



# Analysis of benzoic acid and sorbic acid in some selected food items available in Sri Lanka

A dissertation submitted to the Faculty of Science,  
University of Colombo  
for the Degree of Master of Science in Analytical Chemistry

U. L. Kathriarachchi  
December 2011

## Abstract

Benzoic acid and sorbic acid are commonly used preservatives in food items. They are used to prevent growth of yeasts, moulds and bacteria that can grow in food items and help to extend their shelf life and safety. The salts of benzoic acid and sorbic acid are more frequently used as they are more soluble than the acid form. To ensure the safety of consumers, international standards as well as Sri Lankan government food preservative regulations have been employed for any form of benzoic acid and sorbic acid that is to be used as a permitted preservative in food products. These regulations highlight the permitted levels of these preservatives which can be used in different food items. Thus, a rapid and accurate testing method for benzoic and sorbic acid in different food items is essential to the Government Analyst's Department, Sri Lanka as the approved analyst in the Sri Lankan food act.

In this study a rapid and reliable method is presented for the determination of the preservatives benzoic acid and sorbic acid in some selected food samples. Different brands of carbonated beverages, nectars, fruit juices, cordials, jams and sauces available in the Sri Lankan market were analysed for benzoic and sorbic acids. The procedure used was separation by high performance liquid chromatography (HPLC) followed detection by UV diode array for identification and quantification of the two preservatives. A significant set of validation data was performed through recovery and precision studies. Chromatographic separation was achieved using a C<sub>18</sub> column and acetate buffer pH=4.7 : methanol (70:30) as mobile phase, 1.2 ml/min flow rate and UV detection at 235 nm. These analytical conditions resulted in an effective separation of the preservatives for all products analysed in a run time of 15 minutes.

The percentages of preservative in samples were calculated by external standard using authentic benzoic acid and sorbic acid. Carbonated beverage samples were prepared by diluting the degassed sample with distilled water. Benzoic and sorbic acids in nectars, fruit juices, cordials, and sauce samples were efficiently extracted with methanol after homogenization.

The developed method was applied to the determination of 41 food samples comprising carbonated beverages, nectars, fruit juices, cordials, jams and sauce samples. The range of preservatives found were from not detected – 477 mg/kg and not detected – 476 mg/kg for benzoic acid and sorbic acid respectively. Average percentage recoveries obtained for benzoic and sorbic acid in analysed carbonated beverages, nectars and fruit juices, cordials and jams, falls within the range of 92% to 99%. Recoveries for benzoic acid and sorbic acid in sauce samples were 84% and 85% respectively. The amounts of the analysed preservatives in most cases were below the permitted limits in Sri Lankan food regulations.