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Development of a spectrophotometric method to analyze the benzoic acid content in carbonated beverages

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Benzoic acid is one of the commonly use food preservatives and often used in carbonated beverages. Most of carbonate beverages contain approximately 150 mgL^{-1} of benzoic acid. It has been found that excessive amount of benzoic acid can cause toxic effects on human. Therefore, it is essential to determine benzoic acid content in carbonated beverages before using for human consumption. High Performance Liquid Chromatography (HPLC) is used as a common analytical method to determine benzoic acid content in beverages. Use of HPLC based techniques to determine benzoic acid content in beverages is not economical to a developing country like Sri Lanka. In this article, we have reported the development of spectrophometric based low cost method to analyze of benzoic acid content in carbonated beverages found in Sri Lanka.

Prior to the analysis, benzoic acid in beverages has to be separated from other chemical constituents present in the medium. Apart from food preservatives, various coloring agents also contain in beverages. Most of these chemicals are water soluble compounds. Separation of benzoic acid from other substances can be performed by extracting benzoic acid into the methylene chloride. After the

evaporation of methylene chloride, the remaining residue was dissolved in diluted NaOH, convert benzoic acid into its sodium salt. To remove the any non polar substances present with sodium benzoate, another extraction was carried out with methyene chloride. The remaining aqueous phase was acidified with HCl and extracted the benzoic acid in to methylene chloride medium.

After evaporating methylene chloride layer, the white solid of benzoic acid was obtained. The standard series was prepared by dissolving the benzoic acid in methanol with appropriate concentrations. The benzoic acid (λ_{max} = 226 nm) content in beverages was measured using the calibration plot acquired form standard series.

By using the standard method obtained from literature, analysis of benzoic acid in carbonated beverages was also performed by HPLC method. Based on the result obtained, the benzoic acid content in all five carbonated beverages determined by spectrophotometrically and HPLC methods are in good agreement.

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