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Aschaffenburg, 15 November 2024

From: Be-pf
Authorized by: Behrendt

REPORT

Order No.: 17401/6-3 **Page 1 of 7 pages**

Client: Ningbo Jinxiang Paper Co., Ltd.
309#, Gong Yuan Road, Beilun,
Ningbo, Zhejiang 315803
China

Date of order: 15 May 2024

Receipt of sample material: 21 May 2024

Origin of sample material: From the client

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

(Dr. Derra)
Managing Director

(Behrendt)
Officially certified
and authorized food
chemist

The present report exclusively refers to the samples mentioned. It meets the requirements of the DIN EN ISO/IEC 17025:2018 for simplified test reports. Additional information and statistical data on the results are available upon request.

DAkkS
Deutsche
Akkreditierungsstelle
D-PL-14160-01-01
D-PL-14160-01-02

Geschäftsführer: Dr. Ralph Derra . Handelsregister Aschaffenburg HRB 3329
Die Veröffentlichung von Ergebnissen unserer Arbeiten und Gutachten sowie die Verwendung für Werbezwecke bedürfen – auch auszugsweise – unserer schriftlichen Genehmigung. Erfüllungsort und Gerichtsstand Aschaffenburg.

Sample Material

For analysis the following sample material was in hand:

Sample 3: Natural Hearty with Biopolymer

Carrying out of the Tests

Examination period: 1 August 2024 to 12 November 2024

1. Determination of the Grammage *

The determination was performed according to DIN EN ISO 536:2012-11 after conditioning of the sample at 23 °C/50 % relative humidity which is prescribed as standard atmosphere with a reduced amount of test specimens.

Result: 302 g/m² ≙ 283 g dry matter/m²

2. Determination of the Moisture Content *

The determination was performed as single determination according to DIN EN ISO 638-1:2022-07 in the condition as received.

Result: 6.2 %

3. 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:	24 hours at 23 °C
Isooctane:	24 hours at 20 °C
95 % Ethanol:	2 hours at 60 °C

4. 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: 24 mg/dm² ≙ 8.6 mg/g dry matter

5. 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

6. Determination of Glyoxal in the Water Extract *

The determination was performed according to DIN 54603:2008-08.

Result:	not quantifiable	<	0.005	mg/g dry matter

7. Determination of the Elements in the Water Extract *

The determination was performed according to DIN EN 12498:2019-02 (Pb, Cd, Cr) as well as to DIN EN 17917:2024-02 (Al).

Result:

Lead	(Pb) | ICP-MS:	not quantifiable	<	0.001	mg/l water extract
Cadmium	(Cd) | ICP-MS:	not quantifiable	<	0.001	mg/l water extract
Chromium	(Cr) | ICP-MS:	not quantifiable	<	0.004	mg/l water extract
Aluminium	(Al) | ICP-MS:	not quantifiable	<	0.2	mg/l water extract

8. IR-Spectroscopic Testing of the Dry Matter from the Water Extract *

The dry matter was ground up with KBr and examined by IR-spectroscopy.

Result: Substances which might endanger health as well as deviations from the composition stated, which are detectable by this method, were not found.

9. Gaschromatographic Analysis of the Organic Solvent Extract *

The determination was performed according to SOP 160.200 by means of GC-FID in the isooctane extract. All compounds which elute between tetradecane (C_{14}) and tetracontane (C_{40}) were summed up semi-quantitatively against the internal standard tridecane (C_{13}). Analogously, a separate evaluation of the dialkyl ketones was performed considering the following substances:

Dipentadecyl ketone (Palmitone) Pentadecylheptadecyl ketone Diheptadecyl ketone (Stearone)
Heptadecylnonadecyl ketone Dinonadecyl ketone Nonadecylheneicosyl ketone
Diheneicosyl ketone

Result:

Sum C_{14} - C_{40}	1.11	mg/dm²	≙	0.4	mg/g dry matter
Dialkyl ketones	not quantifiable		<	0.05	mg/g dry matter

10. 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.

Comment:

The 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.

11. Test for Fluorescent Substances *

The test was made by UV irradiation.

Result: The sample did not contain optically brightened fibres.

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

The determination was performed according to DIN CEN/TS 17630:2021-09 by means of GCMS after extraction with 95 % ethanol (v/v).

Result:

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

13. Determination of 1,3-Dichloro-2-propanol [96-23-1] and 3-Monochloro-1,2-propanediol [96-24-2] in the Water Extract *

The determination was performed after solid phase extraction according to the Official Collection of Analytical Methods § 64 of the LFGB, method B 80.56-2:2002-09 by means of GCMS.

Result:

1,3-Dichloro-2-propanol (DCP):	not detected	<	2	µg/l water extract
3-Monochloro-1,2-propanediol (MCPD):	not detected	<	2	µg/l water extract

14. Determination of Isocyanates *

The determination was performed according to EN 13130-8:2004-08 by means of HPLC fluorescence.

Result (measured as NCO):

Phenyl isocyanate	[103-71-9]	not quantifiable	<	0.04	mg/kg
Cyclohexyl isocyanate	[3173-53-3]	not quantifiable	<	0.04	mg/kg
1,5-Naphthalene diisocyanate	[3173-72-6]	not quantifiable	<	0.05	mg/kg
2,4-Toluene diisocyanate	[584-84-9]	not quantifiable	<	0.06	mg/kg
2,6-Toluene diisocyanate	[91-08-7]	not quantifiable	<	0.06	mg/kg
Diphenylmethane-4.4´-diisocyanate	[101-68-8]	not quantifiable	<	0.04	mg/kg
1,6- Hexamethylene diisocyanate	[822-06-0]	not quantifiable	<	0.06	mg/kg
Isophorone diisocyanate	[4098-71-9]	not quantifiable	<	0.05	mg/kg

15. Determination of the Overall Migration *

The migration was performed as a determination in triplicate according to the series of standards EN 1186:2002-07, in connection with the DIN EN 1186-2:2022-10, the DIN EN 1186-3:2022-10 as well as the EN 13130-1:2004-08. If required, the CEN/TS 14234:2003-01 as well as CEN/TS 14235:2003-01 were considered.

The test simulants as well as the contact conditions were chosen in accordance with the requirements of annex III and V of Regulation (EU) No 10/2011.

A. Conditions: 10 days at 40 °C (OM 2)

Test simulants: acetic acid 3 % (w/w) (food simulant B)
ethanol 10 % (v/v) (food simulant A)
ethanol 95 % (v/v) (instead of food simulant D2)

Testing procedure: one-sided contact (coated side)

Result:

acetic acid 3%:	not quantifiable	<	2	mg/dm²
ethanol 10%:	not quantifiable	<	2	mg/dm²
ethanol 95%:			4.8	mg/dm²

B. Conditions: 2 days at 20 °C

Test simulants: isooctane (instead of food simulant D2)

Testing procedure: one-sided contact (coated side)

Result:

isooctane:	not quantifiable	<	2	mg/dm²

16. Determination of the Specific Migration

The determination was performed in duplicate in the same test simulants after a storage period under the conditions indicated above and subsequently mentioned.

C.	Conditions:	10 days at 60 °C
	Test simulants:	acetic acid 3 % (w/w) (food simulant B) vegetable oil (food simulant D2) ethanol 95 % (v/v) (instead of food simulant D2)
	Testing procedure:	one-sided contact (coated side)

16.1. 1,4-Butanediol *

The determination was performed according to EN 13130-7:2004-08 by means of GC-FID in the simulants acetic acid 3% and ethanol 95% (C. Conditions).

Result:

acetic acid 3%:	not quantifiable	<	0.5	mg/dm²
ethanol 95%:	not quantifiable	<	0.5	mg/dm²

16.2. Tetrahydrofuran [109-99-9] *

The determination was performed according to SOP 160.200 by means of Headspace-GCMS in the simulants acetic acid 3% and oil (C. Conditions).

Result:

acetic acid 3%:	not quantifiable	<	0.02	mg/dm²
oil:	not quantifiable	<	0.01	mg/dm²

16.3. Terephthalic acid [100-21-0], Isophthalic acid [121-91-5] and Phthalic acid [88-99-3] *

The determination was performed according to EN 13130-2:2004-08 by means of HPLC-UV in the simulants acetic acid 3% and ethanol 95% (C. Conditions).

Result:

acetic acid 3% + ethanol 95%:

Terephthalic acid:	not quantifiable	<	0.1	mg/dm²
Isophthalic acid:	not quantifiable	<	0.1	mg/dm²
Phthalic acid:	not quantifiable	<	0.1	mg/dm²

16.4. Elements *

The determination was performed by means of AAS or ICP-OES or ICP-MS in the simulant acetic acid 3% (C. Conditions).

Result:

Mercury	(Hg):	not quantifiable	<	0.0001	mg/dm²
Arsenic	(As):	not quantifiable	<	0.0002	mg/dm²
Cadmium	(Cd):	not quantifiable	<	0.0001	mg/dm²
Lead	(Pb):	not quantifiable	<	0.0005	mg/dm²
Antimony	(Sb):	not quantifiable	<	0.0005	mg/dm²
Chromium	(Cr):	not quantifiable	<	0.001	mg/dm²
Nickel	(Ni):	not quantifiable	<	0.001	mg/dm²

16.5. NIAS-GCMS-Screening

The determination was performed semi-quantitatively according to SOP 160.200 by means of on-column-GCMS against deuterated nonadecane in the simulant ethanol 95% (C. Conditions). For the specific evaluation of the signals in the chromatogram a commercially available mass spectra library was used.

Result:

The following compounds could be detected:

Sum of resin acid based structures	4180	µg/dm²
Sum of lactic acid polymers	32	µg/dm²
Sum of alkanes	81	µg/dm²
Sum of lactic acid dimers	88	µg/dm²
Sum of plastic oligomers	1307	µg/dm²

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

End of report