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LABORATORY REPORT

Advanced
Materials
Center, Inc.

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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



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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

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