

## **Analytical method development and validation of anticancer agent, 5-fluorouracil, and its metabolites in biological matrices: an updated review**

### **ABSTRACT**

5-fluorouracil (5-FU) refers to a fluorinated pyrimidine analogue that has been widely used as an anticancer agent for colon, head, and neck cancers. Detection of 5-FU and its metabolites; 5-fluorouridine and 5-fluoro-2-deoxyuridine in biological samples allows optimization of pharmacotherapy and encourages fundamental investigations of this medication. The development of accurate and reliable sample preparation, as well as analytical methods, is critical to isolate targeted analytes from complex matrices, apart from increasing detection sensitivity of analytes. With that, this paper presents a review of prior studies pertaining to chromatographic and electrophoretic methods that focused on the analysis of 5-FU and its metabolites in biological matrices such as plasma and urine. This paper concentrates on HPLC, GC and CE systems, which are the most commonly used strategies for analytical separation of 5-FU and its metabolites from samples. Detection of these antineoplastic agents at trace level demands highly sensitive and selective analytical methodologies. Application of these analytical techniques to biological matrices is reviewed with a focus on method development strategies, including types of mobile phases and background electrolytes employed in LC and CE systems.

**Keyword:** Analytical method development; Chromatographic; Electrophoretic; 5-fluorouracil and its metabolites; Sample preparation