Synthesis and identification by GC-MS of 3-(pyridin-2-yl)-thiazolidinethiones

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INTRODUCTION

Thiazolidinones are an important group of heterocyclic compounds that has attracted considerable attention due facile synthesis and wide range of pharmaceutical activities. Transformation of a carbonyl functional group into thiocarbonyl has been an important interest to synthetic organic chemists for many years. Lawesson’s Reagent is the most widely used agent for such a transformation. Besides, the bioisosteric replacement of carbonyl group by thiocarbonyl may increase biological activity such as in thionation of 4-thioxo-thiazolidin-2-ones.

With this, the purpose of this study was to synthesize new compounds thiocarbonyl derivatives (thiazolidinethiones) arising from 3-(pyridin-2-yl)-thiazolidinones using Lawesson’s Reagent as thionating agent and identified by GC-MS.

RESULTS AND DISCUSSION

For the synthesis of thiazolidinones 3a-h was utilized ultrasonic irradiation methodology according Gouvea et al. The proposed substances 4a-h were obtained with considerable yield in two steps as shown in Scheme 1 through addition 0.5 mmol 3a-h, 1 mmol Lawesson’s reagent in dry toluene (25 mL), and the reaction mixture was refluxed with stirring for 12 h (monitored by TLC). The characterization of 3a-h and 4a-h was performed by GC-MS, considering that the confirmation by 1H and 13C NMR has only been done with compounds 3a-h.

Scheme 1.

Table 1. Mass spectroscopy data of compounds 3a-h and 4a-h.

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>M.W.</th>
<th>GC-MS: m/z(%)</th>
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<tbody>
<tr>
<td>a</td>
<td>290</td>
<td>306</td>
<td>306[M+]3(3)</td>
</tr>
<tr>
<td>b</td>
<td>274</td>
<td>290</td>
<td>290[M+]4(4)</td>
</tr>
<tr>
<td>c</td>
<td>301</td>
<td>317</td>
<td>317[M+]6(6)</td>
</tr>
<tr>
<td>d</td>
<td>290</td>
<td>306</td>
<td>306[M+]2(2)</td>
</tr>
<tr>
<td>e</td>
<td>274</td>
<td>290</td>
<td>290[M+]4(4)</td>
</tr>
<tr>
<td>f</td>
<td>286</td>
<td>302</td>
<td>302[M+]5(5)</td>
</tr>
<tr>
<td>g</td>
<td>301</td>
<td>317</td>
<td>317[M+]4(4)</td>
</tr>
</tbody>
</table>

M.W. – Molecular Weight, *Only shown the molecular ion [M+] in mass-to-charge ratio m/z.

Scheme 2. Common fragmentation of the compounds 4a-h.

The results shown in Table 1 identifies the thionation by GC-MS, either by increasing 16 m/z units of molecular ion [M+] as own fragmentation pattern in relation to thiazolidinones Scheme 2.

CONCLUSION

In summary, thiazolidinethiones 4a-h were obtained in good yields using an easy synthesis. Our preliminary results, guides us for further investigations of this compound class regarding biological activities like antimicrobial and antioxidant.

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REFERENCES


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