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Aschaffenburg, 1 July 2021

From: Eis-ci
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REPORT

Order No.: 18285/6 **Page 1 of 7 pages**

Client: Woodland Pulp LLC
Woodland Mill
144 Main Street
Baileyville, ME 04694
USA

Date of order: 28 April 2021

Receipt of sample material: 20 May 2021

Origin of sample material: From the client

Purpose: Analysis of a pulp grade for its compliance with the demands on food contact materials

(Höfert)
Officially certified and authorized food chemist

(Eisert)
M. Sc. Food chemistry
Project manager

The present report refers exclusively to the samples as laid out therein. Information and statistical data on the results can be obtained on request.

Sample Material

For analysis the following sample material was in hand:

Hardwood Pulp Sample Lot # 1578, gathered on May 11, 2021;
Hardwood Grade Profile - Prime

Carrying out of the Tests

Examination period: 20 May 2021 to 28 June 2021

1. Determination of the Moisture Content *

The determination was performed as single determination according to DIN EN ISO 638:2009-01 in the condition as received.

Result: 10.6 %

2. Preparation of Extracts *

The extracts were prepared according to the "Methodensammlung zur Untersuchung von Papier, Karton und Pappe für den Lebensmittelkontakt" (collection of methods for the examination of paper and board for food contact) of the BfR as well as according to DIN EN 645:1994-01, 647:1994-01 and 15519:2008-01. The selection of suitable procedures for simulating the transfer of substances was performed according to the corresponding BfR guideline ("Leitfaden zur Überprüfung der Stoffübergänge von Bedarfsgegenständen aus Papier, Karton und Pappe").

Water: 2 hours at 80 °C
Isooctane: 2 hours at 60 °C

3. Determination of the Dry Matter in the Water Extract *

The determination was performed according to DIN EN 920:2000-12 gravimetrically after drying at 105 °C:

Result: 1.8 mg/g dry matter

4. Determination of Methanal (Formaldehyde) in the Water Extract *

The determination was performed according to DIN EN 1541:2001-07 photometrically in line with the acetylacetone method.

Result: not quantifiable < 0.004 mg/g dry matter

5. Determination of the Nitrogen Content in the Water Extract *

After the Kjeldahl disintegration and subsequent water vapour distillation, the determination of the ammonium nitrogen was performed photometrically according to DIN 38406-E5-1:1983-10.

Result:	not quantifiable	<	0.015	mg/g dry matter

6. Determination of the Elements in the Water Extract *

The determination was performed according to DIN EN 12498:2019-02.

Result:

Cadmium	(Cd):	not quantifiable	<	0.001	mg/l water extract
Lead	(Pb):	not quantifiable	<	0.001	mg/l water extract
Aluminium	(Al):	not quantifiable	<	0.2	mg/l water extract

7. Determination of the Dry Matter in the Organic Solvent Extract *

The dry matter was determined according to DIN EN 1186:2002-07 after drying at 105 °C.

Result:	not quantifiable	<	0.5	mg/g dry matter

8. Determination of the Transfer of Antimicrobial Constituents *

The determination was made according to DIN EN 1104:2019-01. Test specimens of a diameter of 10 mm were placed onto an inoculated nutrient medium and then incubated. The inhibition zone is indicated as total diameter (including the test specimen).

Result:

with *Aspergillus niger*: Microbial growth up to the edges of the test specimens

with *Bacillus subtilis*: Microbial growth up to the edges of the test specimens. Presence of a modification of the test microorganism *B. subtilis* growth at the edges of the test pieces

Comment:

According to the current state of standardization, proof of the presence of an inhibition zone is provided by the absence of test microorganism growth in a minimum diameter of 14 mm. Therefore, a transfer of antimicrobial constituents is considered as not detected

9. Test for Fluorescent Substances *

The test was made by UV irradiation.

Result: The sample did not contain optically brightened fibres.

10. Determination of the Heavy Metals Contents *

The determination was performed after microwave disintegration by means of AAS or ICP-OES.

Result:

Arsenic	(As):	not quantifiable	<	2	mg/kg dry matter
Cadmium	(Cd):	not quantifiable	<	0.5	mg/kg dry matter
Chromium	(Cr):	not quantifiable	<	1	mg/kg dry matter
Mercury	(Hg):	not quantifiable	<	0.25	mg/kg dry matter
Lead	(Pb):	not quantifiable	<	2	mg/kg dry matter
Copper	(Cu):	not determinable	<	2	mg/kg dry matter
Zinc	(Zn):	not determinable	<	10	mg/kg dry matter

11. Determination of Anthraquinone [84-65-1] and 2-Ethylanthraquinone [84-51-5] *

The determination was performed according to SOP 160.200 by means of GCMS after extraction with 95 % ethanol (v/v) at 60 °C.

Result:

Anthraquinone:	not quantifiable	<	0.13	mg/kg dry matter
2-Ethylanthraquinone:	not quantifiable	<	0.56	mg/kg dry matter

12. Determination of the Residue on Ignition *

The determination was performed according to ISO 2144:2015-05 gravimetrically after the sample was incinerated at 900 °C.

Result: 0.4 % of the dry matter

13. Determination of Organic Halogenated Compounds (OX) *

The determination was performed according to ISO 11480:2017-05, clause 4 (microcoulometric method).

Result: 150 mg/kg

14. Determination of Acrylamide [79-06-1] in the Water Extract *

The determination was performed according to SOP 162.200 by means of LCMS.

Result: not quantifiable < 0.01 mg/l extract

15. Determination of Mineral Oil Hydrocarbons (MOSH and MOAH) *

The determination of the paraffinic, naphthenic mineral oil hydrocarbons (MOSH) and of the aromatic mineral oil hydrocarbons (MOAH) was performed according to the method published by the German "National Reference Laboratory for Materials in contact with food".
After extraction with a mixture of ethanol/hexane, the analysis was performed by means of on-line coupled HPLC-GC-FID using internal standards. In both fractions the chromatographically not resolved hump including signals on top was integrated. Hydrocarbon compounds not defined as mineral oil were deducted during the quantification.

Result:

MOSH – < C_{16}	not determinable	<	5	mg/kg
MOSH – C_{16} - ≤ C_{25}:	not determinable	<	3	mg/kg
MOSH – C_{16} - ≤ C_{35}:	not determinable	<	3	mg/kg
MOSH – C_{20} - ≤ C_{35}:	not determinable	<	3	mg/kg
MOAH – < C_{16}	not determinable	<	5	mg/kg
MOAH – C_{16} - ≤ C_{25}:	not determinable	<	3	mg/kg
MOAH – C_{16} - ≤ C_{35}:	not determinable	<	3	mg/kg

16. Determination of Methanol

The determination was performed according to SOP 160.200 by means of head space chromatography.

Result:	not quantifiable	<	0.4	mg/m²

17. Extraction Tests According to the FDA Regulations *

The determination was performed according to 21 CFR 176.170 in triplicate.

a) Solvent: Water

Condition: 2 hours at 121 °C (condition of use A)

Result:	0.22	mg/sq inch
chloroform soluble portion:	The determination is not necessary as the test result already corresponds with the limit value.	

Comment: Limit Value (chloroform soluble portions): 0.5 mg/ sg inch

b) Solvent: n-Heptane

Condition: 2 hours at 66 °C (condition of use A)

Result: not quantifiable < 0.065 mg/sq inch

chloroform soluble portion: The determination is not necessary as the test result already corresponds with the limit value.

Comment: Limit Value (chloroform soluble portions): 0.5 mg/ sg inch

c) Solvent: Water

Condition: 30 minutes at 100 °C (condition of use B)

Result: not quantifiable < 0.065 mg/sq inch

chloroform soluble portion: The determination is not necessary as the test result already corresponds with the limit value.

Comment: Limit Value (chloroform soluble portions): 0.5 mg/ sg inch

d) Solvent: n-Heptane

Condition: 30 minutes at 49 °C (condition of use B)

Result: not quantifiable < 0.065 mg/sq inch

chloroform soluble portion: The determination is not necessary as the test result already corresponds with the limit value.

Comment: Limit Value (chloroform soluble portions): 0.5 mg/ sg inch

18. Sensory Analysis of a Filter Paper *

The examination was made on the basis of DIN 10 955.

The pulp grade was scalded with 250 ml hot water. The water in its hot state was evaluated by six assessors in an extended triangular test according to DIN ISO 4120. As a reference sample water was taken which had been scalded, too, but which had not been in contact with the sample.

Result:

No statistically confirmed difference could be noticed between the taste of the water which had been in direct contact with the sample and the water which had not been in contact to the sample.

Evaluation (median): < 1

Scale of intensity:

0 = no perceptible off-flavour
1 = off-flavour just perceptible (still difficult to define)
2 = moderate off-flavour
3 = moderately strong off-flavour
4 = strong off-flavour

The accreditation applies to the methods marked with * in the test report (Register no. D-PL-14160-01-01 and D-PL-14160-01-02).

End of report