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## Application Note SI-01232

# Optimum Characterization of Slip Agents by HPLC with ELSD

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### Introduction

To allow products to be packaged by automated machinery, the physical properties of the packaging materials must be carefully controlled in order to increase the output of the line and to improve packaging line operations. For example, the high coefficient of friction (COF) of polyethylene (PE) or polypropylene (PP) film can cause them to jam in automated packaging equipment. The control of a material's COF is achieved using slip agents, such as silicone or fatty acid amides. Slip agents modify the surface properties of the material to which they are added. Stearamide, oleamide and erucamide are common slip agents used to reduce friction effects in PE or PP film processing. The physical properties of a slip agent determine its usage. Thus, erucamides are more heat stable than oleamides, more resistant to oxidation and create fewer volatiles during processing. Consequently, erucamides are more suitable for higher processing temperatures and processes with high output.

The Varian evaporative light scattering (ELS) detector is universal and is not dependent on the optical properties of the compound. The detector can see any compound that is less volatile than the mobile phase, and is compatible with a wide range of solvents. For non-volatile slip agents, the Varian ELS detector can be operated at high temperatures to maximize signal response.

### Instrumentation

Column: Silica 5  $\mu\text{m}$ , 250 x 6 mm  
Detection: Varian ELSD (neb= 0 °C, evap=70 °C, gas=1.0 SLM)

### Materials and Reagents

Eluent A: ACN  
Eluent B: DCM

### Conditions

Flow Rate: 1.0 mL/min  
Injection Volume: 20  $\mu\text{L}$   
Gradient: 15-50 % B in 5 min, 50-80 % in 10 min

### Results and Discussion

#### Peak Identification

1. Lauryl diethyl amide
2. Glycerol monostearate
3. Oleamide
4. Erucamide

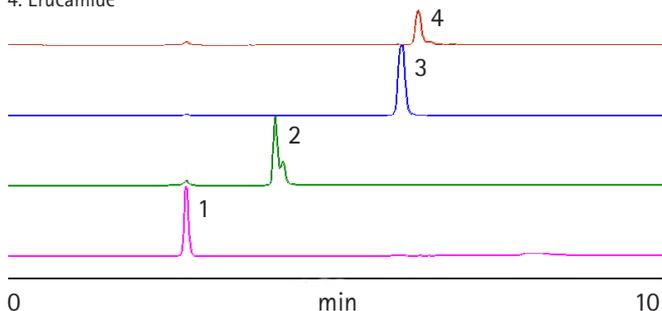


Figure 1. Excellent separation of four common slip agents obtained using Varian ELSD.

### Conclusion

Separation and identification of four amides commonly used as slip agents is straightforward using evaporative light scattering detection (ELSD). ELSD is universal and not dependent on the optical properties of the compound, unlike UV. Therefore, for UV inactive slip agents ELSD is the ideal detection choice.

The Varian ELS detector surpasses other ELSDs for low temperature HPLC applications with semi-volatile compounds. Its innovative design represents the next generation of ELSD technology, providing optimum performance across a diverse range of HPLC applications. The Varian ELS detector's unique gas control permits evaporation of high boiling solvents at very low temperatures. For example, 100 % water at a flow rate of 5 mL/min can be removed at 30 °C. The novel design of the Varian ELS detector provides superior performance compared to detectors from other vendors for the analysis of semi-volatile compounds.

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