

Ti Application Note No. T- 68

Title: Determination of coconut oil ethoxylates (non-ionic surfactants)

Summary: Determination of coconut oil ethoxylates (non-ionic surfactants) by potentiometric titration with sodium tetraphenylborate using the NIO electrode.

Sample: Coconut oil ethoxylates (fatty acid ethoxylates)

Sample Preparation: none

Instruments and Accessories: 702, 716, 736, 751 or 785 Titrino or 726 Titroprocessor, 722 Propeller Rod Stirrer, 6.0507.010 NIO electrode, 6.0726.100 Ag/AgCl reference electrode [bridge electrolyte $c(\text{NaOH}) = 3 \text{ mol/L}$]

Analysis: Weigh approx. 30 mg sample into a beaker (precision 0.1 mg) and dissolve it in about 50 mL dist. water. Add 10 mL $c(\text{BaCl}_2) = 0.1 \text{ mol/L}$ and 40 mL dist. water, then titrate with sodium tetraphenylborate $c(\text{STPB}) = 0.01 \text{ mol/L}$.

Calculation: As non-ionic surfactants do not react stoichiometrically with Ba^{2+} and STPB, a so-called calibration factor has to be determined. This calibration factor f can either be given as mL STPB / g NIO or as mg NIO / mL STPB.

$$f_1: \text{ mL STPB / g NIO} = \text{EP1} / \text{C00}$$

$$f_2: \text{ mg NIO / mL STPB} = \text{C00} * \text{C01} / \text{EP1}$$

EP1 = titrant consumption in mL

C00 = approx. 0.03 (sample weight in g)

C01 = 1000 (conversion factor in mg/g)

Results: $f_1: \text{ AVG}(3) = 304.3 \pm 2.1 \text{ mL STPB / g NIO}$
 $f_2: \text{ AVG}(3) = 3.97 \pm 0.03 \text{ mg NIO / mL STPB}$

Remarks: It is not possible to separate different non-ionic surfactants by titration.