# Waste-minimised copper-catalysed azide-alkyne cycloaddition in Polarclean as a reusable safe reaction medium

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# **General information**

GC analyses were performed using a Hewlett- Packard HP 5890A equipped with a capillary column DB-35MS (30 m, 0.53 mm), a FID detector and helium as a gas carrier. GC-EIMS analyses were carried out using a Hewlett-Packard HP 6890N Network GC system/5975 Mass Selective Detector equipped with an electron impact ionizer at 70 eV. NMR spectra were recorded on a Bruker DRX-ADVANCE 400 MHz (<sup>1</sup>H at 400 MHz and <sup>13</sup>C at 100.6 MHz) in DMSO-d6. Elemental analyses were conducted on a FISONS instrument EA 1108 CHN. Melting points were measured on a Büchi 510 instrument. The amount of copper in the final products was measured with an Agilent 4210 Microwave Plasma-Atomic Emission Spectrometer (MP-AES). Unless otherwise stated, all solvents and reagents were purchased and used without further purification. Alkynes **1a**, **1b**, **1g** and **1h** are commercially available. Alkynes **1c-f** and azides **2a-f** were prepared according to the following procedures.

# Preparation of starting reagents

**General synthesis of 1-halo-2-(prop-2-yn-1-yloxy)benzene (1c-e) and (prop-2-yn-1-yloxy)benzene (1f)**<sup>1</sup> Phenol derivative (1 eq.),  $K_2CO_3$  (2 eq.) and acetone were added to a round bottom flask and stirred for 1 minute. prop-2-yn-1-yl methanesulfonate<sup>2</sup> (1.5 eq.) was then added dropwise, and the reaction was stirred at 65 °C. After 24h the solvent was evaporated and the solid residue was dissolved in EtOAc and washed with water. The aqueous phase was extracted with EtOAc (x 3) and the collected organic phase was dried over sodium sulfate and evaporated. Purification by flash column chromatography (EtOAc/petroleum ether 1:20) yielded the desired products (**1c**: 81%; **1d**: 93%; **1e**: 72%; **1f**: 90%).

# Synthesis of azidobenzene (2a)<sup>3</sup>

Aniline (1.6 g, 16.8 mmol), 15% aqueous HCl (15.6 mL) and NaNO<sub>2</sub> (1.7 g, 20.0 mmol) dissolved in water were added to a flask and stirred at 0 °C for 30 min. NaN<sub>3</sub> (2.2 g, 33.6 mmol) dissolved in water was added and the solution was stirred at 0 °C for 2 h. The product was extracted with EtOAc (x 3), dried with sodium sulfate and the solvent was evaporated. Purification by flash column chromatography (petroleum ether as eluent) yielded the desired product in 90% yield.

# Synthesis of 1-azido-4-methoxybenzene (2b)<sup>3</sup>

*p*-Anisidine (1.6 g, 13.4 mmol),15% aqueous HCl 15% (15.0 mL) and NaNO<sub>2</sub> (1.4 g, 16.1 mmol) dissolved in water were added to a flask and stirred at 0 °C for 30 min. NaN<sub>3</sub> (1.7 g, 26.8 mmol) dissolved in water was added and the solution was stirred at 0 °C for 2h. The product was extracted with EtOAc (x3), dried with sodium sulfate and the solvent was evaporated. Purification by flash column chromatography (petroleum ether as eluent) yielded the desired product in 80% yield.

#### Synthesis of 1-azido-4-methylbenzene (2c)<sup>3</sup>

*p*-Toluidine (6.0 g, 56.0 mmol), 15% aqueous HCI (55.0 mL) and NaNO<sub>2</sub> (4.6 g, 67.1 mmol) dissolved in water were added to a flask and stirred at 0 °C for 30 min. NaN<sub>3</sub> (7.3 g, 112.0 mmol) dissolved in water was then added and the solution was stirred at 0 °C for 2h. The product was extracted with EtOAc (x3), dried with sodium sulfate and the solvent was evaporated. Purification by flash column chromatography (petroleum ether as eluent) yielded the desired product in 80% yield.

#### General synthesis of 1-(azidomethyl)-2-halobenzene (2d-f)<sup>3</sup>

The required 2-halobenzyl alcohol (1 eq.) was dissolved in dry dichloromethane in a round-bottom flask under a nitrogen atmosphere. After the addition of triethylamine (1.7 eq.) the reaction was cooled to 0 °C and methanesulfonyl chloride (1.3 eq.) was added dropwise. The reaction was left under stirring for 1h, before being transferred to a separating funnel. The solution was washed sequentially with 1% aqueous HCl (x3) and NaHCO<sub>3</sub> (x3), dried over sodium sulfate and evaporated to yield the desired products (I: 80%; Br: 80%; Cl: 86%), which were used in the next step without purification.

The required 2-halobenzyl methane sulfonate (1 eq.) was dissolved in anhydrous DMF in a round-bottom flask. After the addition of NaN<sub>3</sub> (3 eq.), the reaction was stirred at 50 °C for 24h. Then, the solution was transferred to a separating funnel and diluted with dichloromethane. The organic phase was sequentially washed with warm water (x3) and brine (x3), dried over sodium sulfate and evaporated. Purification by flash column chromatography (EtOAc/petroleum ether 1:40) yielded the desired products (**2d**: 80%; **2e**: 70%; **2f**: 85%).

# General procedure for the CuAAC reaction in Polarclean/water

Sodium ascorbate (0.05 mmol, 0.1 eq.) and copper sulfate pentahydrate (0.01 mmol, 0.02 eq.) were dissolved in 1 mL of Polarclean/water (4:1) in a screw-capped vial equipped with a magnetic stirring bar. The alkyne (0.5 mmol, 1 eq.) and the azide (0.5 mmol, 1 eq.) were added and the reaction was heated to 50 °C under stirring for 24h. In most of the cases the formation of the product is evidenced by the formation of a precipitate. In these cases, the product was filtered with a Büchner funnel, washed with water (0.5 mL) and dried under vacuum. When the product did not precipitate from the reaction medium, but formed a separated oily phases, the two liquid phases were separated. Addition of water to the oily phase resulted in the precipitation of the product, which was filtered with a Büchner funnel, washed with water (0.5 mL) and dried under vacuum.

# Procedure for the recycling of the catalyst and the reaction medium

All reactions were run on a 2 mmol scale, using 4 mL of Polarclean/water (4:1) as reaction medium. The recycled liquid phase obtained from the previous reaction run was placed in a screw-capped vial equipped with a magnetic stirring bar. Sodium ascorbate (20 mg, 0.1 mmol), 1-iodo-2-(prop-2-yn-1-yloxy)benzene (**1d**) (520 mg, 2 mmol) and 1-azido-4-methylbenzene (**2c**) (268 mg, 0.5 mmol) were added, and the reaction was heated at 50 °C under stirring for 24h. The product was filtered with a Büchner funnel, washed with water (2 mL) and dried under vacuum. Product **3g** was obtained in 99% yield in all reaction runs (1<sup>st</sup> run: 774 mg; 2<sup>nd</sup> run: 772 mg; 3<sup>rd</sup> run: 772 mg; 4<sup>th</sup> run: 770 mg; 5<sup>th</sup> run: 771 mg).

# **Overall E-factor for five consecutive reaction runs**

[40 mg + 20 mg + 20 mg + 20 mg + 20 mg (sodium ascorbate) + 10 mg (copper catalyst) + 4 g (reaction medium) + 10 g (water used to wash the solids)]/[774 mg + 772 mg + 772 mg + 770 mg + 771 mg (product)]= 3.66

# E-factor for a single reaction run

Assuming that the reaction medium and the catalyst can be infinitely recycled: [20 mg (addition of sodium ascorbate) + 2 g (water used to wash the solid)]/[772 mg (product)] = 2.62

## Highest reported yields for the preparation of triazoles 3, based on a SciFinder search

#### 3a:

98% RSC Advances, 5(90), 73340-73345; 2015 98% Tetrahedron Letters, 56(19), 2472-2475; 2015 98% Advanced Synthesis & Catalysis, 355(14-15), 2982-2991; 2013

#### 3b:

91% ACS Sustainable Chemistry & Engineering, 2(12), 2658-2665; 2014

## 3c:

96% Journal of the American Chemical Society, 139(15), 5378-5386; 2017

# 3d:

99% Organic & Biomolecular Chemistry, 10(39), 7965-7969; 2012

#### 3e:

79% ChemistrySelect, 1(15), 4803-4813; 2016

#### 3f:

New compound

# 3g:

93% Green Chemistry, 18(23), 6380-6386; 2016

#### 3h:

New compound

# 3i:

84% Green Chemistry, 18(23), 6380-6386; 2016

# 3j:

58% Zhurnal Organicheskoi Khimii, 23(9), 1986-90; 1987

# 3k:

57% Uzbekskii Khimicheskii Zhurnal, (4), 54-6; 1986 15% Zhurnal Organicheskoi Khimii, 23(9), 1986-90; 1987

# 3I:

63% Zhurnal Organicheskoi Khimii, 23(9), 1986-90; 1987

# 3m:

100% Topics in Catalysis, 53(7-10), 523-528; 2010 99% RSC Advances, 5(90), 73340-73345; 2015 98% Tetrahedron Letters, 56(19), 2472-2475; 2015

#### 3n:

79% Advanced Synthesis & Catalysis, 352(7), 1179-1192; 2010

# 30:

95% Tetrahedron, 66(46), 8846-8853; 2010

# 3p:

90% Tetrahedron, 66(46), 8846-8853; 2010

#### 3q:

98% RSC Advances, 5(59), 47275-47283; 2015

# 3r:

New compound

# 3s:

94% Journal of Colloid and Interface Science, 457, 141-147; 2015 94% European Journal of Organic Chemistry, (10), 1875-1884, S1875/1-S1875/18; 2010 94% Tetrahedron Letters, 50(20), 2358-2362; 2009

3t:

New compound

**3u:** New compound

**3v:** 94% Tetrahedron, 66(46), 8846-8853; 2010

**3w:** nuovo

**3x:** 93% Catalysis Letters, 146(3), 629-644; 2016

**3y:** New compound

3z:

87% Green Chemistry, 18(23), 6380-6386; 2016



<sup>13</sup>C NMR (100.6 MHz, DMSO-d6) δ: 21.3, 119.6, 120.4, 125.8, 127.9, 129.1, 130.0, 130.4, 137.1, 138.1, 147.9

GC-EIMS (m/z, %): 51 (24), 77 (44), 103 (38), 130 (39), 165 (30), 207 (100), 235 (2, M<sup>+</sup>).





Lit. Ref.         Chem. Commun. 2017, 53, 1526–1529 $MeO \leftarrow \leftarrow \leftarrow +$ $N_3 \leftarrow \leftarrow$	Chem. Name	4-(4-methoxyphenyl)-1-phenyl-1 <i>H</i> -1,2,3-triazole (3d)								
$ \frac{\text{MeO}_{f_{i}}}{\text{MeO}_{i}} + \frac{\text{N}_{3}}{\text{MeO}_{i}} \qquad $	Lit. Ref.			Chem. Commun	. <b>2017</b> , <i>5</i> 3, 1526	–1529				
METHOD:         In a screw-capped vial copper(II) sulfate pentahydrate (2.5mg, 0.01 mmol), sodium ascorbate (10 mg, 0.05 mr Polarclean/H <sub>2</sub> O (4:1, 1 mL), azidobenzene (2a) (60 mg, 0.5 mmol) and 1-ethynyl-4-methoxybenzene (1b) (66 mg, mmol) were added consecutively. A magnetic stirring bar was added and the solution was stirred at 50 °C for 24 hc The product was filtered with a Büchner funnel, washed with water (0.5 mL) and dried under vacuum. 4 Methoxyphenyl)-1-phenyl-1 <i>H</i> -1,2,3-triazole (3d) was obtained as a yellow solid (125 mg, 99% yield).           Mol Formula         C <sub>15</sub> H <sub>13</sub> N <sub>3</sub> O         m.p.         152.5-154.5 °C           Elemental Analysis: Calc.: C: 71.70; H: 5.21; N: 16.72. Found: C: 71.68; H: 5.19; N: 16.70         yalue         No. H         Mult.         j value/Hz           9.17         1         s	$MeO + N_{3} $									
Mol Formula         C <sub>15</sub> H <sub>13</sub> N <sub>3</sub> O         m.p.         152.5-154.5 °C           Elemental Analysis: Calc.: C: 71.70; H: 5.21; N: 16.72. Found: C: 71.68; H: 5.19; N: 16.70         Image: Comparison of the state of the	<b>METHOD:</b> In a screw-capped Polarclean/H <sub>2</sub> O (4 mmol) were added The product was Methoxyphenyl)-1-	d vial copper(II) s :1, 1 mL), azidob d consecutively. A filtered with a phenyl-1 <i>H</i> -1,2,3-t	sulfate penta enzene ( <b>2a</b> ) magnetic st Büchner fu riazole ( <b>3d</b> ) v	ahydrate (2.5mg, ( (60 mg, 0.5 mmc irring bar was add nnel, washed with was obtained as a y	0.01 mmol), soc I) and 1-ethynyl ed and the solut n water (0.5 m rellow solid (125	Jium ascorbate (10 n -4-methoxybenzene ( ion was stirred at 50 hL) and dried under mg, 99% yield).	ng, 0.05 mmol), <b>1b</b> ) (66 mg, 0.5 °C for 24 hours. • vacuum. 4-(4-			
Image: state         Value         No. H         Mult.         j value/Hz           9.17         1         s         1	Mol Formula	a	$C_{15}H_{13}$	N <sub>3</sub> O	m.p.	152.5-154	.5 °C			
<sup>1</sup> H NMR 400 MHz DMSO-d6         Value         No. H         Mult.         j value/Hz           9.17         1         s	Elemental Analys	<b>is:</b> Calc.: C: 71.70	); H: 5.21; N:	16.72. Found: C: 1	71.68; H: 5.19; N	l: 16.70				
H NMR       9.17       1       s         400 MHz       9.17       1       s         DMSO-d6 $7.94$ 2       d       8.0         7.88       2       d       8.8         7.63       2       t       16.0         7.53-7.49       1       m         7.07       2       d       8.8         3.81       3       s       3         1 <sup>3</sup> C NMR (100.6 MHz, DMSO-d6) $\delta$ : 55.7, 114.9, 119.0, 120.4, 123.2, 127.2, 129.1, 130.4, 137.1, 147.8, 159.8		value	No. H	Mult.		j value/Hz				
DMSO-d6         7.94         2         d         8.0           7.88         2         d         8.8           7.63         2         t         16.0           7.53-7.49         1         m         16.0           7.07         2         d         8.8           3.81         3         s         1	400 MHz	9.17	1	S						
7.88       2       d       8.8         7.63       2       t       16.0         7.53-7.49       1       m       1         7.07       2       d       8.8         3.81       3       s       1         ***********************************	DMSO-d6	7.94	2	d		8.0				
7.63       2       t       16.0         7.53-7.49       1       m         7.07       2       d       8.8         3.81       3       s <sup>13</sup> C NMR (100.6 MHz, DMSO-d6) δ: 55.7, 114.9, 119.0, 120.4, 123.2, 127.2, 129.1, 130.4, 137.1, 147.8, 159.8		7.88	2	d		8.8				
7.53-7.49       1       m         7.07       2       d       8.8         3.81       3       s       3 <sup>13</sup> C NMR (100.6 MHz, DMSO-d6) δ: 55.7, 114.9, 119.0, 120.4, 123.2, 127.2, 129.1, 130.4, 137.1, 147.8, 159.8		7.63	2	t		16.0				
7.07         2         d         8.8           3.81         3         s         13         s		7.53-7.49	1	т						
3.81         3         s <sup>13</sup> C NMR (100.6 MHz, DMSO-d6) δ: 55.7, 114.9, 119.0, 120.4, 123.2, 127.2, 129.1, 130.4, 137.1, 147.8, 159.8		7.07	2	d		8.8				
<sup>13</sup> C NMR (100.6 MHz, DMSO-d6) δ: 55.7, 114.9, 119.0, 120.4, 123.2, 127.2, 129.1, 130.4, 137.1, 147.8, 159.8		3.81	3	S						
<b>GC-EIMS (m/z, %):</b> 77 (42), 180 (22), 208 (100), 223 (54), 251(2, M <sup>+</sup> ).	<sup>13</sup> C NMR (100.6 M GC-EIMS (m/z, %)	Hz, DMSO-d6) δ: ): 77 (42), 180 (22	55.7, 114.9, ), 208 (100),	119.0, 120.4, 123. 223 (54), 251(2, N	2, 127.2, 129.1, <sup>+</sup> ).	130.4, 137.1, 147.8, 1	159.8			

Chem. Name	4-(4-methoxyphenyl)-1-( <i>p</i> -tolyl)-1 <i>H</i> -1,2,3-triazole (3e)									
Lit. Ref.			Org. Lett. <b>20</b>	<b>14</b> , <i>16</i> , 5108–51	11					
MeO $+$ $N_3$ $CuSO_4 \cdot 5H_2O (2 \text{ mol}\%)$ Na-ascorbate (10 mol%) Polarclean/H <sub>2</sub> O (4:1) 50 °C, 24 h										
<b>METHOD:</b> In a screw-capped Polarclean/H <sub>2</sub> O (4: mg, 0.5 mmol) wer hours. The produc Methoxyphenyl)-1-	d vial copper(II) 1, 1 mL), 1-azido re added consecu ct was filtered w ( <i>p</i> -tolyl)-1 <i>H</i> -1,2,3	sulfate pent o-4-methylbe utively. A ma ith a Büchne -triazole ( <b>3e</b> )	ahydrate (2.5mg, ( nzene ( <b>2c</b> ) (67 mg, gnetic stirring bar v er funnel, washed was obtained as a	0.01 mmol), soc 0.5 mmol) and vas added and t with water (0.5 yellow solid (13)	lium ascorbate (10 1-ethynyl-4-methoxy he solution was stirre mL) and dried und 2 mg, 99% yield).	mg, 0.05 mmol), benzene ( <b>1b</b> ) (66 ed at 50 °C for 24 er vacuum. 4-(4-				
Mol Formula	1	C <sub>16</sub> H <sub>15</sub>	N <sub>3</sub> O	m.p.	169-17	2 °C				
Elemental Analys	<b>is:</b> Calc.: C: 72.4	3; H: 5.70; N	: 15.84. Found: C: 7	72.40; H: 5.60; N	l: 15.80					
	value	No. H	Mult.		j value/Hz					
400 MHz	9.08	1	s							
DMSO-d6	7.72	2	d		8.4					
	7.81	2	d		8.4					
	7.41	2	d		8.0					
	7.05	2	d		8.4					
	3.80	3	s							
	2.38	3	s							
<sup>13</sup> C NMR (100.6 M	Hz, DMSO-d6) δ	104 (24) 2	6, 138.8, 134.9 130	.7, 127.2, 123.2	, 120.3, 118.9, 114.9,	, 55.6, 21.0.				

Chem. Name		4-((2-bromophenoxy)methyl)-1-( <i>p</i> -tolyl)-1 <i>H</i> -1,2,3-triazole (3f)									
Lit. Ref.				_							
Br + $N_3$ CuSO <sub>4</sub> ·5H <sub>2</sub> O (2 mol%) Na-ascorbate (10 mol%) Polarclean/H <sub>2</sub> O (4:1) 50 °C, 24 h											
METHOD: In a screw-capped Polarclean/H <sub>2</sub> O (4, ( <b>1c</b> ) (106 mg, 0.5 r °C for 24 hours. T ((2-Bromophenoxy	d vial copper(II) si :1, 1 mL), 1-azido mmol) were addec he product was fil y)methyl)-1-( <i>p</i> -toly	ulfate pentah -4-methylber d consecutive tered with a I)-1 <i>H</i> -1,2,3-tr	nydrate (2.5mg, 0. nzene ( <b>2c</b> ) (67 mg, ely. A magnetic stir Büchner funnel, w iazole ( <b>3f</b> ) was obt	01 mmol), sodiur 0.5 mmol) and 1 ring bar was add ashed with water tained as an off-w	n ascorbate (10 mg, 0.05 -bromo-2-(prop-2-yn-1-ylo ed and the solution was st (0.5 mL) and dried under /hite solid (167 mg, 100%)	mmol) and xy)benzene irred at 50 vacuum. 4- yield).					
Mol Formula	a	C <sub>16</sub> H <sub>14</sub> B	rN₃O	m.p.	117-120 °C						
Elemental Analys	<b>is:</b> Calc.: C: 55.83	3; H: 4.10; N	12.21. Found: C:	55.80; H: 4.07; C	9: 4.60						
	value	No. H	Mult.	j value/Hz							
400 MHz	8.91	1	s								
DMSO-d6	7.81-7.79	2	т								
	7.60-7.58	1	т								
	7.42-7.7.38	4	т								
	6.95-6.91	1	т								
	5.32	2	S								
	2.39	3	s								
<sup>13</sup> C NMR (100.6 M 143.8, 154.7	Hz, DMSO-d6) δ:	21.0, 62.5,	111.6, 114.8, 120.5	5, 123.0, 123.4, 1	29.5, 130.7, 133.6 134.7,	138.9,					
GC-EIMS (m/z, %)	: 65 (32), 91 (64)	, 143 (52), 14	14 (100), 236 (31),	264 (29), 344(5	M⁺).						

Chem. Name	4-((2-lodophenoxy)methyl)-1- <i>p</i> -tolyl-1 <i>H</i> -1,2,3-triazole (3g)									
Lit. Ref.			Green Chem. <b>2</b>	<b>016</b> , <i>18</i> , 6380–6	5386					
$H_{1} = \frac{1}{10000000000000000000000000000000000$										
<b>METHOD:</b> In a screw-capped Polarclean/H <sub>2</sub> O (4: ( <b>1d</b> ) (130 mg, 0.5 m °C for 24 hours. Th ((2-lodophenoxy)m	I vial copper(II) = 1, 1 mL), 1-azido nmol) were addeo ne product was fil ethyl)-1- <i>p</i> -tolyl-1 <i>H</i>	sulfate penta -4-methylbe I consecutive tered with a H-1,2,3-triazo	ahydrate (2.5mg, 0 nzene ( <b>2c</b> ) (67 mg, ely. A magnetic stirri Büchner funnel, wa ole ( <b>3g</b> ) was obtaine	.01 mmol), soo 0.5 mmol) and ng bar was add shed with water d as a pale brow	lium ascorbate (10 mg, 1 1-iodo-2-(prop-2-yn-1-yle ed and the solution was s (0.5 mL) and dried unde wn powder (193 mg, 99%	0.05 mmol), oxy)benzene tirred at 50 r vacuum. 4- yield).				
Mol Formula		C <sub>16</sub> H <sub>14</sub>	IN₃O	m.p.	97-99 °C					
Elemental Analys	i <b>s:</b> Calc.: C: 49.12	2; H: 3.61; N	: 10.74. Found: C: 4	9.10; H: 3.59; N	l: 10.70.					
	value	No. H	Mult.	j value/Hz						
400 MHz	8.90	1	S			1				
DMSO-d6	7.81-7.78	3	m							
	7.42-7.38	3	m							
	7.28	1	d		7.6					
	6.81-6.77	1	m							
	5.30	2	s							
	2.40	3	S							
<sup>13</sup> C NMR (100.6 M 157.1	Hz, DMSO-d6) δ:	21.1, 62.7, 8	87.2, 113.8, 120.5, 7	123.3, 123.6,13	D.2, 130.7, 134.7, 138.9, 1	39.6, 143.9,				

Chem. Name	4-(()	2-bromophe	noxy)methyl)-1-(4-r	nethoxyphen	yl)-1 <i>H</i> -1,2,3-triazole (3ł	n)
Lit. Ref.				_		
Br	+	N <sub>3</sub>	CuSO <sub>4</sub> ·5H <sub>2</sub> <u>Na-ascorbat</u> OMe Polarclear 50 °C	2O (2 mol%) te (10 mol%) n/H₂O (4:1) 5, 24 h	Br N N	DMe
METHOD: In a screw-cappe Polarclean/H <sub>2</sub> O ( yloxy)benzene (10 was stirred at 50 under vacuum. 4- (178 mg, 99% yiel	ed vial copper(II) (4:1, 1 mL), 1-a c) (106 mg, 0.5 m °C for 24 hours. T ·((2-Bromophenox Id).	sulfate penta azido-4-metho imol) were ac he product w y)methyl)-1-(-	ahydrate (2.5mg, 0.0 oxybenzene ( <b>2b</b> ) ( dded consecutively. vas filtered with a Bü 4-methoxyphenyl)-1.	01 mmol), soo 75 mg, 0.5 A magnetic st chner funnel, H-1,2,3-triazolo	dium ascorbate (10 mg mmol) and 1-bromo-2 irring bar was added ar washed with water (0.5 e ( <b>3h</b> ) was obtained as	, 0.05 mmol), 2-(prop-2-yn-1- nd the solution mL) and dried a yellow solid
Mol Formula	a	C <sub>16</sub> H <sub>14</sub> Br	N <sub>3</sub> O <sub>2</sub>	m.p.	91-94 °C	;
Elemental Analys	sis: Calc.: C: 53.3	5; H: 3.92; N	: 11.67. Found: C: 53	3.30; H: 3.90; I	N: 11.60	
	value	No. H	Mult.		j value/Hz	
400 MHz	8.86	1	S			
DMSO-d6	7.83	2	d		9.2	
	7.59	1	d		8.0	
	7.38	2	d		4.0	
	7.15	2	d		9.2	
	6.95-6.91	1	т			
	5.32	2	S			
	3.84	3	S			
<sup>13</sup> C NMR (100.6 N 154.7, 159.8	/Hz, DMSO-d6) δ	: 56.0, 62.5, <sup>-</sup>	111.6, 114.8, 115.4,	122.3, 122.9,	123.5, 129.5, 130.4, 133	3.6, 143.7,
GC-EIMS (m/z, %	<b>.):</b> 56 (86), 57 (100	)), 84 (70), 10	02 (98), 145 (23), 16	0 (100), 280 (1	9), 360 (2 M <sup>+</sup> ).	

Chem. Name		4-((2-chlorophenoxy)methyl)-1-(4-methoxyphenyl)-1 <i>H</i> -1,2,3-triazole (3i)									
Lit. Ref.				Green Chem. 20	<b>016</b> , <i>18,</i> 6380–0	6386					
$\begin{array}{c} \begin{array}{c} & & \\ & \\ & \\ & \\ & \\ \end{array} \end{array} + \begin{array}{c} & \\ & \\ & \\ & \\ \end{array} \\ & \\ & \\ \end{array} \\ & \\ & \\$											
<b>METHOD:</b> In a screw-capped vial copper(II) sulfate pentahydrate (2.5mg, 0.01 mmol), sodium ascorbate (10 mg, 0.05 mmol), Polarclean/H <sub>2</sub> O (4:1, 1 mL), 1-azido-4-methoxybenzene ( <b>2b</b> ) (75 mg, 0.5 mmol) and 1-chloro-2-(prop-2-yn-1-yloxy)benzene ( <b>1e</b> ) (83 mg, 0.5 mmol) were added consecutively. A magnetic stirring bar was added and the solution was stirred at 50 °C for 24 hours. The product was filtered with a Büchner funnel, washed with water (0.5 mL) and dried under vacuum. 4-((2-Chlorophenoxy)methyl)-1-(4-methoxyphenyl)-1 <i>H</i> -1,2,3-triazole ( <b>3i</b> ) was obtained as a white solid (156 mg, 99% yield).											
Mol Formula	a		C <sub>16</sub> H <sub>14</sub> C	IN <sub>3</sub> O <sub>2</sub>	m.p.	108-110 °C					
Elemental Analys	sis: Calc	:.: C: 60.8	86; H: 4.47; N	: 13.31. Found: C: 6	0.80; H: 4.40; N	N: 13.30					
	v	alue	No. H	Mult.		j value/Hz					
400 MHz	8	3.87	1	S							
DMSO-d6	7	7.83	2	d		9.2					
	7.4	5-7.40	2	т							
	7.3	6-7.32	1	т							
	7	7.14	2	d		8.8					
	7.0	0-6.97	1	т							
	5	5.33	2	s							
3.83 3 s											
<sup>13</sup> C NMR (100.6 MHz, DMSO-d6) δ: 56.0, 62.4, 114.9, 115.3, 122.0, 122.3, 122.4, 123.5, 129.8, 130.4, 130.5											
GC-EIMS (m/z, %	<b>5):</b> 315 (3	3), 145 (2	20), 160 (100)	, 280 (18), 315 (3 M <sup>-</sup>	<sup>+</sup> ).						

Chem. Name		4-((2-chlorophenoxy)methyl)-1-phenyl-1 <i>H</i> -1,2,3-triazole (3j)								
Lit. Ref.			Zh. Org. Khim	. <b>1987</b> , <i>9</i> , 1986– <sup>-</sup>	1990					
$\begin{array}{c c c c c c c c c c c c c c c c c c c $										
<b>METHOD:</b> In a screw-capped Polarclean/H <sub>2</sub> O (4 mg, 0.5 mmol) wer hours. The produc Chlorophenoxy)me	d vial copper :1, 1 mL), az re added con ct was filtere ethyl)-1-pheny	r(II) sulfate pent idobenzene ( <b>2a</b> ) secutively. A ma d with a Büchne /I-1 <i>H</i> -1,2,3-triazc	ahydrate (2.5mg, (60 mg, 0.5 mmc gnetic stirring bar er funnel, washed le ( <b>3j</b> ) was obtaine	0.01 mmol), soo bl) and 1-chloro-2 was added and t with water (0.5 d as a brown soli	dium ascorbate 2-(prop-2-yn-1-y he solution was mL) and dried id (142 mg, 99%	(10 mg, 0.05 mm loxy)benzene ( <b>1e</b> ) ( stirred at 50 °C for under vacuum. 4-( yield).	ol), [84 [24 [(2-			
Mol Formula	a	C <sub>15</sub> H <sub>12</sub> (	CIN <sub>3</sub> O	m.p.	ę	91-92 °C				
Elemental Analys	i <b>s:</b> Calc.: C: (	63.05; H: 4.23; N	: 14.71. Found: C:	63.00; H: 4.20; N	l: 14.69					
	value	No. H	Mult.		j value/Hz					
400 MHz	8.98	1	S							
DMSO-d6	7.92	2	d		7.6					
	7.61	2	t		15.6					
	7.53-7.5	0 1	m							
	7.45-7.4	1 2	m							
	7.36-7.3	2 1	m							
	6.99	1	t		15.2					
	5.35	2	S							
<sup>13</sup> C NMR (100.6 M 153.8.	Hz, DMSO-d	<b>6) δ:</b> 62.3, 115.0	, 120.7, 122.0, 122	.5, 123.6, 128.8,	129.3, 130.4,13	30.5, 137.0, 143.9,				
GC-EIMS (m/z, %)	): 77 (51), 130	0 (100), 222 (42)	, 250 (35), 285 (4,	M <sup>+</sup> ).						

Chem. Name			4-((2-bro	mophenoxy)meth	yl)-1-phenyl-1 <i>H</i>	-1,2,3-triazole (3k)	
Lit. Ref.				Zh. Org. Khim	. <b>1987</b> , <i>9</i> , 1986–	1990	
Br∖	0 1c	+	N <sub>3</sub>	CuSO <sub>4</sub> ·5H Na-ascorba Polarclea 50 °	<sup>2</sup> O (2 mol%) ate (10 mol%) n/H <sub>2</sub> O (4:1) C, 24 h	Br	
<b>METHOD:</b> In a screw-cappe Polarclean/H <sub>2</sub> O (4 mg, 0.5 mmol) we hours. The produ Bromophenoxy)m	ed vial copp I:1, 1 mL), a ere added co ict was filter ethyl)-1-phe	er(II) s zidobe nsecu ed wit nyl-1 <i>H</i>	sulfate pent enzene ( <b>2a</b> ) itively. A ma th a Büchne <i>I</i> -1,2,3-triazo	ahydrate (2.5mg, (60 mg, 0.5 mmol) gnetic stirring bar v er funnel, washed le ( <b>3k</b> ) was obtaine	0.01 mmol), soo and 1-bromo-2 vas added and t with water (0.5 ed as an off-white	dium ascorbate (10 mg, -(prop-2-yn-1-yloxy)benze he solution was stirred at mL) and dried under va e solid (163 mg, 99% yield	0.05 mmol), ene ( <b>1c</b> ) (106 50 °C for 24 icuum. 4-((2- t).
Mol Formul	а		C <sub>15</sub> H <sub>12</sub> E	BrN₃O	m.p.	99-98 °C	
Elemental Analys	sis: Calc.: C	: 54.56	6; H: 3.66; N	: 12.73. Found: C:	54.54; H: 3.60; N	N: 12.70	
1	valu	e	No. H	Mult.		j value/Hz	
400 MHz	8.97		1	s			
DMSO-d6	7.94-7.	92	2	m			
	7.63-7.	59	3	m			_
	7.53-7.	49	1	m			
	7.39-7.	38	2	m			
	6.94-6.	91	1	m			
	5.34		2	s			
<sup>13</sup> C NMR (100.6 N 154.7	IHz, DMSO-	d6) δ:	62.5, 111.6	, 114.8, 120.6, 123	.0, 123.5, 129.3,	129.5, 130.4, 133.6, 137.	0, 143.9,
GC-EIMS (m/z, %	<b>):</b> 51 (24), 7	7 (94),	, 103 (28), 12	29 (46), 130 (100),	222 (39), 250 (3	3), 330 (4, M <sup>+</sup> ).	

Chem. Name		4-((2-iodo	phenoxy)methyl)	-1-phenyl-1 <i>H</i> -1	,2,3-triazole (3I)	
Lit. Ref.			RSC Adv. <b>20</b> ′	<b>13</b> , <i>8</i> , 2710–27 <i>1</i>	19	
۱	0 + 1d	N <sub>3</sub>	CuSO₄·5H₂C Na-ascorbate Polarclean// 50 °C,	0 (2 mol%) (10 mol%) H₂O (4:1) 24 h	3I	
<b>METHOD:</b> In a screw-capped Polarclean/H <sub>2</sub> O (4: mg, 0.5 mmol) wer hours. The produc lodophenoxy)meth	d vial copper(II) 1, 1 mL), azidob e added consecu t was filtered wi yl)-1-phenyl-1 <i>H</i> -1	sulfate pentah enzene ( <b>2a</b> ) ( ttively. A magr th a Büchner ,2,3-triazole ( <b>3</b>	nydrate (2.5mg, 0. 60 mg, 0.5 mmol) netic stirring bar wa funnel, washed w I) was obtained as	01 mmol), soc and 1-iodo-2- as added and th ith water (0.5 a yellow solid	lium ascorbate (10 mg (prop-2-yn-1-yloxy)ben: ne solution was stirred mL) and dried under (187 mg, 99% yield).	g, 0.05 mmol), zene ( <b>1d</b> ) (129 at 50 °C for 24 vacuum. 4-((2-
Mol Formula	1	C <sub>15</sub> H <sub>12</sub> IN	3O	m.p.	105-108°	С
Elemental Analys	<b>is:</b> Calc.: C: 47.7	1; H: 3.21; N: 1	1.14. Found C: 47	.70; H: 3.19; N	11.10.	
	value	No. H	Mult.		j value/Hz	
400 MHz	8.96	1	S			
DMSO-d6	7.93	2	d		8.0	
	7.80	1	d		1.6	
	7.79-7.60	2	т			
	7.51	1	t		14.8	
	7.42-7.38	1	т			
	7.29	1	d		8.0	
	6.79	1	t		15.2	
	5.32	2	S			
<sup>13</sup> C NMR (100.6 M	Hz, DMSO-d6) δ:	62.7, 87.2, 11	3.8, 120.6, 123.4,	123.6, 129.3, 1	30.2, 130.4, 137.0, 140	0.0, 144.0
GC-EIMS (m/z, %)	: 77 (68), 103 (21	), 130 (100), 2	22 (34), 250 (35),	377 (3 M⁺)		



Chem. Name		1-(2-iodobenzyl)-4-(p-tolyl)-1H-1,2,3-triazole (3n)								
Lit. Ref.				Adv. Syn. Cat. 20	<b>)10</b> , <i>35</i> 2, 1179-	-1192				
+ $N_3$ $V_3$ $V_$										
<b>METHOD:</b> In a screw-capped vial copper(II) sulfate pentahydrate (2.5mg, 0.01 mmol), sodium ascorbate (10 mg, 0.05 mmol), Polarclean/H <sub>2</sub> O (4:1, 1 mL), 1-(azidomethyl)-2-iodobenzene ( <b>2d</b> ) (130 mg, 0.5 mmol) and 1-ethynyl-4-methylbenzene ( <b>1a</b> ) (58 mg, 0.5 mmol) were added consecutively. A magnetic stirring bar was added and the solution was stirred at 50 °C for 24 hours. The product was filtered with a Büchner funnel, washed with water (0.5 mL) and dried under vacuum. 1-(2-lodobenzyl)-4-( <i>p</i> -tolyl)-1 <i>H</i> -1,2,3-triazole ( <b>3n</b> ) was obtained as a yellow solid (185 mg, 99% yield).										
Mol Formula	a		C <sub>16</sub> H <sub>1</sub>	<sub>4</sub> IN <sub>3</sub>	m.p.	177-180 °C	)			
Elemental Analys	is: Cal	c.: C: 51.2	2; H: 3.76; N	: 11.20. Found.: C: 5	51.20; H: 3.70; I	N: 11.10				
1		value	No. H	Mult.	j value/Hz					
400 MHz		8.5	1	s						
DMSO-d6		7.95	1	d		7.2	_			
		7.75	2	d		8.0	_			
		7.43	1	t		14.4	_			
		7.25	2	d		8.0				
	7.	15-7.11	2	m						
		5.66	2	s						
		2.02	3	s						
<sup>13</sup> C NMR (100.6 MHz, DMSO-d6) δ: 21.3, 57.9, 99.6,122.0, 125.6, 129.3, 129.9, 130.0, 137.7, 138.4, 140.0, 147.0 GC-FIMS (m/z %): 90 (32): 103 (19): 130 (89): 217 (41): 220 (100), 248 (18), 375 (10 M <sup>+</sup> )										











Chem. Name			4-	cyclohexyl-1-( <i>p</i> -tol	yl)-1 <i>H</i> -1,2,3-tr	iazole (3t)				
Lit. Ref.					_					
$+ N_{3} + \frac{N_{3} + \frac{CuSO_{4} \cdot 5H_{2}O(2 \text{ mol}\%)}{Na-ascorbate(10 \text{ mol}\%)}}{Polarclean/H_{2}O(4:1)}$										
<b>METHOD:</b> In a screw-cappe Polarclean/H <sub>2</sub> O (4 mmol) were added The product was f tolyl)-1 <i>H</i> -1,2,3-tria:	d vial c :1, 1 mL d consec iltered w zole ( <b>3t</b> )	opper(II) : _), 1-azido cutively. A /ith a Bücł was obtai	sulfate penta -4-methylber magnetic sti nner funnel, v ined as a whi	hydrate (2.5mg, 0. nzene ( <b>2c</b> ) (67 mg, irring bar was addeo washed with water ( te solid (120 mg, 99	01 mmol), soc 0.5 mmol) and d and the solut 0.5 mL) and dr % yield).	lium ascorbate (10 mg, 0 ethynylcyclohexane ( <b>1g</b> ) ion was stirred at 50 °C fo ied under vacuum. 4-Cycl	0.05 mmol), (54 mg, 0.5 or 24 hours. ohexyl-1-( <i>p</i> -			
Mol Formula	a		C <sub>15</sub> H <sub>15</sub>	N <sub>3</sub>	m.p.	112-115 °C				
Elemental Analys	<b>is:</b> Calc	.: C: 74.65	5; H: 7.94; N:	17.41. Found: C: 74	1.60; H: 7.90; N	l: 17.38				
1	v	value	No. H	Mult.		j value/Hz				
400 MHz	8	3.47	1	S						
DMSO-d6	7	7.74	2	d		8.0				
	7	7.36	2	d		8.0				
	2.7	2-2.71	1	т						
	2	2.36	3	S						
	2.0	2-1.99	2	т			]			
	1.7	7-1.74	2	т						
	1.6	9-1.66	1	т						
	1.4	8-1.33	4	т						
	1.2	7-1.21	1	т						
<sup>13</sup> C NMR (100.6 M	Hz, DM	SO-d6) δ:	21.0, 26.0, 2	26.1, 32.9, 34.8, 119	.2, 120.1, 130.0	6, 135.1, 138.3, 153.7				
GC-EIMS (m/z, %)	<b>):</b> 65 (26	6), 91 (48),	107 (29), 17	0 (100), 184 (28), 21	13 (34), 241(10	) M <sup>+</sup> ).				

Chem. Name		1-(2-iodobenzyl)-4-cyclohexyl-1 <i>H</i> -1,2,3-triazole (3u)								
Lit. Ref.					_					
$\begin{array}{c} & & & \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & & \\ & & & \\ & & & \\ & &$										
<b>METHOD:</b> In a screw-capped vial copper(II) sulfate pentahydrate (2.5mg, 0.01 mmol), sodium ascorbate (10 mg, 0.05 mmol), Polarclean/H <sub>2</sub> O (4:1, 1 mL), 1-(azidomethyl)-2-iodobenzene ( <b>2d</b> ) (130 mg, 0.5 mmol) and ethynylcyclohexane ( <b>1g</b> ) (54 mg, 0.5 mmol) were added consecutively. A magnetic stirring bar was added and the solution was stirred at 50 °C for 24 hours. The product was filtered with a Büchner funnel, washed with water (0.5 mL) and dried under vacuum. 1-(2-lodobenzyl)-4-cyclohexyl-1 <i>H</i> -1,2,3-triazole ( <b>3u</b> ) was obtained as a white solid (182 mg, 99% yield).										
Mol Formula	a		C15H1	۵IN2	m.p.	126-129°C				
Elemental Analys	is: Calc.: C	: 49.06:	: H: 4.94: N:	: 11.44. Found: C: 49	).00: H: 4.90: N	J: 11.40				
1	valu	ie	No. H	Mult.	, ,	j value/Hz				
'H NMR 400 MHz	7.93	3	1	d	7.6					
DMSO-d6	7.84	1	1	S						
	7.40	)	1	t		14.8				
	7.10	)	1	t		14.4				
	6.99	9	1	d		7.6				
	5.56	6	2	S						
	2.6	7	1	S						
	1.95-1	.93	2	т						
	1.74-1	.65	3	т						
	1.41-1	.30	4	т						
	1.26-1	.20	1	m						
<sup>13</sup> C NMR (100.6 M GC-EIMS (m/z, %)	Hz, DMSO ): 67 (23), 9	- <b>d6) δ:</b> 2	26.1, 33.0, 3 , 94 (26), 12	35.1, 57.7, 99.5, 121 22 (60), 217 (100), 24	.6, 129.3, 129. 40 (22), 311 (3	8, 130.6, 138.7, 139.9 6), 367 (28 M⁺).				

Chem. Name	1-(2-bromobenzyl)-4-cyclohexyl-1 <i>H</i> -1,2,3-triazole (3v)							
Lit. Ref.		Tetrahedron <b>2010</b> , <i>66,</i> 8846–8853						
+ $N_3$ Br $N_3$ $N_$								
<b>METHOD:</b> In a screw-capped vial copper(II) sulfate pentahydrate (2.5mg, 0.01 mmol), sodium ascorbate (10 mg, 0.05 mmol), Polarclean/H <sub>2</sub> O (4:1, 1 mL), 1-(azidomethyl)-2-bromobenzene ( <b>2e</b> ) (106 mg, 0.5 mmol) and ethynylcyclohexane ( <b>1g</b> ) (54 mg, 0.5 mmol) were added consecutively. A magnetic stirring bar was added and the solution was stirred at 50 °C for 24 hours. The product was filtered with a Büchner funnel, washed with water (0.5 mL) and dried under vacuum. 1-(2-Bromobenzyl)-4-cyclohexyl-1 <i>H</i> -1,2,3-triazole ( <b>3v</b> ) was obtained as a pale yellow solid (159 mg, 99% yield).								
Mol Formula	Mol Formula		C15H18BrN3		m.p.	81-82 °C		
Elemental Analys	is: Calo	c.: C: 56.26	6; H: 5.67; N:	13.12. Found: C: 56	5.20; H: 5.60; N	J: 13.10		
1	value		No. H	Mult.	j value/Hz			
400 MHz		7.89	1	S				
DMSO-d6		7.68	1	d	7.6			
		7.40	1	t	14.8			
		7.30	1	t	14.0			
		7.08	1	d	7.6			
		5.61	2	S				
		2.67	1	S				
	1.9	95-1.93	2	т				
	1.7	73-1.65	3	т				
	1.4	11-1.30	4	т				
	1.2	26-1.20	1	т				
<sup>13</sup> C NMR (100.6 MHz, DMSO-d6) δ: 26.0, 26.1, 33.0, 35.1, 53.2, 121.6, 128.7, 130.6, 130.7,133.3, 152.8								
GC-EIMS (m/z, %)	: 90 (40	0), 94 (18),	122 (36), 16	69 (100), 212 (15), 24	40 (10), 320 (2	M <sup>+</sup> ).		

Chem. Name	1-(2-chlorobenzyl)-4-cyclohexyl-1 <i>H</i> -1,2,3-triazole (3w)							
Lit. Ref.	_							
+ $N_3$ + $Cl$ $N_3$ + $Cl$ $N_3$ + $Cl$ $N_3$ Polarclean/H <sub>2</sub> O (2 mol%) Na-ascorbate (10 mol%) Polarclean/H <sub>2</sub> O (4:1) 50 °C, 24 h								
<b>METHOD:</b> In a screw-capped vial copper(II) sulfate pentahydrate (2.5mg, 0.01 mmol), sodium ascorbate (10 mg, 0.05 mmol), Polarclean/H <sub>2</sub> O (4:1, 1 mL), 1-(azidomethyl)-2-chlorobenzene ( <b>2</b> f) (84 mg, 0.5 mmol) and ethynylcyclohexane ( <b>1</b> g) (54 mg, 0.5 mmol) were added consecutively. A magnetic stirring bar was added and the solution was stirred at 50 °C for 24 hours. The product was filtered with a Büchner funnel, washed with water (0.5 mL) and dried under vacuum. 1-(2-Chlorobenzyl)-4-cyclohexyl-1 <i>H</i> -1,2,3-triazole ( <b>3w</b> ) was obtained as a pale yellow solid (121 mg, 88% yield).								
Mol Formula	a	C15H18CIN3		CIN <sub>3</sub>	m.p.	112-114 °C		
Elemental Analys	<b>is:</b> Cal	c.: C: 65.3	3; H: 6.58; N:	15.24. Found: C: 65	5.30; H: 6.55; N	l: 15.20		
	,	value	No. H	Mult.		j value/Hz		
400 MHz		7.86	1	S				
DMSO-d6		7.51	1	d		7.6	1	
	7.4	40-7.33	2	т				
		7.15	1	d		6.4		
		5.64	2	S				
		2.66	1	S				
		1.92	2	S				
	1.6	68-1.64	3	т				
	1.3	38-1.33	4	т				
	1.2	22-1.20	1	т				
<sup>13</sup> C NMR (100.6 M	Hz, DM	ISO-d6) δ	: 152.8, 134.(	), 132.9, 130.7, 130.	5, 130.0, 128.2	2, 121.5, 50.8, 35.1, 33.0, 2	26.1, 26.0	
GC-EIWIS (III/2, %)	<b>J.</b> 09 (27	2), 120 (IC	<i>JUJ</i> , 1 <i>21</i> (34),	212 (10), 240(13), 2				



Chem. Name	4-(thiophen-3-yl)-1-( <i>p</i> -tolyl)-1 <i>H</i> -1,2,3-triazole (3y)							
Lit. Ref.	_							
S	s +	N <sub>3</sub>	CuSO <sub>4</sub> ·5H Na-ascorb Polarclea 50 °	H₂O (2 mol%) ate (10 mol%) nn/H₂O (4:1) C, 24 h	S N N			
<b>METHOD:</b> In a screw-capped vial copper(II) sulfate pentahydrate (2.5mg, 0.01 mmol), sodium ascorbate (10 mg, 0.05 mmol), Polarclean/H <sub>2</sub> O (4:1, 1 mL), 1-azido-4-methylbenzene ( <b>2c</b> ) (67 mg, 0.5 mmol) and 3-ethynylthiophene ( <b>1h</b> ) (54 mg, 0.5 mmol) were added consecutively. A magnetic stirring bar was added and the solution was stirred at 50 °C for 24 hours. The product was filtered with a Büchner funnel, washed with water (0.5 mL) and dried under vacuum. 4-(Thiophen-3-yl)-1-( <i>p</i> -tolyl)-1 <i>H</i> -1,2,3-triazole ( <b>3y</b> ) was obtained as a yellow solid (119 mg, 99% yield).								
Mol Formula	a	C <sub>13</sub> H <sub>11</sub>	<sub>11</sub> N <sub>3</sub> S <b>m.p.</b>		181-185 °C			
Elemental Analysis: Calc.: C: 64.71; H: 4.59; N: 17.41. Found: C: 64.70; H: 4.50; N: 17.40								
	value	No. H	Mult.		j value/Hz			
400 MHz	9.11	1	S					
DMSO-d6	7.94-7.93	1	т					
	7.81	2	d		8.0			
	7.71-7.69	1	т					
	7.60-7.59	1	т					
	7.43	2	d		8.0			
	2.40	3	S					
<sup>13</sup> C NMR (100.6 MHz, DMSO-d6) δ: 21.1, 119.7, 120.3, 121.8, 126.3, 127.8, 130.7, 132.0, 134.8, 138.8, 144.2								
GC-EIMS (m/z, %	<b>):</b> 65 (20), 122 (19)	, 213 (100),	241 (17 M <sup>+</sup> ).					



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