

**DEVELOPMENT OF A FLUORIMETRIC METHOD  
FOR THE DETERMINATION OF ACETAMINOPHEN**

**GAMAGE DONA CHINTHA RANSIRINI PREMARATNA**

**Dissertation submitted in partial fulfillment of the requirements for the  
DEGREE OF MASTER OF SCIENCE (ANALYTICAL CHEMISTRY)  
of the UNIVERSITY OF COLOMBO.**

**P/15599**

**DECEMBER 2000**

## ABSTRACT

Acetaminophen which is most commonly used as an analgesic and antipyretic in the world has the advantage over aspirin due to lack of gastro-intestinal side effects. In therapeutic doses the acetaminophen is thought to be safer but in large overdoses it causes serious liver damage where an accurate, rapid detection is essential.

A fluorimetric method has been developed to determine the amount of acetaminophen using Ce(IV) as the oxidizing agent. The acetaminophen was reacted with Ce(IV) in the presence of hydrogen ions to give a fluorescent species; p-benzoquinone. This oxidation product of acetaminophen has the excitation and emission maxima at 265 and 360 nm. The Ce(IV) is non-fluorescent under these experimental conditions. But Ce(III); the reduced product of Ce(IV) from the reaction between the acetaminophen and the Ce(IV) is also fluorescent and has the same excitation and emission maxima as that of p-benzoquinone. Hence, the resultant fluorescence was the contribution from both p-benzoquinone and Ce(III).

To avoid the interference from Ce(III), the  $\text{CN}^-$  was used in the presence of DMSO at pH 7.5. This had resulted in the shifting of the excitation and emission maxima of p-benzoquinone to 400 and 480 nm. The resultant fluorescent species is 2,3-dicyanohydroquinone, which provides a means of determining the amount of acetaminophen present in a sample.