

Determination of Ethyl Vanillin by a Using Briggs-Rauscher Oscillator

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A study on the determination of an antioxidant ethyl vanillin (EV) built on its perturbation effects on a Briggs-Rauscher (BR) oscillator was reported in this paper. A tetraazamacrocyclic Ni(II) complex, [NiL](ClO₄)₂, was used as a catalyst in such a oscillator, and the ligand L in the complex is 5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene. The pH value for the BR reaction was kept at 2, which is analogous to the pH of the fluids of the human stomach. It has been concluded from the experimental data that the addition of EV into BR system could cause the temporary cease in the oscillation after inhibition time (t_{in}) depending on the concentration of EV added. It was found that, as the concentration of EV were increased, the t_{in} were increased. Thus, a polynomial regression curve was achieved over a range 7.5×10^{-6} to 3.5×10^{-5} M of EV with a correlation coefficient of 0.98. The obtained RSD from six measurements of 2.5×10^{-5} M of EV is 0.159%. On the basis of the FCA model, reaction mechanism involving HOO[•] radical has been proposed.

Keywords: Antioxidant; Briggs-Rauscher; Chemical oscillation; Ethyl vanillin; Inhibitory effect

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