

Thesis Title	Nafion Coated - Probes for Determination of TBHQ, Antioxidant in Vegetable Oils
Thesis Credits	12
Candidate	Miss Duangsuda Kasiwat
Supervisors	Dr. Werasak Surareungchai Asst. Prof. Dr. Tipaporn Yoovidhya
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Abstract

The work aims to study the optimum condition of Nafion-coated probes for determination of TBHQ in vegetable oils without any form of sample modification. An electrochemical probe consisting of co-planar platinum working and counter electrodes, and a silver quasi-reference electrode, was coated with a film of ionically conducting polymer, Nafion. A Nafion-coated probes was obtained at an optimum concentration and drying time for 15 minutes at room temperature 24 ± 1 °C and relative humidity 52 ± 1 percents. The electrochemical behaviour of ferrocene in oil could be observed at the probe without sample pretreatment. Hence it was demonstrated that the probe could be used to perform direct measurement of the antioxidant, *tert*-butylhydroquinone (TBHQ) in vegetable oils. Using differential pulse voltammetry (DPV), a linear response to TBHQ was obtained across the concentration range 1-50 mg kg⁻¹, with a sensitivity of 6.37×10^{-2} μ A kg mg⁻¹. The limit of detection was 0.23 mg kg⁻¹ (S/N = 3). Interference from phenolic antioxidants such as butylated hydroxyanisole (BHA), and butylated hydroxytoluene (BHT) was studied. BHA showed some interference at TBHQ:BHA ratios of 1:1 and 1:2. The others did not interfere. The mean recoveries of TBHQ spiked into samples of soybean, sunflower, palm and rice-bran oil were found to be 97.7 ± 0.11 , 96.7 ± 0.2 , 93.7 ± 0.29 and 95 ± 0.5 percent, respectively (n=5).

Keywords : Electrochemical Analysis / Nafion / *Tert*-Butylhydroquinone / Vegetable Oils