A SIMPLE AND RAPID FLOW INJECTION ANALYSIS METHOD FOR THE DETERMINATION OF CITRIC ACID IN SOFT DRINKS AND GRISEX DRUG USING Fe$_2$O$_3$ BASED SOLID-STATE pH ELECTRODE

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There is a considerable interest in the development of methodology for the determination of citric acid (CA) because it is extensively used in food and pharmaceutical industries. CA appears in a natural way in foods like citrus fruits and pineapple where this is the main organic acid. CA is utilized as multi-functional food additive in the processes of production of different foods because it presents excellent antibacterial and acidulant effect, reinforces the antioxidant action of other substances and improves the flavours of juices, soft drinks and syrups. In the pharmaceutical industry CA is an ingredient for the preparation of a great number of pharmaceutical formulations because of its anticoagulant properties and to prevent kidney calculi.

The use of flow injection (FI) methodologies present a great potential to carry out analysis of CA contained in different foods, drinks, fruit juices, pharmaceuticals, etc [1]. The work presented here was aimed at developing an accurate, simple, inexpensive, and rapid flow injection analysis procedure for the determination of relatively low citric acid concentrations (approximated range: 0.5 mg L$^{-1}$ to 5 mg L$^{-1}$) in various soft drinks. pH electrodes developed as in all solid-state formation permit miniaturization of detection cells. However a flow-through detection cell that has a few microliter dead volume was prepared with Fe$_2$O$_3$ based solid-state pH electrode. Calibration graphs in flow injection analysis system obtained were linear over the range 1–50 mM citrate. The throughput the method was 10 samples with an RSD of 2.0 % ($n = 10$); the mean relative error was 4% compared with a standard titration method. The recovery was 95–105 %. Literature results were used to make comparison with the the procedure developed here for some soft drinks by applying two-sided t-test. The results were found compatible. In addition to soft drinks, the amount of citric acid was determined in Gribex drug that is used in symptomatic treatment of colds and influenza infections.

Reference