ANALYTICAL METHOD

July 16, 1985 Method No. TC-AM-85-1212
This method was updated to the current format on 6/26/2019 QA Number 2409

Epoxidized Soybean Oil in TELONE* II Soil Fumigant

1. Scope

This method is applicable to the determination of epoxidized soybean oil (ESO) in TELONE II soil fumigant. The method is validated at a concentration of 1.2% w/w ESO.

2. Safety

2.1 TELONE II soil fumigant is a toxic, strongly odiferous and flammable liquid. It is hazardous if inhaled and toxic if absorbed through the skin. Contact with the eyes and prolonged or repeated contact with skin will cause irritation. Prevent contact with the skin, eyes and clothing. Do not breathe the vapors. Work only in a well-ventilated hood away from any source of ignition. Do not store in the presence of strong bases, aluminum, magnesium or their alloys.

2.2 Tests with ESO on animals have indicated a very low toxicity. In case of skin contact, flush area with large amounts of soap and water. For eye contact, flush with large amounts of water for at least fifteen (15) minutes. Sustained or intermittent contact with ESO should be avoided. ESO may hydrolyze and/or polymerize slowly in the presence of acids, bases, water or water vapor.

2.3 Each analyst should be acquainted with potential hazards of the reagents, products, and solvents before commencing laboratory work. SOURCES OF INFORMATION INCLUDE: MATERIAL SAFETY DATA SHEETS, LITERATURE, AND OTHER RELATED DATA. Safety information on non-Dow products should be requested from the supplier. Disposal of reagents, reactants, and solvents must be in compliance with local, state, and federal laws and regulations.

3. Principle

Infrared spectroscopy utilizing a calibrated liquid cell is used to analyze the percent ESO in the sample. Quantitation is based on the ESO's absorbance at a specific wave number as compared to a prepared standard curve.

4. Interference

No direct interferences have been observed in the use of this method. If results are suspect based on the analytical history of the product, the data should be confirmed by an alternate method.

5. Apparatus

5.1 Infrared Spectrophotometer: Perkin-Elmer 1330 or equivalent, available from Perkin-Elmer Corporation, Main Avenue, Norwalk, CT 06856.

5.2 Liquid Infrared Cell: Calcium fluoride (CaF_2), 0.1 mm pathlength, calibrated, non-demountable, available from Barnes Analytical, 652 Glenbrook Road, Stamford, CT 06906.

5.3 Liquid Infrared Cell Holder: Universal holder 0004-035 or equivalent, available from Barnes Analytical.

5.4 Syringe: B-D and Yale 2004 or equivalent, 1 mL glass Luer tip, available from Becton-Dickinson, Rutherford, NJ 07070.

5.5 Paper: Infrared, chart, absorbance scale, No. 5100-4366 or equivalent, available from Perkin-Elmer.

6. Reagents

6.1 TELONE II soil fumigant (with or without ESO): Available from Distribution, Dow Chemical U.S.A., Texas Operations, APB, Freeport, TX 77541.

6.2 Vikoflex 7170 epoxidized soybean oil, available from the Viking Chemical Company, 838 Baker Building, Minneapolis, MN 55402.

6.3 Methylene chloride: Available from Curtin Matheson Scientific, 9999 Stuebner Airline, Houston, TX 77038.

7. Procedure

7.1 Sample Preparation

7.1.1 Fill the liquid cell by flushing the cell with the sample using a 1 mL glass syringe attached to one of the cell openings. Remove syringe and stopper cell openings with plastic plugs made of Teflon resin.

7.1.2 Place cell in light path of infrared spectrophotometer and scan sample out to 1000 cm^{-1}

7.1.3 Measure absorbance of band at 1740 cm^{-1} (Figure 1)

7.1.4 Compare measured absorbance against prepared standard curve to obtain% w/w of ESO.

7.1.5 Rinse cell out several times with methylene chloride, then blow inside of cell dry with nitrogen. Store in desiccator.

7.1.6 Keep sample from spilling on outside windows of cell. If sample is spilled on the windows, wipe off with methylene chloride to remove any residual ESQ.

7.2 Instrument Conditions

Chart Expansion:	1
Scan Time:	12 Minutes
Slit Program:	Automatic, narrow

7.3 Standard Curve Preparation

7.3.1 Prepare ESO standards of approximately 0.5, 1.0, 1.5 and 2.0% w/w in TELONE II soil fumigant. Use TELONE II soil fumigant that has been stabilized with about 0.5% w/w epichlorohydrin and contains no ESO.

7.3.2 Determine absorbance for prepared standards and blank as described in Sections 7.1 and 7.2. (Figure 2)

7.3.3 Draw a standard curve for absorbance of ESO vs. % w/w ESO in TELONE II soil fumigant. (Figure 3)

8. Precision and Validation Data

Data obtained by this procedure indicated a relative standard deviation (RSD) of+ 2.1%. The data obtained may be expected to vary from the mean average, relative precision (RP), by not more than+ 4.2 at the 95% confidence level.

Test	%**w/w** ESQ in TELONE II Soil Fumigant
1	1.22
2	1.22
3	1.22
4	1.26
5	1.22
6	1.20
7	1.26
8	1.26
9	1.28
10	1.23
Mean Average **(x)**:	1.24
Relative Standard Deviation (RSD):	2.1
Relative Precision at the 95% Confidence Level:	4.2

Average% difference from the prepared ESQ standard of 1.23% w/w in TELONE II soil fumigant= 1.7.

* * * * * * * * * * * * * * * *

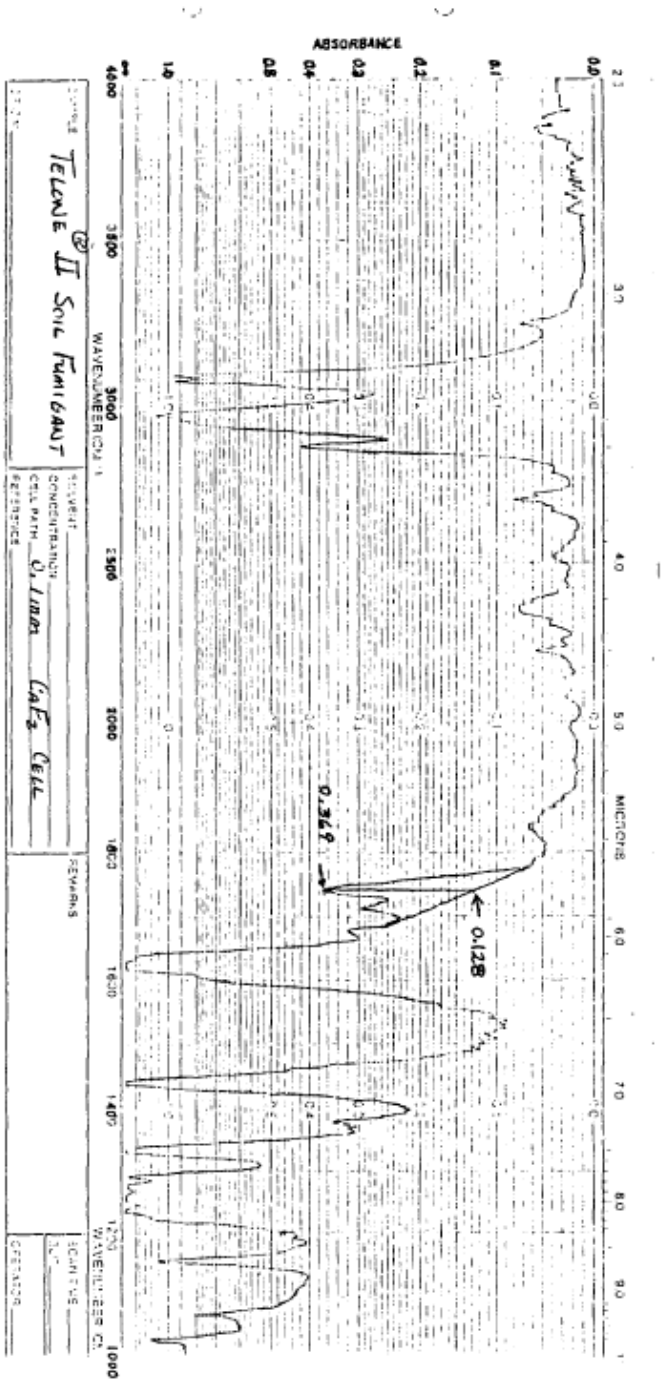
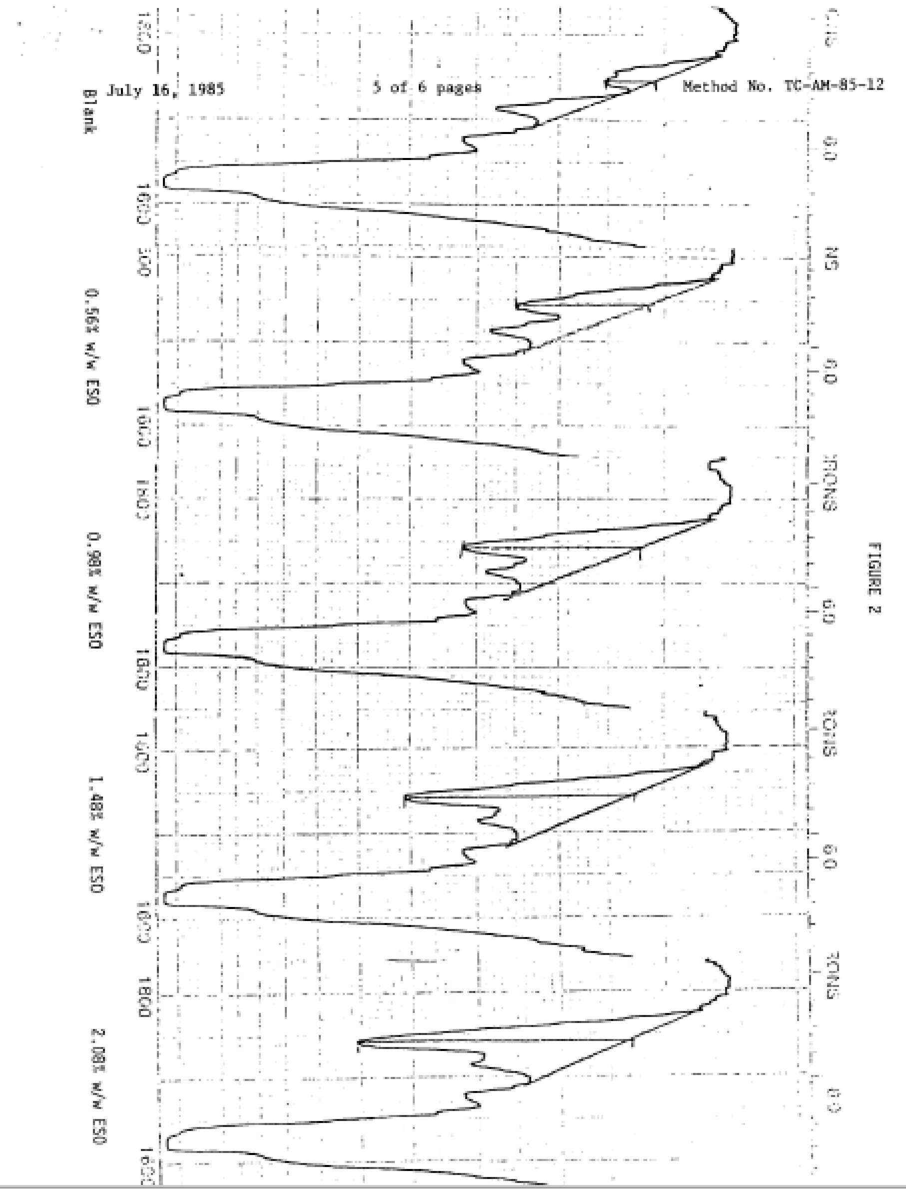
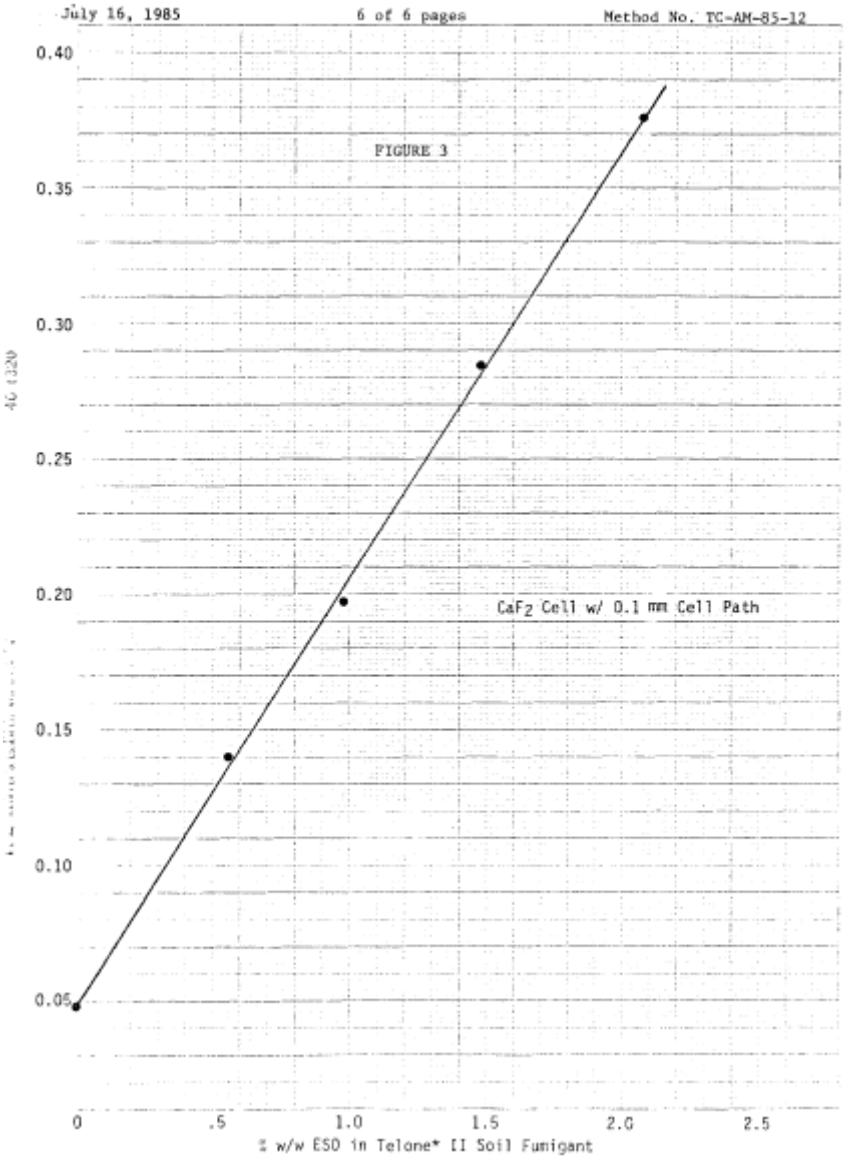

A8SOR8ANCE
ABSORBANCE
TELONE II SOIL FUMIGANT
0.369
0.128
WAVENUMBER (CM-1)
MICRONS
4000
3500
3000
2500
2000
1800
1600
1400
1200
1000

FIGURE 1



*Trademark of The Dow Chemical Company



*Trademark of The Dow Chemical Company