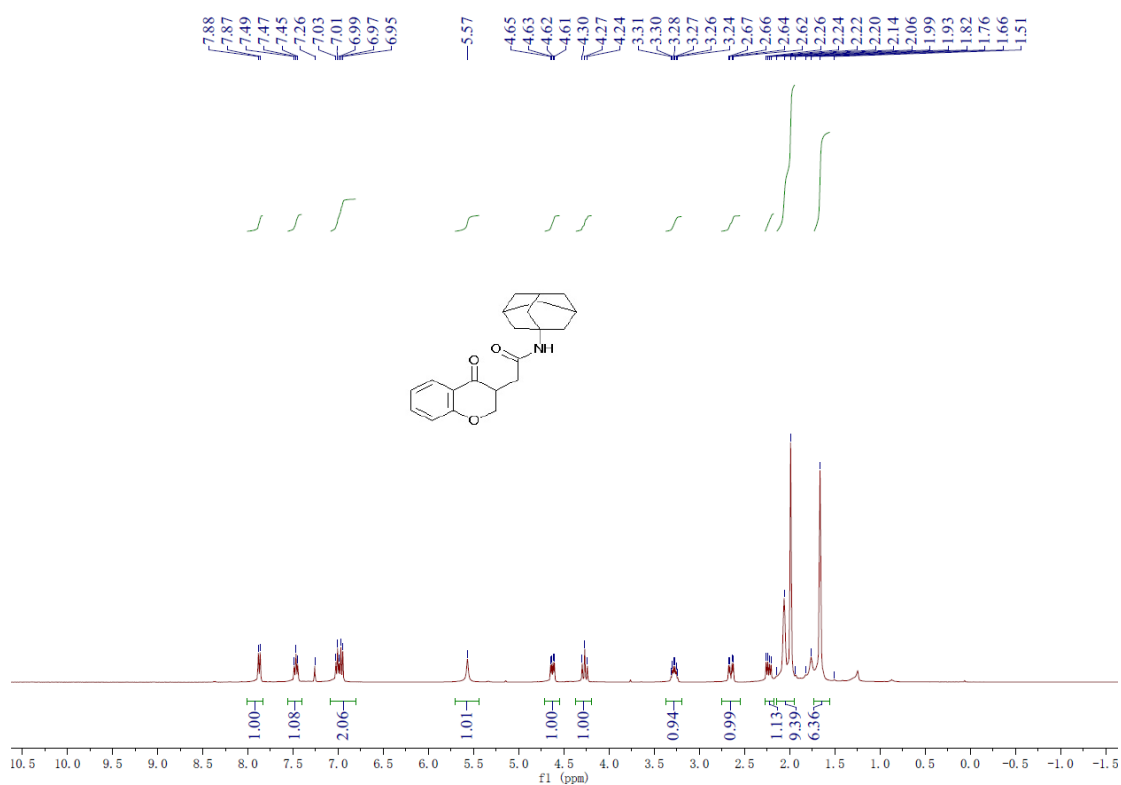


<sup>1</sup>H spectra of 3am

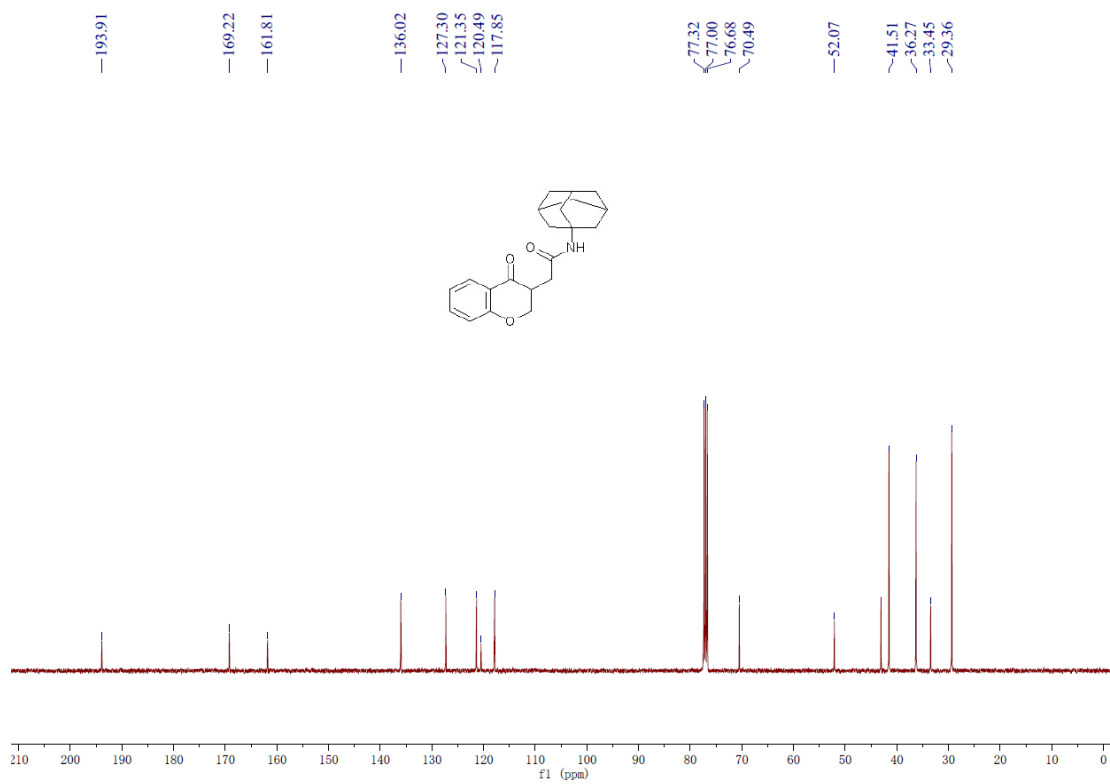


<sup>13</sup>C spectra of 3am

**N-(adamantan-1-yl)-2-(4-oxochroman-3-yl)acetamide (3an)**



<sup>1</sup>H spectra of **3an**



<sup>13</sup>C spectra of **3an**