

## Simultaneous determination of acetaminophen and codeine in tablets by hollow fiber solid-phase microextraction combined with HPLC-DAD

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The aim of the present work was the development a new pre-concentration technique for the determination of acetaminophen and codeine by high performance liquid chromatography and diode array detection (HPLC–DAD) and this developed and validated method was the application to pharmaceutical formulations . Sol-gel sorbents for hollow fiber solid phase microextraction(HF-SPME) was developed for pre-concentration . The sol-gel nanocomposites were reinforced with nanopaticles . Sorption capacity of different functionalized nanoparticle: Tio2-CNT, formic acid-Tio2, COOH-MWCNTS, Naclo-MWCNTS, nano Sio2 and magnetic nanoparticles , for extraction of of acetaminophen and codeine at the optimum conditions was examined. The sol was injected into a polypropylene hollow fiber segment for in situ gelation. This device operated in direct immersion sampling mode. Parameters affecting the efficiency of HF-SPME were thoroughly investigated. The experimental setup is simple and affordable, and the device is disposable. Linearity was observed over a range of 0.50–5000 ng/mL .The limit of detection (LOD) was between 0.20- 0.30 ng/mL. The relative recoveries in the commercial tablets ranged from 88.0% to 94.0%. The method has satisfactory specificity, linearity, recovery, accuracy and precision . The results obtained from the developed and validated method were showed that this HF-SPME–HPLC-PDA method would be potentially useful for simultaneous analysis of acetaminophen and codeine.

**Keywords:** Acetaminophen; Codeine; Hollow fiber solid phase microextraction; Sol–gel; Nanoparticles; Pharmaceutical formulations