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Crystal structure of (E)-7-hydroxy-2-((6-methoxypyridin-2-yl)methylene)-3,4-dihydronaphthalen-1(2H)-one, C$_{17}$H$_{15}$NO$_3$

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Abstract

C$_{17}$H$_{15}$NO$_3$, triclinic, $P\overline{1}$ (no. 2), $a = 7.5016(4)$ Å, $b = 13.6750(8)$ Å, $c = 14.8557(9)$ Å, $\alpha = 115.469(6)$ $^\circ$, $\beta = 91.726(5)$ $^\circ$, $\gamma = 97.325(5)$ $^\circ$, $V = 1358.48(15)$ Å$^3$, $Z = 4$, $R_{gt}(F) = 0.0442$, $wR_{ref}(F^2) = 0.1095$, $T = 100$ K.

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The molecular structure is shown in the figure. Displacement ellipsoids are drawn at the 40% probability level.

Table 1: Data collection and handling.

<table>
<thead>
<tr>
<th>Crystal:</th>
<th>Yellow block</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size:</td>
<td>$0.13 \times 0.12 \times 0.10$ mm</td>
</tr>
<tr>
<td>Wavelength:</td>
<td>Mo $K\alpha$ radiation (0.71073 Å)</td>
</tr>
<tr>
<td>$\mu$:</td>
<td>0.10 mm$^{-1}$</td>
</tr>
<tr>
<td>Diffractometer, scan mode:</td>
<td>SuperNova</td>
</tr>
<tr>
<td>$\theta_{\text{max}}$, completeness:</td>
<td>25.5 $^\circ$, 99%</td>
</tr>
<tr>
<td>$N(hkl)<em>{\text{measured}}$, $N(hkl)</em>{\text{unique}}$, $R_{\text{int}}$:</td>
<td>9244, 5038, 0.025</td>
</tr>
<tr>
<td>Criterion for $I_{\text{obs}}$, $N(hkl)_{\text{gt}}$:</td>
<td>$I_{\text{obs}} &gt; 2 \sigma(I_{\text{obs}})$, 4080</td>
</tr>
<tr>
<td>$N(\text{param})_{\text{refined}}$:</td>
<td>383</td>
</tr>
<tr>
<td>Programs:</td>
<td>CrysAlis$^\text{PRO}$ [1], SHELX [2, 3]</td>
</tr>
</tbody>
</table>

Table 1 contains crystallographic data and Table 2 contains the list of the atoms including atomic coordinates and displacement parameters.

Source of material

Drop 5 mL (25%) sodium hydroxide aqueous solution to 7-hydroxy-3,4-dihydronaphthalen-1(2H)-one and 6-methoxypicolinaldehyde, then add 10 mL methanol and stir at room temperature for 3 h. Silica gel thin layer method was used to monitor the process control chromatography (TLC, 254 nm). When the reaction was stopped, the precipitate was filtered from the reaction and dissolved with ethyl acetate. The organic phase was washed successively by water and brine, and dried with anhydrous sodium sulfate. After filtration, the ethyl acetate was condensed under vacuo to yield a white solid, which was purified by silica gel column chromatography (petroleum ether: ethyl acetate = 1:2, v/v). Appropriate crystals of the title compound were obtained by recrystallization from dichloromethane and methanol (1:1, v/v) and dried in vacuo at 65 $^\circ$C for 3 h.

Experimental details

The H atoms were placed in idealized positions and treated as riding on their parent atoms, with $d$(C–H) = 0.97 Å (methylene), $U_{iso}$(H) = 1.2$U_{eq}$(C), and $d$(C–H) = 0.93 Å (aromatic), $U_{iso}$(H) = 1.2$U_{eq}$(C).
In inflammatory neurodegenerative diseases of the central nervous system (CNS), the microglia are activated and polarized into pro-inflammatory M1 phenotype. Neuroinflammation is a mediator and key factor in the progression of brain diseases [4]. The inflammatory process may lead to excessive release of inflammatory mediators or cytokines, such as tumor necrosis factor-α (TNF-α), interleukin (IL)-6, and so on [5]. Existing studies have showed that 3,4-dihydropyranolate-1(2H)-one (DHN) derivatives have anti-tumor and anti-inflammatory activity as modifiers for allergic and inflammatory responses, however, few studies on DHN derivatives against neuroinflammation have been conducted. Thus it is promising to synthesize novel pyridine substituted derivatives to fight neuroinflammation [6]. Some DHN derivatives had been designed and synthesized as anti-inflammatory agents [7, 8]. Our group investigated DHN derivatives based on pyridine groups and tested their anti-neuroinflammatory activity. The results showed that the methoxy substituted compounds have better activity.

The title compound crystallizes in the triclinic space group P1. Bond lengths and angles are all in the expected ranges [9]. There are two drug molecules in the asymmetric unit. 6-Methoxypyrindine and carbonyl groups adopt the E stereochemistry. Because of the distorting effect of 3,4-dihydropyranolate-1(2H)-one, the 7-hydroxyphenyl and 6-methoxy pyridine groups are not coplanar. This twisted configuration may increase the likelihood of interactions.
with bioactive molecules, for the purposes of creating more potent biological activity [10].

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**Conflict of interest statement:** The authors declare no conflicts of interest regarding this article.

**References**