

EUROFINS Umwelt Ost GmbH · Niederlassung Freiberg  
OT Tuttendorf, Gewerbepark "Schwarze Kiefern" · D-09633 Halsbrücke

**Ithaka Institute for Carbon Cycling**  
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**CH-1974 Arbaz**  
**SCHWEIZ**

Title: **Test report to order 11409720**  
Test report: **No. 1010036010K1**  
***This test report replaces the test report no. 1010036010***  
***with date of 08.08.2014***

Project: **No. 1010036**  
Title of project: **Kon-Tiki II, Soil Kiln**  
Number of samples: **1 sample**  
Sample type: **bio char**  
Sampler: **unknown**  
Receipt of samples: **2014-07-25**  
Test period: **2014-07-25 - 2014-08-13**

Annex: **Thermogravimetry**

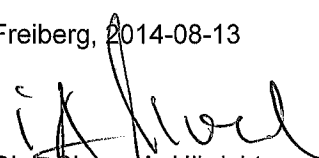
Subcontraction:  
(§76)

The test results refer solely to the analysed test specimen. Unless the sampling was done by our laboratory or in our sub-order the responsibility for the correctness of the sampling is disclaimed. This test report is only valid with signature and may only be further published completely and unchanged. Extracts or changes require the authorisation of the EUROFINS UMWELT in each individual case.

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The GTCS are available on <http://www.eurofins.de/umwelt/avb.aspx>.

Accredited test laboratory according to DIN EN ISO/IEC 17025 notification under the DAkkS German Accreditation System for Testing. The accreditation shall apply for the tests listed in the certificate.

Freiberg, 2014-08-13

  
Dipl.-Chem. A. Ulbricht  
Head of Laboratory



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Project: Kon-Tiki II, Soil Kiln

**Analysis according to European Biochar Certificate**

Parameter	Unit	LOQ	limits		Sample designation	Kon-Tiki II	
			GW 1	GW 2	Lab-ID#	114049997	
					Method		db
bulk density	kg/m <sup>3</sup>				DIN 51705	530	-
specific surface area (BET) (§76)	m <sup>2</sup> /g				DIN 66132/ISO 9277	-	289,9
true density (§76)	g/cm <sup>3</sup>				DIN 66137	-	1,73
total water	% w/w	0,1			DIN 51718	31,2	-
ash content at 550°C	% w/w	0,1			analogue DIN 51719	12,8	18,6
hydrogen	% w/w	0,1			DIN 51732	0,73	1,07
carbon, total	% w/w	0,2	> 50	> 50	DIN 51732	55,6	80,8
nitrogen, total	% w/w	0,05			DIN 51732	0,26	0,39
oxygen, diff.	% w/w				DIN 51733, calculated	-0,7	-1,0
carbonate as CO <sub>2</sub>	% w/w	0,4			DIN 51726	2,01	2,92
carbon, organic	% w/w				calculated	55,1	80,0
ratio H/C (molar)			< 0,6	< 0,6	calculated	0,16	0,16
ratio H/Corganic (molar)			< 0,7	< 0,7	calculated	0,16	0,16
ratio O/C (molar)			< 0,4	< 0,4	calculated	-0,01	-0,01
sulfur, total	% w/w	0,03			DIN 51724-3	0,06	0,08
pH value (CaCl <sub>2</sub> )			≤ 10	≤ 10	DIN ISO 10390	8,6	-
electrical conductivity	µS/cm	1			BGK Kapitel III. C2	575	-
salt content	g/kg				BGK Kapitel III. C2	3,05	4,44
salt content calc. with bulkdensity	g/l				BGK Kapitel III. C2	1,62	2,35
thermogravimtrie					TGA 701 D4C (N)	see annex	-

**Determination from the microwave digestion according to DIN 22022**

lead (Pb)	g/t	2	< 150	< 120	DIN EN ISO 17294-2	-	32
cadmium (Cd)	g/t	0,2	< 1,5	< 1	DIN EN ISO 17294-2	-	< 0,2
copper (Cu)	g/t	1	< 100	< 100	DIN EN ISO 17294-2	-	130
nickel (Ni)	g/t	1	< 50	< 30	DIN EN ISO 17294-2	-	5
mercury (Hg)	g/t	0,07	< 1	< 1	DIN EN 1483	-	< 0,07
zinc (Zn)	g/t	1	< 400	< 400	DIN EN ISO 17294-2	-	180
chromium total (Cr)	g/t	1	< 90	< 80	DIN EN ISO 17294-2	-	13
boron (B)	mg/kg	1			DIN EN ISO 17294-2	-	50
manganese (Mn)	mg/kg	1			DIN EN ISO 17294-2	-	160

**Determination from the melting digestion on ash 550°C according to DIN 51729-1/ -11 - referred to original substance**

phosphorus	mg/kg	-9990000			DIN EN ISO 11885	-	2400
magnesium	mg/kg	-9990000			DIN EN ISO 11885	-	5900
calcium	mg/kg	-9990000			DIN EN ISO 11885	-	54000
potassium	mg/kg	-9990000			DIN EN ISO 11885	-	8200
sodium	mg/kg	-9990000			DIN EN ISO 11885	-	650
iron	mg/kg	-9990000			DIN EN ISO 11885	-	2100
silicon	mg/kg	-9990000			DIN EN ISO 11885	-	5500
sulfur	mg/kg	-9990000			DIN EN ISO 11885	-	1200

Project: Kon-Tiki II, Soil Kiln

**Analysis according to European Biochar Certificate**

Parameter	Unit	LOQ	limits		Sample designation	Kon-Tiki II	
			GW 1	GW 2	Lab-ID#	114049997	
					Method		db

**Determination from the toluene extract**

naphthalene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	3,3
acenaphthylene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	< 0,1
acenaphthene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	< 0,1
fluorene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	0,2
phenanthrene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	0,6
anthracene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	0,2
fluoranthene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	0,1
pyrene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	0,1
benz(a)anthracene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	< 0,1
chrysene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	< 0,1
benzo(b)fluoranthene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	< 0,1
benzo(k)fluoranthene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	< 0,1
benzo(a)pyrene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	< 0,1
indeno(1,2,3-cd)pyrene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	< 0,1
dibenz(a,h)anthracene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	< 0,1
benzo(g,h,i)perylene (toluene extr.)	mg/kg	0,1			analogue DIN EN 15527	-	< 0,1
sum PAH (EPA) (toluene extr.)	mg/kg		< 12	< 4	calculated	-	4,50

**Annotation:**

limit 1: quality level basic (referred to dry substance)

limit 2: quality level premium (referred to dry substance)

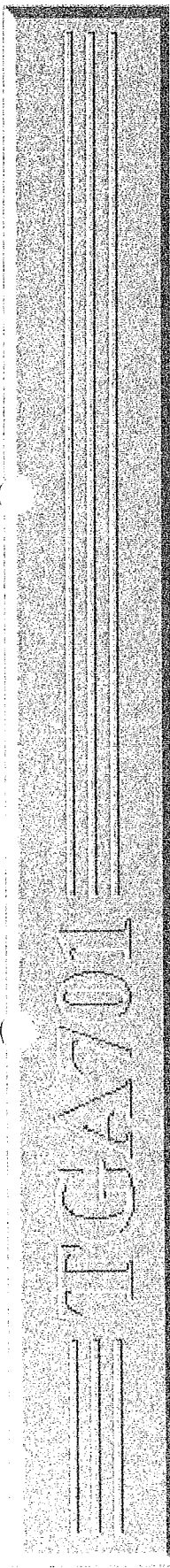
(Ho,V) and (Hu,p) complies calorific value at constant volume or pressure

(N) - not accredited method

ar: as received basis

db: dry basis

EUROFINS UMWELT is not liable for accuracy of the cited limits.

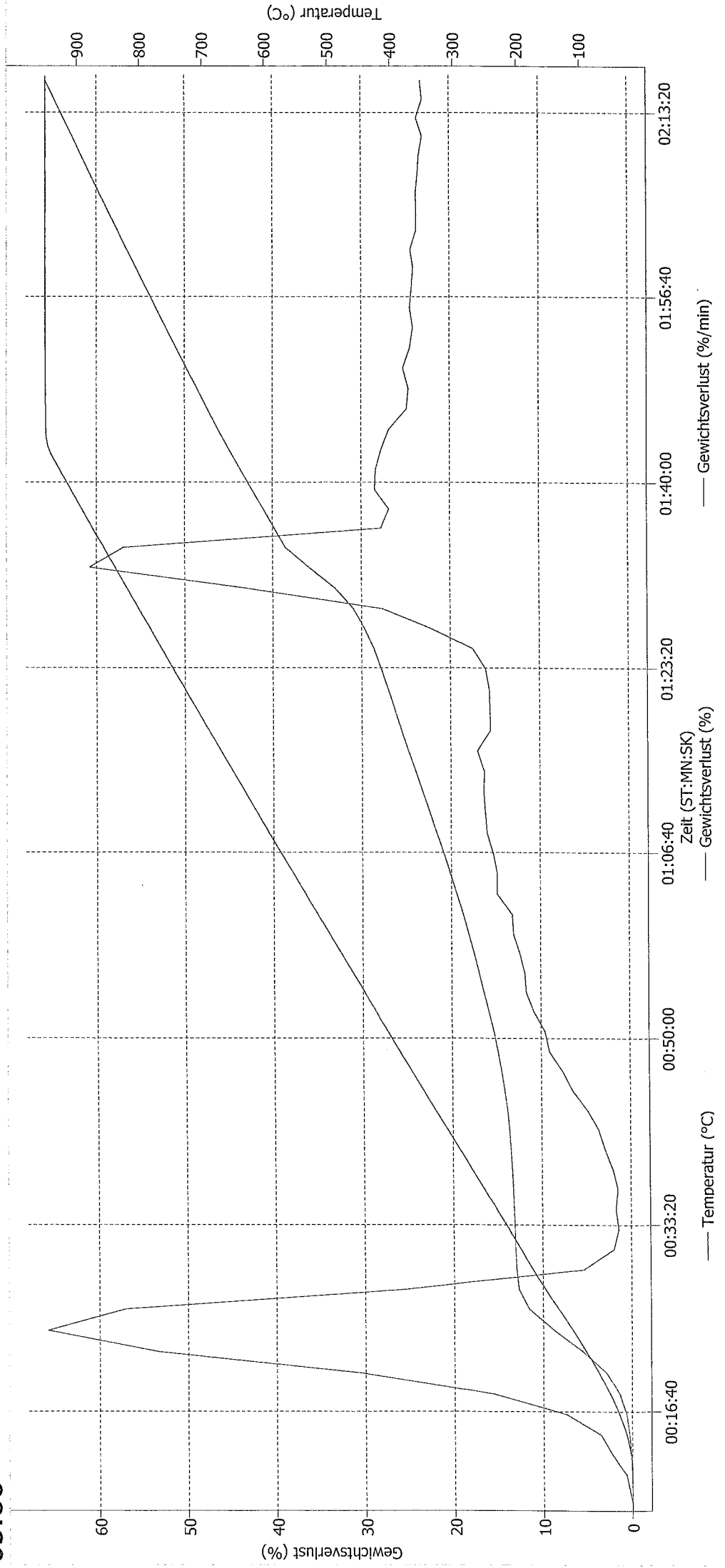


Name	Position	Methode	Ausgangsgewicht	Wasser	Wasser	135	Asche	810	Asche	815	Asche	815	Datum der Analyse	GV:550	Dauer der Analyse	TGA 950	(Wf) GV:550
11404997	12	TGA 950 N (Pflanzenkohle)	1.0951										8/6/2014 9:55:32 AM		02:16:48	65.88	
11404997	16	TGA 950 N (Pflanzenkohle)	1.0695										8/6/2014 9:55:33 AM		02:16:48	65.77	
Mittelwert			1.0823	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		65.82	0.00
ABW- Abweichung			0.02	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000		0.083	0.000
RSD			1.673	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000		0.127	0.000

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Name	Position	Methode	Ausgangsge- wicht	Wasser	Wasser	Asche 135	Asche 550	Asche 810	Asche 815	Datum der Analyse	Dauer der Analyse	TGA 950 (wf)	GV 550	GV 600	Gewicht
114049997	12	TGA 950 N (Pflanzenkohle)	1.0951							8/6/2014 9:55:32 AM	02:16:48	65.88			

**TGA 950**  
**65.88**





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Name	Position	Methode	Ausgangsgewicht	Wasser	135	Asche	550	Asche	810	Asche	815	Datum der Analyse	Dauer der Analyse	TGA 950 (wf)	GV 550	GV 600	Gewicht
114049997	16	TGA 950 N (Pflanzenkohle)	1.0695									8/6/2014 9:55:33 AM	02:16:48	65.77			

TGA 950  
65.77

