Determination of Residue Carbofuran in Water, Food grains and Vegetables by Spectrophotometry for the Development of Simple Screening Carbofuran Test Kit

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In the present work, a simple analytical technique for the determination of carbofuran contaminated in environmental samples at trace level by spectrophotometry was described. The spectrophotometric determination of carbofuran was based on the coupling with diazotized *p*-aminoacetophenone in alkaline medium. The dye formed was measured at the wavelength of 475 nm. The reaction condition was optimized and effects of *p*-aminoacetophenone, sodium nitrite, hydrochloric acid, and sodium hydroxide concentration were investigated. The use of sulfamic acid for eliminating the excess amount of sodium nitrite from the reaction was also considered. The limit of detection under the optimized condition was 95 ng/L. Percent relative standard deviation represented the precision of the developed method was 2.31% at the concentration of carbofuran 0.6 mg/L. It was found that by using EDTA as a masking agent, the developed method has less suppression from various pesticides and heavy metals and percent recoveries were in the range of 85-110%. The method was effectively used for the determination of carbofuran contaminated in environmental sample, *i.e.*, grain, soil, water and vegetable samples. In addition, a sample and specific carbofuran test kit was developed by using the optimized analytical condition based on the comparison of the test color solution with the standard color strip obtained from different concentrations of carbofuran standard solutions. The developed carbofuran test kit could be a useful screening device for the determination of carbofuran in contaminated environmental samples and could be distributed to agricultural areas in the local community in the future.

Keywords: Carbofuran; Diazotized *p*-aminoacetophenone; Spectrophotometry; Carbofuran test kit; Environmental samples