Lin Ling Gan and Bo Wang*

Crystal structure of 3-amino-2-hydroxy-6-methoxybenzamide hydrate, $C_{16}H_{22}N_4O_7$

Table 1: Data collection and handling.

Crystal:	Block, clear light yellow
Size:	$0.28 \times 0.25 \times 0.22$ mm
Wavelength:	Mo $K\alpha$ radiation (0.71073 Å)
μ :	0.12 mm^{-1}
Diffractometer, scan mode:	Bruker APEX-II, φ and ω -scans
$\theta_{\max}$, completeness:	25° , >99%
$N(hkl)_{\text{measured}}$, $N(hkl)_{\text{unique}}$, R_{int} :	4323, 1488, 0.030
Criterion for I_{obs} , $N(hkl)_{\text{gt}}$:	$I_{\text{obs}} > 2 \sigma(I_{\text{obs}})$, 1249
$N(\text{param})_{\text{refined}}$:	134
Programs:	Bruker programs [1], SHELX [2, 3], OLEX2 [4]

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Abstract

$C_{16}H_{22}N_4O_7$, orthorhombic, $Fdd2$ (no.43), $a = 26.279(15)$ Å, $b = 30.020(17)$ Å, $c = 4.404(2)$ Å, $V = 3474(3)$ Å³, $Z = 8$, $R_{\text{gt}}(F) = 0.0332$, $wR_{\text{ref}}(F^2) = 0.0899$, $T = 296(2)$ K.

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The molecular structure and the water molecule are shown in the figure. Table 1 contains crystallographic data and Table 2 contains the list of the atoms including atomic coordinates and displacement parameters.

Source of material

A cool solution of 2-hydroxy-6-methoxy-3-nitrobenzamide (636 mg, 3 mmol) in methanol (6 mL) was degassed by hydrogen, then platinum on activated carbon (159 mg, 10% Pt, ca 50% moisture) was added and degassed by hydrogen again, after this the mixture was stirred under hydrogen atmosphere at room temperature overnight. The reaction mixture was filtered and the cake was washed by methanol (2 mL $\times$ 2), the filtrates were combined, dried over and concentrated,

Table 2: Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å²).

Atom	<i>x</i>	<i>y</i>	<i>z</i>	$U_{\text{iso}}^*/U_{\text{eq}}$
O1W	−0.500000	−0.500000	−1.1274(8)	0.0585(9)
O1	−0.34806(7)	−0.33777(7)	−1.2509(6)	0.0636(7)
H1	−0.355633	−0.362919	−1.193975	0.095*
O2	−0.39858(8)	−0.40715(7)	−1.2076(6)	0.0688(7)
O3	−0.50388(7)	−0.35372(6)	−1.7921(5)	0.0582(6)
C1	−0.37661(11)	−0.28003(8)	−1.5568(8)	0.0509(8)
C2	−0.38391(10)	−0.32265(8)	−1.4436(6)	0.0452(7)
C3	−0.42667(10)	−0.34784(8)	−1.5202(7)	0.0415(6)
C4	−0.43262(11)	−0.39229(8)	−1.3770(7)	0.0475(7)
C5	−0.46207(10)	−0.32867(8)	−1.7228(6)	0.0430(7)
C6	−0.54232(11)	−0.33493(11)	−1.9760(8)	0.0633(9)
H6A	−0.569070	−0.356291	−2.004951	0.095*
H6B	−0.555802	−0.308872	−1.878607	0.095*
H6C	−0.528207	−0.326869	−2.169370	0.095*
C7	−0.45379(11)	−0.28711(8)	−1.8409(7)	0.0509(8)
H7	−0.476992	−0.274821	−1.976579	0.061*
C8	−0.41096(12)	−0.26353(8)	−1.7583(8)	0.0548(8)
H8	−0.405411	−0.235561	−1.842781	0.066*
N1	−0.33223(11)	−0.25628(9)	−1.4710(9)	0.0738(10)
H1A	−0.3366(14)	−0.2307(8)	−1.487(12)	0.089*
H1B	−0.3179(15)	−0.2672(12)	−1.270(12)	0.089*
N2	−0.47395(9)	−0.41599(7)	−1.4248(8)	0.0592(8)
H2A	−0.477393	−0.441582	−1.339485	0.071*
H2B	−0.497535	−0.405899	−1.541441	0.071*
H1W	−0.5215(13)	−0.4966(16)	−1.030(11)	0.103(18)*

*Corresponding author: Bo Wang, Dean's Office, School of Pharmacy, Chongqing Medical University, Chongqing 400016, P.R. China, e-mail: wangbo@cqmu.edu.cn

Lin Ling Gan: Chongqing Engineering Research Center of Pharmaceutical Sciences, School of Pharmacy, Chongqing Medical and Pharmaceutical College, Chongqing 401331, P.R. China

which was purified by column chromatography over silica gel eluting with a gradient of methanol/dichloromethane (v/v, 0–3%) to afford the white solid. Yield, 426 mg, 78%. The title compound was dissolved in dichloromethane, and the

solvent was evaporated slowly at room temperature. After three days, light yellow crystals were obtained.

Experimental details

Data reduction was carried out using SAINT+ and SADABS [1]. The structure was determined by intrinsic phasing routines in the SHELXT program [2] and refined by full-matrix least-squares methods in SHELXL [3] by using Olex 2 [4]. All of the hydrogen atoms were placed in the calculated positions.

Discussion

Aminobenzamide derivatives are an important class of organic compounds, which have a wide range of applications in the areas of medicine and chemical industry [5, 6]. For instance, aminobenzylamides are widely used as anti-cancer drugs, anti-inflammatory analgesics and antilipemic drugs in the field of medicine, and as insecticides and fungicides in the field of pesticides [7]. Additionally, aminobenzylamides can also be used to synthesize quinazolinone, aminobenzene, benzotriazinone and other chemicals with important application value in organic synthesis [8, 9]. Although 3-amino-2-hydroxy-6-methoxybenzamide is a known compound, its single crystal structure has not been reported yet. Therefore, in consideration of the importance of this compound in the field of medicinal chemistry, 2-hydroxy-6-methoxy-3-nitrobenzamide was synthesized from commercial material 2-hydroxy-6-methoxy-3-nitrobenzamide, and also its crystal structure will be reported. The bond lengths and angles in the title molecule are in normal ranges. The intramolecular OH...O hydrogen bond [10] and the NH...O hydrogen bond [11] are both typical for topologies present in the title structure.

In a word, 3-amino-2-hydroxy-6-methoxybenzamide was synthesized under a mild condition, which can be readily used as a key intermediate to develop new drugs, novel reagent and advanced materials.

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