



## ABSTRACT

A simple, efficient and rapid reversed phase HPLC method was developed for the simultaneous determination of illegal drugs in numerous cough syrup formulations available over the counter in Pakistan. Different pharmaceutical industries incorporate illicit drugs in cough syrups to increase the effectiveness of the product while their ultimate interest is money only. This study involves the gradient elution of caffeine, ephedrine and dextromethorphan using Diode Array Detector. Mobile phase A consisted of 50 mM sodium dihydrogen phosphate buffer and acetonitrile (ACN) used as an organic modifier as mobile phase B. The concentration of mobile phase B was selected as 30,30,80,80 and 30. Good chromatographic separation between caffeine, ephedrine and dextromethorphan was accomplished within 10 minutes using C18 column(250 mm x 4.6 mm, 5-  $\mu$ m particle) at the flow rate of 1.0 mL/min with good resolution. The DAD detection of the components was executed at 254 nm, 206 nm and 224 nm on the basis of  $\lambda_{\text{max}}$  of caffeine, ephedrine and dextromethorphan respectively. The linearity of the developed method ranges from 12.5-250  $\mu$ g/mL for caffeine and ephedrine and 15 to 300  $\mu$ g/mL for dextromethorphan. The LOD values of caffeine, ephedrine and dextromethorphan were found to be 0.75  $\mu$ g/mL, 0.15  $\mu$ g/mL and 0.16  $\mu$ g/mL respectively. The LOQ value of caffeine, ephedrine and dextromethorphan were found to be 2.25  $\mu$ g/mL, 0.45  $\mu$ g/mL and 0.48  $\mu$ g/mL respectively. Validation of the developed method was performed according to ICH guidelines. The proposed method was successfully applied for the routine and simultaneous analysis of illicit drugs (caffeine, ephedrine and dextromethorphan) in different cough syrup formulations.

**Key words:** Illicit drugs, Caffeine, Ephedrine, Dextromethorphan, Stress Induced Degradation, Cough Syrup Formulations.

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