

**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:** Red Pod Inc.  
Boon Lim

**Date:** March 6, 2009  
**Project:** 09P1049 FTIR/Ash/Metals  
**Check#:** 2355

**Purpose:**

Evaluate one (1) Cup material 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. Coated Hot Cup – 22.0 mil

**Source:**

Red Pod Inc.

**Conclusions:**

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

**Results:**

The FTIR transmission spectrum for the sample was 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 Coated Hot Cup is composed of cellulose and PLA. The spectrum of the PLA that was applied to the cup closes resembles that of Nature Works.

Ash testing shows an inorganic residue of **0.34%** by weight on Sample A as received.

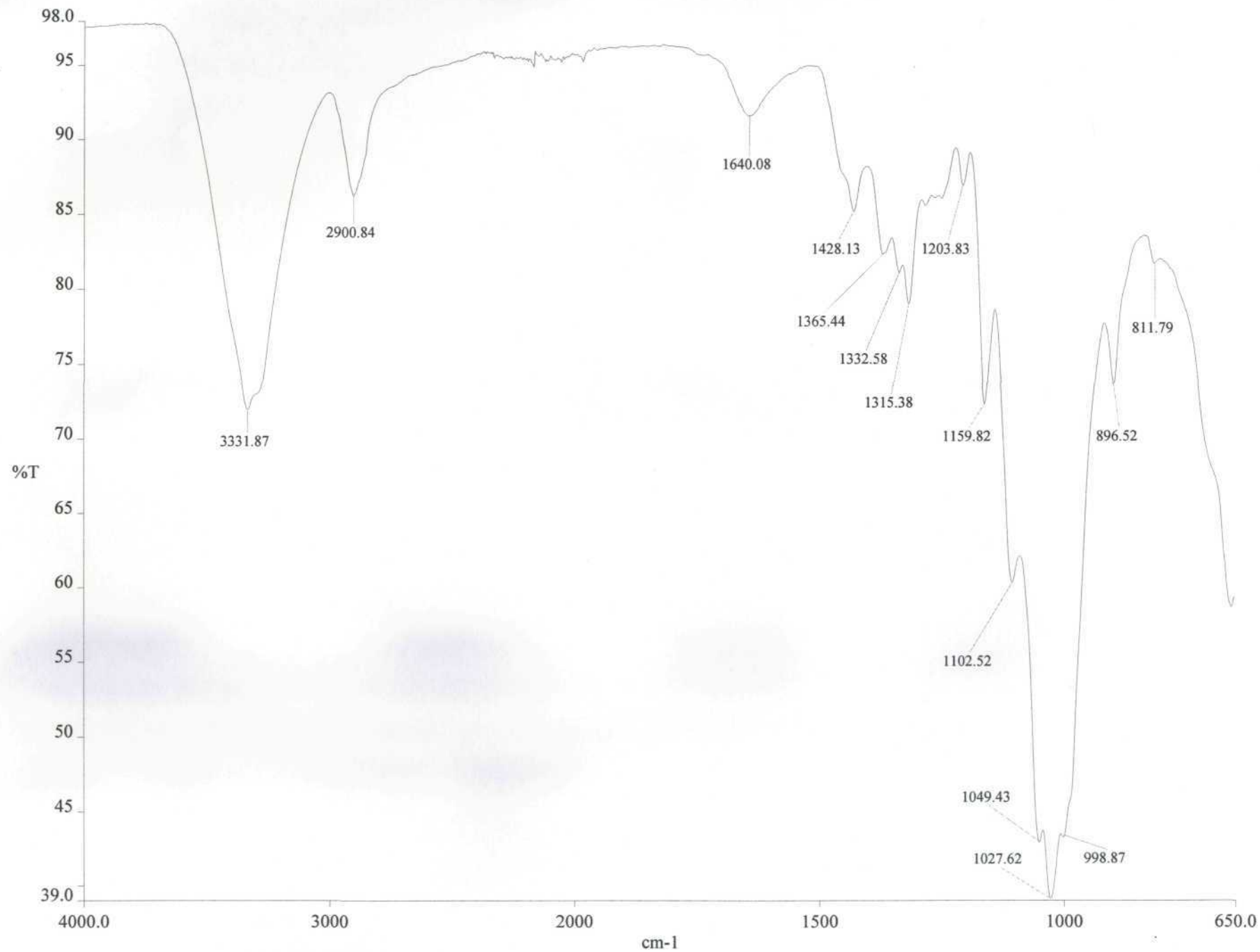
Refer to Table I attached for a results summary by element.

Heavy Metals / element testing using wet ashing of Sample A shows the presence of Arsenic (As), Calcium (Ca), Chromium (Cr), Copper (Cu), Iron (Fe) 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:**

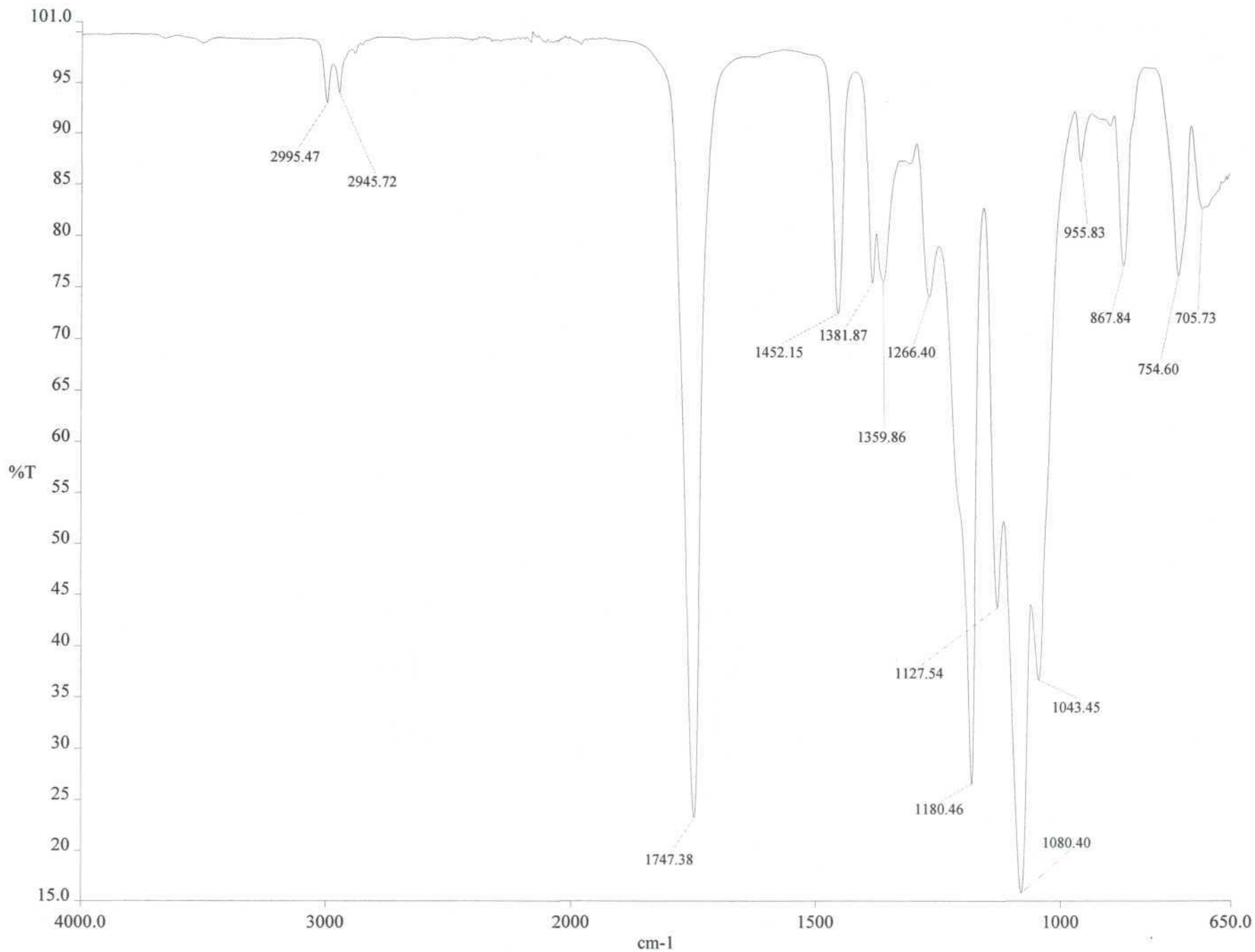
Sample A was evaluated using an FTIR transmission infrared spectrometer fitted with an ATR accessory, Perkin Elmer Spectrum 100. The ash test of the materials were run using a crucible, controlled pre burning and final heating at 650 Celsius in a Thermolyne 6000 Muffle Furnace. The heavy metals / toxic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



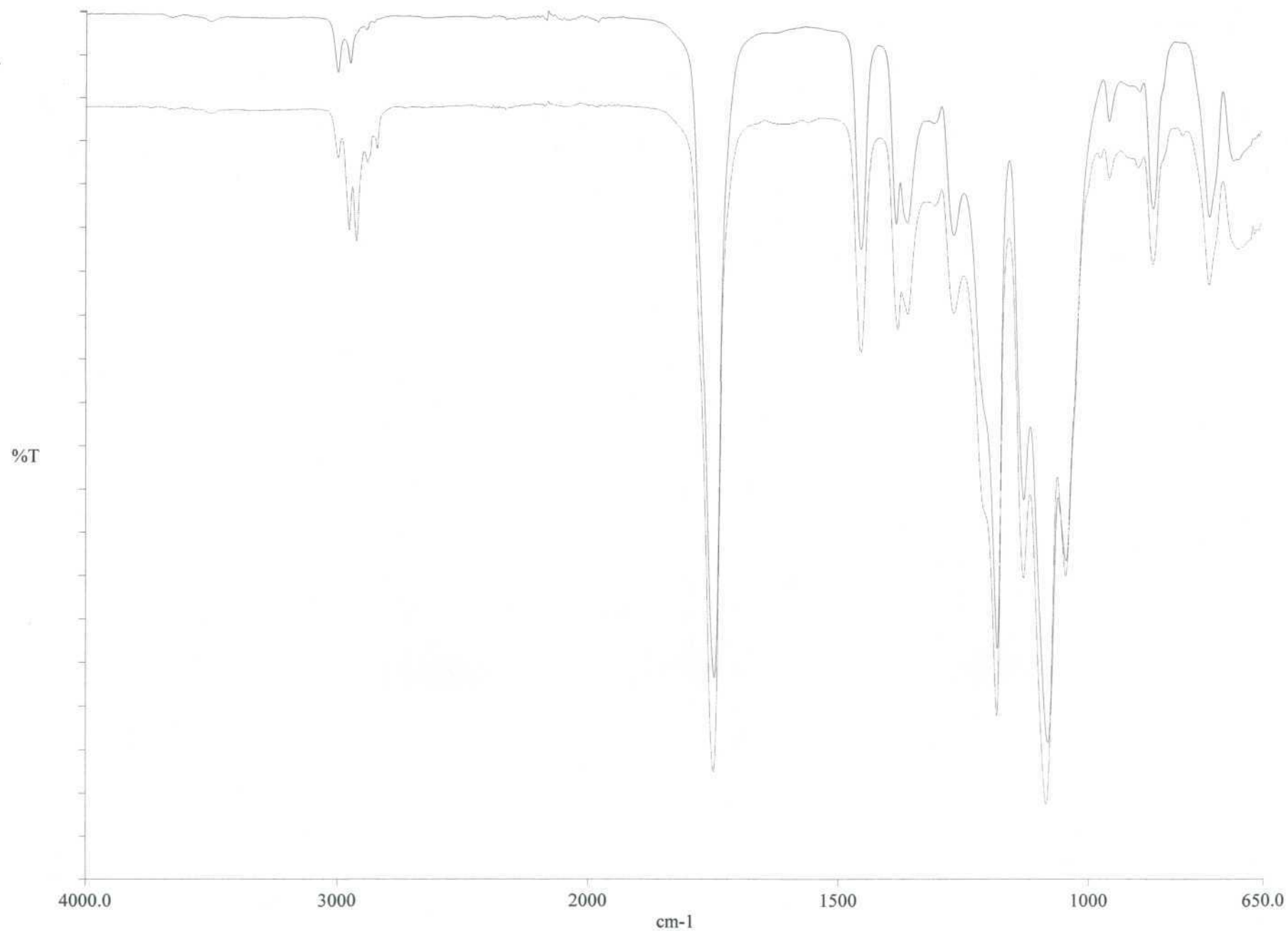
c:\pel\_data\spectra\12431.sp - 09P1049-Red Pod Inc - Coated Hot Cup - 22.0 mil - Non Coated Side



\_\_\_\_\_ c:\pel\_data\spectra\12431.sp - 09P1049-Red Pod Inc - Coated Hot Cup - 22.0 mil - Non Coated Side  
\_\_\_\_\_ c:\pel\_data\spectra\cellulose- paperboard.sp



c:\pel\_data\spectra\12431b.sp - 09P1049-Red Pod Inc - Coated Hot Cup - 22.0 mil - Coated Side



\_\_\_\_\_ c:\pel\_data\spectra\12431b.sp - 09P1049-Red Pod Inc - Coated Hot Cup - 22.0 mil - Coated Side

\_\_\_\_\_ c:\pel\_data\spectra\pla eco.sp - PLA Resin in cutlery

Table 1: BPI Appendix A Metals Data

Heavy Metals Analysis for Red Pod Inc. : Sample A: Coated Hot Cup - 22.0 mil

09P1049

Analyte	Limit USA-a (ppm)	Limit Canada-b (ppm)	BNQ(Proposed)d (ppm)	DIN V 54900-1 (ppm)	EN 13432-c (ppm)	Green Pla (ppm)	Actual (ppm)
Arsenic	21.5	37.5	19	NA	5	3.5	0.18
Cadmium	19.5	10	5	0.3	0.5	0.5	<0.08
Calcium	NA	NA	NA	NA	NA	NA	615.00
Chromium	NA	NA	189	30	50	50	0.35
Cobalt	NA	75	38	NA	NA	NA	<0.40
Copper	750	NA	265	23	50	37.5	0.25
Iron	NA	NA	NA	NA	NA	NA	3.49
Lead	150	250	125	30	50	50	<0.40
Mercury	8.5	2.5	1	0.3	0.5	0.5	<0.10
Molybdenum	NA	10	5	NA	1	1	<0.40
Nickel	210	90	45	15	25	25	<0.20
Selenium	50	7	4	NA	0.75	0.75	<0.10
Zinc	1400	925	463	100	150	150	8.58

## Notes:

- a. Metal limits for US are 50% of those proscribed by CFR 503.13 Table 3 (per ASTM 6400-04 requirements).
- b. Metal limits for Canada are 50% of those proscribed in Table II of the "Standards for Metals in Fertilizers and Supplements".
- c. Metal limits EC are 50% of those prescribed in ecological criteria for the award of the Community eco-label to soil improvers (EC OJL, 219,7.8.98, p39).
- d. Metal limits proposed for BNQ Canada are 25% of those proscribed in Table II of the "Standards for Metals in Fertilizers and Supplements".