

CONFIDENTIAL!
Not to be released
without appropriate
authorization!

LABORATORY REPORT

Advanced
Materials
Center, Inc.

125 Swanson Street Ottawa, IL. 61350 (815) 433-1495 Fax (815) 433-1795

To: E2E FoodPack
Mike Gorski

Date: May 22, 2009
Project: 09P1099 FTIR/Ash/Metals

Purpose:

Evaluate one (1) molded Bioplastic Cutlery sample for 13 each metal and element concentrations to determine if it meets BPI (Appendix A) and ASTM D 6400-04 requirements. Also provide comparison to current BNQ (Canada), European and Japanese requirements. Use FTIR infrared spectrometry, ash testing and AA heavy metals analysis for composition verification.

Sample Identification:

A. Bioplastic Cutlery

09-004 – PBS Knife – Jan. 6 – 46.0 mil

09-005 – PBS Fork – Jan. 6 – 45.0 mil

09-005 – PBS Spoon – Jan. 6 – 42.0 mil

Source:

E2E Foodpack

Conclusions:

In our opinion, the analysis of the Cutlery shows that the sample can meet ASTM D 6400-04 specifications and BPI requirements for % Ash, FTIR and Metals Analysis.

Results:

The FTIR transmission spectra for the samples were obtained to ID the material compositions evaluated of the sample and are attached for reference.

In our opinion, the spectrum for Sample A verifies that the cutlery is composed of PBS and Calcium Carbonate (CaCO₃).

Ash testing shows an inorganic residue of **21.78%** by weight on Sample A as received.

Refer to Table I attached for a results summary by element.

Heavy Metals / element testing using wet ashing of Sample A shows the presence of Cadmium (Cd), Calcium (Ca), Chromium (Cr), Copper (Cu), Iron (Fe), Lead (Pb), Nickel (Ni) and Zinc (Zn) are present but, below the BPI Appendix A requirements for the US and Canada.

A more comprehensive table is attached to show current European and Japanese restriction levels. A table of values for the elements evaluated shows the other elements as less than the detection limit for the test. This means not detected within that limit.

Discussion / Experimental:

Sample A was evaluated using an FTIR transmission infrared spectrometer fitted with an ATR accessory, Perkin Elmer Spectrum 100. The ash test of the materials were run using a crucible, controlled pre burning and final heating at 650 Celsius in a Thermolyne 6000 Muffle Furnace. The heavy metals / toxic elements were determined by QC Metallurgical Labs, Davenport, IA by wet acid ashing and AA analysis of the residue.



Greg Geil
Environmental Scientist

Attachments: FTIR Spectra, Metals Summary-Table I (Appendix A, BPI)

~~GUANGXI QIAOWANG PULP PACKING PRODUCTS CO., LTD.~~
~~NO. 18, CHANGYI ROAD~~
~~NANNING ECONOMIC &~~
~~TECHNICAL DEVELOPMENT AREA GUANGXI CHINA~~

Report on the submitted sample said to be BIODEGRADABLE FOOD UTENSILS (100% SUGAR CANE FIBRE).

SGS Job No. : 1511142
Manufacturer : ~~GUANGXI QIAOWANG~~
LTD
Country of Origin : CHINA
Sample Receiving Date : APR 07 2004
Testing Period : APR 08 - 15 2004



e2efoodpack
earth to earth
147 Liberty St., Toronto, Ontario M6K 3G3
T: 416 884 9453 • e2efoodpack.com

Test Requested : For compliance with the Food and Drug Administration Regulations for determining the amount of net chloroform-soluble extractives from the components of paper and paperboard.

Test Method : As specified in FDA 21 CFR 176.170.

Test Results :	<u>Extractants and Conditions</u>	<u>Pale Brown Sample</u>	
		<u>Amount of Extractives (mg/inch²)</u>	<u>Limit (mg/inch²)</u>
	Distilled Water at 150°F for 2 hours	0.08	0.5
	8% Alcohol at 150°F for 2 hours	0.10	0.5
	50% Alcohol at 150°F for 2 hours	0.16	0.5
	n-Heptane at 100°F for 30 minutes	0.06	0.5

Conclusion : The submitted sample said to be BIODEGRADABLE FOOD UTENSILS (100% SUGAR CANE FIBRE) complies with the FDA Specifications for determining the amount of net chloroform-soluble extractives residue of food contact surface.

*** End of Report ***

Signed for and on behalf of
SGS Hong Kong Ltd.

Froelito V. Aguila
Senior Laboratory Executive

This Test Report is issued by the Company subject to its General Conditions of Service printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full, without prior written permission of the Company.