NOVEL *O*-BENZYL OXIME ETHERS OF 1-(THIOPHEN-2-YL)ETHAN-1-ONE – SYNTHESIS, STRUCTURE AND ANTIMICROBIAL ACTIVITY

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Supplementary Information

Crystal data for compound 7

Crystallographic data for 7: Empirical formula: $C_{13}H_{12}BrNOS$, formula weight: 310.21, colourless block crystals, crystal system: monoclinic, space group: $P2_1/n$, a = 5.60856(10), b = 10.3329(2), c = 22.2291(4) Å, β = 90.2704(17)°, V = 1288.22(4) Å^3, Z = 4, D_{calc} = 1.599 g/cm^3. A colourless crystal (ethanol) (0.33 × 0.28 × 0.20 mm) was used to record 13400 (Cu$K\alpha$-radiation, θ_{max} = 76.286°) intensities on a Super Nova diffractometer. The supplementary crystallographic data of **7** have been deposited at the Cambridge Crystallography Data Centre (CCDC) as supplementary publication CCDC 1498391. Copies of the data can be obtained, free, on application to CCDC, 12 Union Road, Cambridge CB2 1EZ, UK, (fax: +44-(0)1223-336033 or e-mail: deposit@ccdc.cam.ac.uk).

Table S1. *Experimental details*

Crystal data	
Chemical formula	$C_{13}H_{12}BrNOS$
Formula weight (M_r)	310.21
Crystal system / Space group	Monoclinic / $P2_1/n$
Temperature / K	130.0(1)
a / Å	5.60856(10)
b / Å	10.3329(2)
c / Å	22.2291(4)
α / °	90.00
β / °	90.2704(17)
γ / °	90.00
V / Å^3	1288.22(4)
Z (Z')	4 (1)
Radiation type	Cu $K\alpha$
μ / mm^{-1}	5.721
Crystal size / mm	0.33*0.28*0.20
Color / Shape	Colourless / Block
D_c / g cm^{-3}	1.599
Data collection	
Diffractometer	Rigaku SuperNova Dual, Atlas
Absorption correction	Multi-scan (CrysAlis PRO; Rigaku, 2014)
T_{min}, T_{max}	0.62863, 1.00000
No. of measured, independent and observed [$I > 2\sigma(I)$] reflections	13400, 2663, 2635
R_{int}	0.0369
θ range	2.00– 76.28º
Max/min. indices h, k, l	$-7 \leq h \leq 7$,$-12 \leq k \leq 12$, $-24 \leq l \leq 27$
Refinement	
Final R indices [$I > 2\sigma(I)$]	R1 = 0.0386, wR2 = 0.1003

R indices (all data)	R1 = 0.0389, wR2 = 0.1005
Goodness-of-fit (all data)	1.095
No. of reflections	2663
No. of parameters/restraints	162/3
Completeness to θ_{max} = 67.68º /%	99.9
Largest diff. peak and hole /eÅ^3	0.904 and -0.612

Table S2. *Fractional atomic coordinates, isotropic or equivalent isotropic displacement parameters (Å^2) and site occupancy factors*

	x	*y*	*z*	U_{iso}/U_{eq}	*sof*
S1*a*	0.7680(4)	0.3562(2)	0.51733(12)	0.0272(4)	0.50000
S1*b*	0.6941(4)	0.3927(2)	0.50724(12)	0.0272(4)	0.50000
C2	0.5143(6)	0.2943(3)	0.55129(14)	0.0197(6)	1.00000
C3	0.5084(6)	0.3365(4)	0.60936(16)	0.0285(7)	1.00000
H3	0.3996	0.3040	0.6383	0.034 `	1.00000
C4	0.6788(7)	0.4329(4)	0.62259(17)	0.0337(8)	1.00000
H4*a*	0.6764	0.4830	0.6584	0.040	0.50000
H4*b*	0.7204	0.4617	0.6618	0.040	0.50000
C5*a*	0.8468(14)	0.4472(9)	0.5792(3)	0.032(2)	0.50000
H5*a*	0.9859	0.4992	0.5824	0.039	0.50000
C5*b*	0.7744(16)	0.4782(8)	0.5705(3)	0.032(2)	0.50000
H5*b*	0.8773	0.5512	0.5692	0.039	0.50000
C6	0.3705(5)	0.1945(3)	0.52175(14)	0.0178(6)	1.00000
C7	0.1918(8)	0.1205(5)	0.55713(16)	0.0399(10)	1.00000
H7A	0.0315	0.1390	0.5416	0.060	1.00000
H7B	0.2019	0.1461	0.5995	0.060	1.00000
H7C	0.2244	0.0277	0.5535	0.060	1.00000
N8	0.4138(5)	0.1754(2)	0.46585(12)	0.0175(5)	1.00000
O9	0.2729(4)	0.0719(2)	0.44345(9)	0.0203(5)	1.00000
C10	0.2995(6)	0.0675(3)	0.37967(14)	0.0202(6)	1.00000
H10A	0.2484	-0.0187	0.3650	0.024	1.00000
H10B	0.4703	0.0780	0.3697	0.024	1.00000

C11	0.1574(5)	0.1704(3)	0.34719(13)	0.0168(6)	1.00000
C12	-0.0516(5)	0.2193(3)	0.37176(13)	0.0168(6)	1.00000
H12	-0.1027	0.1902	0.4101	0.020	1.00000
C13	-0.1860(5)	0.3101(3)	0.34073(13)	0.0172(6)	1.00000
H13	-0.3286	0.3436	0.3576	0.021	1.00000
C14	-0.1093(5)	0.3512(3)	0.28487(14)	0.0173(6)	1.00000
C15	0.0981(5)	0.3048(3)	0.25949(14)	0.0206(6)	1.00000
H15	0.1483	0.3342	0.2211	0.025	1.00000
C16	0.2320(5)	0.2144(3)	0.29123(14)	0.0204(6)	1.00000
H16	0.3760	0.1822	0.2745	0.024	1.00000
Br17	-0.29373(6)	0.47536(3)	0.24121(2)	0.02538(13)	1.00000

Table S3. *Selected geometric parameters (Å, °)*

Bond lengths

S1 – C5	1.719(7)	N8 – O9	1.419(3)
S1 – C2	1.738(4)	O9 – C10	1.427(4)
S1A – C5A	1.721(7)	C10 – C11	1.510(4)
S1A – C2	1.736(4)	C11 – C16	1.391(4)
C2 – C3	1.363(5)	C11 – C12	1.391(4)
C2 – C6	1.462(4)	C12 – C13	1.386(4)
C3 – C4	1.410(5)	C13 – C14	1.383(4)
C4 – C5A	1.360(8)	C14 – C15	1.381(4)
C4 – C5	1.362(8)	C14 – Br17	1.910(3)
C6 – N8	1.282(4)	C15 – C16	1.390(5)
C6 – C7	1.488(5)		

Valency angles

C5 – S1 – C2	89.5(3)	C2 – C6 – C7	119.7(3)
C5A – S1A – C2	93.6(3)	C6 – N8 – O9	110.4(2)
C3 – C2 – C6	129.4(3)	N8 – O9 – C10	108.2(2)
C3 – C2 – S1A	108.5(3)	O9 – C10 – C11	113.2(3)
C6 – C2 – S1A	121.1(2)	C16 – C11 – C12	119.4(3)

C3 – C2 – S1	111.3(3)	C16 – C11 – C10	119.8(3)
C6 – C2 – S1	118.7(2)	C12 – C11 – C10	120.8(3)
C2 – C3 – C4	113.9(3)	C13 – C12 – C11	120.5(3)
C5A – C4 – C3	113.6(4)	C14 – C13 – C12	119.0(3)
C5 – C4 – C3	109.6(4)	C15 – C14 – C13	121.8(3)
C4 – C5 – S1	114.6(5)	C15 – C14 – Br17	118.7(2)
C4 – C5A – S1A	109.3(5)	C13 – C14 – Br17	119.5(2)
N8 – C6 – C2	115.9(3)	C14 – C15 – C16	118.7(3)
N8 – C6 – C7	124.3(3)	C15 – C16 – C11	120.7(3)

Antimicrobial activity

The antimicrobial activities of the compounds were determined using the broth microdilution method in 96-well microtiter plates, as described previously.[1] The tested microorganisms were bacterial reference strains *Escherichia coli* ATTC 25922 and *Staphylococcus aureus* ATCC 25923 and a yeast clinical isolate *Candida albicans*. The ether oxime derivatives were dissolved in dimethyl sulfoxide (DMSO), diluted tenfold with culture broth to a concentration of 1.024 mg/mL, and then serially diluted to 0.125 μg/mL in the medium Luria-Bertani (LB) broth for bacteria and Sabouraud dextrose broth (SDB) for yeast. Two antibiotics, ampicillin and itraconazole, were references for bacteria and yeast. The wells were inoculated with the culture of the tested strains to obtain a final concentration of 10^4 CFU/mL. The values of the minimum inhibitory concentrations (MIC) were determined after incubation at 37°C for 24 h for the bacteria or 48 h for Candida. The microbial growth was detected by optical density at 550 nm (OD550) and compared with that of the drug-free growth control containing culture broth with DMSO. The lowest concentration of the tested compounds, at which no visible growth occurs, was defined as the MIC. These assays were performed in triplicate for each concentration.

1. T. Kosmalski, J. Kutkowska, A. K. Gzella, and A. Nowakiewicz, *Acta Pol. Pharm.* 2015, **72**, 289.