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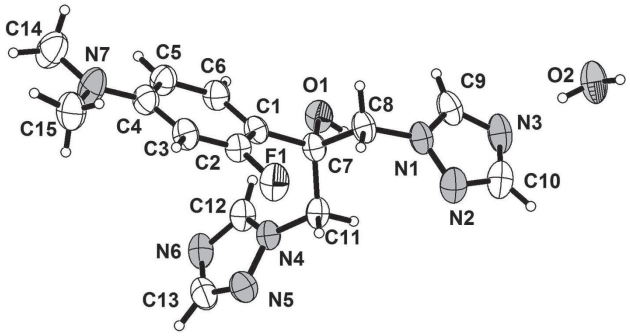
Crystal structure of 2-(4-(dimethylamino)-2-fluorophenyl)-1,3-bis(1*H*-1,2,4-triazol-1-yl) propan-2-ol monohydrate, $C_{15}H_{20}FN_7O_2$



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Abstract

$C_{15}H_{20}FN_7O_2$, triclinic, $P\bar{1}$ (no. 2), $a = 5.8088(18)$ Å, $b = 11.667(4)$ Å, $c = 13.104(4)$ Å, $\alpha = 68.724(4)°$, $\beta = 84.660(5)°$, $\gamma = 84.859(4)°$, $V = 822.4(4)$ Å^3, $Z = 2$, $R_{gt}(F) = 0.0501$, $wR_{ref}(F^2) = 0.1394$, $T = 293(2)$ K.

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The asymmetric unit of the title crystal structure is shown in the figure. Tables 1 and 2 contain details of the measurement method and a list of the atoms including atomic coordinates and displacement parameters.

Table 1: Data collection and handling.

Crystal:	Colourless block
Size:	0.28 × 0.22 × 0.18 mm
Wavelength:	Mo $K\alpha$ radiation (0.71073 Å)
μ:	1.1 cm^{-1}
Diffractometer, scan mode:	Bruker APEX-II, φ and ω
$2\theta_{max}$, completeness:	50°, 98.4%
$N(hkl)_{measured}$, $N(hkl)_{unique}$, R_{int}:	4390, 2838, 0.024
Criterion for I_{obs}, $N(hkl)_{gt}$:	$I_{obs} > 2\ \sigma(I_{obs})$, 1857
$N(param)_{refined}$:	229
Programs:	DIAMOND [1], SHELX [2], Bruker programs [3]

Source of material

Fluconazole ($C_{13}H_{12}F_2N_6O$, 20 mg) was dissolved in a water and DMF (v:v = 4:1, 5 mL) solution. Then the solution was transferred to a Teflon-lined stainless vessel and heated to 313 K for 72 h. It was then cooled to room temperature at a rate of 1 K/h to afford colorless block crystals of the title compound in *ca*. 30% yield.

Experimental details

H atoms bonded to aromatic and methylene C atoms were positioned geometrically (C—H = 0.93 and 0.97 Å, respectively) and included in the refinement as the riding-model, with $U_{iso}(H) = 1.2U_{eq}(C)$. Hydroxyl and water H atoms were refined as rigid groups with O—H = 0.82 Å that were allowed to rotate but not tip, with $U_{iso}(H) = 1.5U_{eq}(O)$.

Comment

Fluconazole ($C_{13}H_{12}F_2N_6O$), 2-(2,4-difluorophenyl)-1,3-bis(1,2,4-triazol-1-yl)-propan-2-ol, a good antifungal agent, has been effectively applied in clinical treatment and also plays a great role in preventing the opportunistic fungal infections for HIV patients [4, 5]. In order to enhance fluconazole's biomedical application, numberous research groups have been engaged in new polymorphs of fluconazole, which resulted in the formation of several polymorphs,

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

Atom	*x*	*y*	*z*	U_{iso}*/U_{eq}
F1	0.0295(2)	0.37080(12)	0.55389(11)	0.0549(4)
O1	0.5429(3)	0.31464(15)	0.77918(13)	0.0481(4)
H1	0.5116	0.3183	0.8403	0.072*
N1	0.2555(3)	0.53275(16)	0.76014(15)	0.0454(5)
N2	0.0400(4)	0.56043(19)	0.79813(18)	0.0586(6)
N3	0.3129(4)	0.60236(19)	0.88777(17)	0.0607(6)
N4	0.1645(3)	0.14260(16)	0.83728(14)	0.0405(5)
N5	−0.0201(4)	0.07588(19)	0.84265(17)	0.0533(6)
N6	0.2914(4)	−0.04937(18)	0.90646(16)	0.0525(6)
N7	0.5224(4)	0.1484(2)	0.37448(18)	0.0665(7)
C1	0.3884(4)	0.29169(19)	0.62792(17)	0.0386(5)
C2	0.2352(4)	0.3080(2)	0.54847(18)	0.0413(5)
C3	0.2731(4)	0.2644(2)	0.46452(18)	0.0475(6)
H3	0.1618	0.2793	0.4139	0.057*
C4	0.4802(4)	0.1974(2)	0.45503(18)	0.0473(6)
C5	0.6400(4)	0.1815(2)	0.5327(2)	0.0500(6)
H5	0.7817	0.1392	0.5279	0.060*
C6	0.5937(4)	0.2264(2)	0.61587(18)	0.0455(6)
H6	0.7048	0.2124	0.6665	0.055*
C7	0.3383(4)	0.3394(2)	0.72168(17)	0.0386(5)
C8	0.2878(4)	0.4789(2)	0.67541(19)	0.0462(6)
H8A	0.4153	0.5165	0.6244	0.055*
H8B	0.1492	0.4973	0.6350	0.055*
C9	0.4139(5)	0.5588(2)	0.8145(2)	0.0535(7)
H9	0.5733	0.5477	0.8022	0.064*
C10	0.0879(5)	0.6018(2)	0.8747(2)	0.0625(8)
H10	−0.0272	0.6286	0.9166	0.075*
C11	0.1355(4)	0.27625(19)	0.79894(18)	0.0408(6)
H11A	0.1198	0.3023	0.8618	0.049*
H11B	−0.0063	0.3027	0.7609	0.049*
C12	0.3457(4)	0.0662(2)	0.87588(19)	0.0463(6)
H12	0.4910	0.0908	0.8807	0.056*
C13	0.0679(5)	−0.0370(2)	0.8848(2)	0.0568(7)
H13	−0.0195	−0.1047	0.8989	0.068*
C14	0.7389(5)	0.0819(3)	0.3639(3)	0.0767(9)
H14A	0.8587	0.1388	0.3342	0.115*
H14B	0.7248	0.0379	0.3156	0.115*
H14C	0.7777	0.0245	0.4347	0.115*
C15	0.3518(5)	0.1536(3)	0.3005(2)	0.0691(8)
H15A	0.2259	0.1048	0.3406	0.104*
H15B	0.4203	0.1220	0.2458	0.104*
H15C	0.2950	0.2375	0.2657	0.104*
O2	0.5413(3)	0.72228(15)	1.00420(13)	0.0637(6)
H2A	0.4974	0.6680	0.9860	0.096*
H2B	0.4817	0.7926	0.9817	0.096*

salts, solvates and cocrystals [6, 7]. In this context, we initial the solvothermal treatment of fluconazole in water and DMF solution. An unexpectant crystalline product resulting from the S_NAr reaction of the aryl fluoride, namely 2-(4-(dimethylamino)-2-fluorophenyl)-1,3-bis(1*H*-1,2,4-triazol-1-yl)propan-2-ol monohydrate ($C_{15}H_{20}FN_7O_2$), was obtained and characterized by X-ray single-crystal diffraction.

In the asymmetric unit, there is one 2-(4-(dimethylamino)-2-fluorophenyl)-1,3-bis(1*H*-1,2,4-triazol-1-yl)propan-2-ol and a water molecule. The torison angles of C2–C1–C7–O1, C7–C8–N1–N2 and C7–C11–N4–N5 are −174.8(2), −99.3(2), and −138.2(2), respectively. The dihedral angles between the aryl ring and the triazole rings are 26.0(1) and 68.5(1)°, respectively. Two terminal pyridyl rings make a dihedral angle of 68.0(1)° with each other. In contrast to the polymorphs of fluconazole [7], the title compound has not been found to form a dimer. The resultant hydrogen-bonding array is an infinite waving tape built by the O–H···O and O–H···N interactions between the host substituted fluconazole and the water molecule. Weak π···π interactions have to be taken into account, to construct the final 3D supramolecular arrangement.

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