

SPECTROPHOTOMETRIC ANALYSIS OF TOTAL ASCORBIC ACID CONTENT IN VARIOUS FRUITS AND VEGETABLES

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Abstract

Total ascorbic acid (ascorbic acid + dehydroascorbic acid) has been determined in ten different samples of fruits and vegetables by spectrophotometric method. Five grams of sample were homogenized with 25 mL of metaphosphoric acid - acetic acid solution, and it was quantitatively transferred into a 50 mL volumetric flask and shaken gently to homogenize solution. Then it was diluted up to the mark by the metaphosphoric acid - acetic acid solution. The obtained solution is filtered and centrifuged at 4000 rpm for 15 minutes, after what the supernatant solution is used for spectrophotometric determination (Perkin Elmer spectrophotometer Lambda 25) of vitamin C content in 10 samples of different fruits and vegetables. Investigated samples were ten different kind of fruits and vegetables obtained from different markets: Rose hip, orange, strawberry, lemon, mandarin, potato, tomato, carrot, apple, cucumber. This method is based on the oxidation of ascorbic acid to dehydroascorbic acid by bromine water in the presence of acetic acid. After coupling with 2,4-dinitrophenylhydrazine (DNPH) a red complex was produced and absorbance of that complex was spectrophotometrically measured at 521 nm. A linear concentration range for standard solutions of ascorbic acid was obtained up to 10 $\mu\text{g mL}^{-1}$, with a correlation coefficient of 0.9929. The contents of ascorbic acid were found between 7 and 50 mg/100 g of fresh fruits, also 6 and 23 mg/100 g of fresh vegetables. The limit of detection of ascorbic acid was found to be 0.01 $\mu\text{g mL}^{-1}$ (3 σ from 10 measurements of ascorbic acid concentration of 3 $\mu\text{g mL}^{-1}$), and limit of quantification of ascorbic acid was 0.017 $\mu\text{g mL}^{-1}$. The content of total ascorbic acid in ten different samples of fruits and vegetables was compared with results of literature values.

Keywords: Total ascorbic acid, 2,4-dinitrophenylhydrazine, spectrophotometric method, fruits and vegetables