Direct Simultaneous Determination of Ketamin, Phenobarbital, Zopiclone, Zolpidem, Phenytoin and Thiopental in a Carbonated Caffeine Based Beverage using HPLC-DAD

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The drug facilitated crime (sexual assault, DFSA, organ theft, robbery) reports has been increasing recently and causes uneasiness in public [1,2]. The victims may drink the beverages spiked with especially hypnotic drugs which are tasteless, odorless and colourless, without noticing [3]. Besides the old hypnotic drugs as ketamin, phenobarbital, thiopental, etc., zolpidem and zopiclone were also started to be used in drug-facilitated sexual assaults [4]. Phenytoin, an old antiepileptic drug with anticonvulsive effect, which is reported to be used sometimes in combination with barbiturates, has also been used recently in DFSA, in forensic cases [5, 6, 7]. Screening methods are important in determination of such drugs on time, in beverages and solutions found in crime scenes, with fast, easy and cheap methods.

In this study, an HPLC method was developed with the direct injection of samples where the analytes were separated with a good resolution. Standard mix solutions in ethanol with maximum 52.7 μL volume, were spiked to each 1.000 mL of carbonated caffeine based beverage (Coke) sample. 50 μL norketamine ethanolic solution was used as internal standard. After vortexing, the spiked beverage samples were directly introduced to HPLC system and analysed, without any sample preparation. A C18 monolithic column was used for fast separation at 50°C, using a gradient including 50.0 mM phosphate buffer, methanol and acetonitrile mobile phase.

The linearity range of the method were between 2.5-200.0 μg/mL for thiopental and 1.0-200.0 μg/mL for the other analytes. All the regression coefficients were >0.99 and percentage RSD values were below 15.0%. Repeatability and intermediate precision were determined at three concentrations: 2.5, 50.0 and 100.0 μg/mL. The developed method is a very easy, fast, cheap, accurate and reproducible with no requirement for sample preparation, a short elution time (12 minutes) and a good chromatographic separation.