

Spectrophotometric determination of benzoic acid based on inhibitive effect on tyrosinase enzyme

ABSTRACT

A simple method for detection of benzoic acid in food products has been developed based on inhibitive effect on tyrosinase enzyme. A mixture of tyrosinase, phenol and 3-methyl-2-benzothiazolinone hydrazone (MBTH) gave a maroon coloured solution which was bleached upon addition of benzoic acid. The wavelength at maximum absorbance was determined as 504 nm. The biosensor demonstrated optimum activity at pH 7. The relative standard deviation (RSD) of the reproducibility of this method was very good with RSD value of 1.91 %. The dynamic range of benzoic acid concentration was found to be between 50-700 ppm with the detection limit of 109 ppm. The kinetic parameters Michaelis-Menten constant (KM) and maximum absorbance (Absmax) in the absence and in the presence of benzoic acid were also evaluated. The kinetic analyses show that the inhibition of benzoic acid on the tyrosinase activity is reversible and competitive with an inhibition constant of 90.9 ppm. The proposed method was compared with HPLC and satisfactory agreement was achieved.

Keyword: Benzoic acid; Inhibition; Spectrophotometric determination; Tyrosinase