



Organic Waste Systems

FINAL REPORT

INFRARED SPECTRUM

OF

TRAY OF 100% NATUREWORKS 2002 PLA

STUDY RIK-1/1

**JOLYBAR FILM TECHNIC CONVERTING LTD.
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O.W.S.

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Edition: 1

Date: Sep-19-08

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1. PRINCIPLE

Infrared Spectroscopy is a qualitative method that indicates the presence of particular functional groups in a test item. The percentage transmission or absorbency of a test item at different wavelengths is recorded which results in a typical infrared spectrum of that material. Each material has its own infrared spectrum.

2. APPARATUS

Spectrum One FT-IR Spectrometer (Perkin-Elmer) with ATR crystal, consisting of diamond as interface crystal and Zinc Selenide as focusing crystal. Spectrum: 400 – 4000 cm⁻¹.

3. TEST ITEM

Tray of 100% Natureworks 2002 PLA

4. METHOD AND INTERPRETATION

- *Pretreatment of test item*

A small amount of test item is placed in a sample holder and introduced in the apparatus. First an IR spectrum of the sample holder without test item is taken.

- *Interpretation*

The apparatus gives the ATR-IR spectrum in a region from 400 to 4000 cm⁻¹. The infrared spectrum of a test item records wavelength or frequency of infrared radiation versus percentage transmission (%T) :

$$\% T = \frac{\text{intensity}}{\text{original intensity}} \times 100$$

When a compound absorbs radiation at a particular wavelength, the intensity of radiation being transmitted decreases. This results in a decrease in %T and appears in the spectrum as a dip, called an absorption peak, or absorption band. Different functional groups have typical ranges of wavelengths of absorption. Each test item has its own typical infrared spectrum.

4.1. RESULTS

The ATR-IR-spectrum of a tray of 100% Natureworks 2002 PLA is given in Figure 1. A disturbed signal was observed for the domain from 400 till 500 cm⁻¹ and therefore this is not shown in the figure. The obtained IR-spectrum corresponds with a typical PLA-spectrum.

Gent, Sep-19-08



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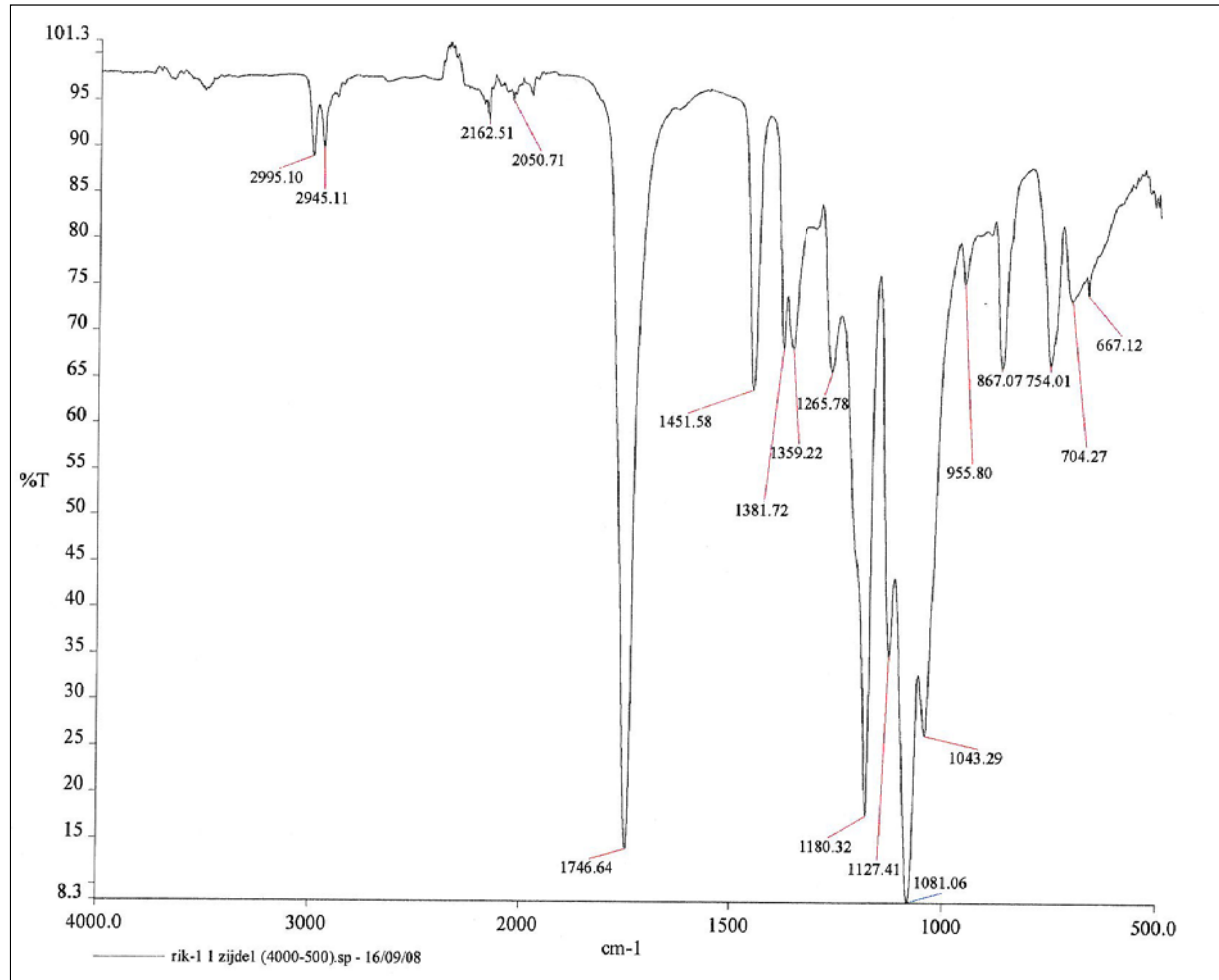


Figure 1. ATR-IR-spectrum of tray of 100% Natureworks 2002 PLA.