Optimization of the Methanolic Extraction Procedure for Chemical Preservatives in Ready to Serve Jelly Drinks by Response Surface Methodology

W.A.G.E. Wijelath[1], N.Y. Jayanath[1], D. Senevirathne[2], K.P.G.K.T. Guruge[2] and W.M.T. Madhujith[1]

[1]*Department of Food Science and Technology, University of Peradeniya, Peradeniya, Sri Lanka*

[2]*Government Analyst's Department, Pelawatta, Battaramulla, Sri Lanka*

Ready to serve (RTS) jelly drinks which are widely consumed by school children in Sri Lanka contain Benzoic acid and Sorbic acid as chemical preservatives. This research was aimed to optimize the methanolic extraction procedure for rapid analysis of these two preservatives in RTS jelly drinks using High Performance Liquid Chromatography (HPLC). Response Surface Methodology (RSM) adopting Box Behnken design was used to determine the effects of 03 independent variables namely, ammonium acetate/acetic acid: methanol ratio (v/v), ultrasonic extraction time and ultrasonication temperature on recovery percentages of benzoic and sorbic acids. Independent variables were used at 03 levels with a center point. A negative matrix having similar chemical and physical properties to jelly drinks, spiked with 100 ppm of each benzoic and sorbic acids was used. These matrices were extracted using the 15 experimental conditions suggested by the Box Behnken design. Regression analysis was carried out for fitting the response surface model for all the responses and all linear and quadratic terms of the independent variables. The predicted optimum extraction conditions for ammonium acetate/acetic acid: methanol ratio, ultrasonic extraction time and temperature were 60:40 (v/v), 15 min. and 30 ^{o}C, respectively, at desirability level of 0.95. The benzoic acid and sorbic acid recovery percentages at optimum extraction conditions were 98.36±0.90% and 97.82±0.90% respectively. It showed no significant difference ($p>0.05$) to the predicted values of 97.86 and 96.43 for benzoic and sorbic recovery percentages, respectively.

Keywords: Benzoic acid, Jelly drinks, Sorbic acid, Response surface methodology