

Novel Spectrophotometric Method for RAPID Quantifying Acetaminophen Concentration in Emergent Situation

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摘要

Abstract

A novel spectrophotometric method for rapid quantification of acetaminophen in serum that is particularly suited for emergency usage is described. Free unconjugated acetaminophen is separated from other endogenous interferences by extracting the drug into ethyl acetate by simply using a vortex mixer. Subsequently, the cupric ions in the reagent are reduced by the phenolic hydroxyl groups present in the drug. The resultant cuprous ions then interacted with bicinchoninic acid (BCA) to form a chromophore which absorbs maximally at 562 nm. The proposed method has a linearity range from 50 to 400 $\mu\text{g/mL}$. The method was precise with day-to-day coefficients of variation (CVs) for two controls (44 and 195 $\mu\text{g/mL}$) of 5.0 and 4.5%, respectively. Results obtained by the proposed method correlated excellently with those determined by either an established HPLC or a Schiff's base dye formation method with correlation coefficients of 0.98 and 0.99, respectively. A group of commonly used prescription drugs or compounds of potential interferences were tested and found not to interfere. The proposed method for acetaminophen determination, which has a turnaround time of <10 min, is simple and rapid. For this reason, it is especially suitable for the screening of drug overdose in an emergency situation.