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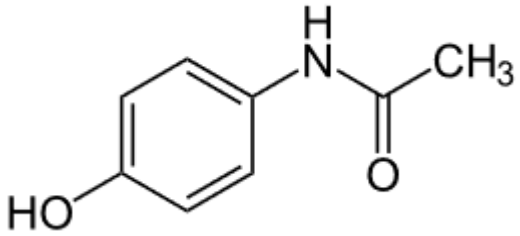
Method for Paracetamol Analysis

A method for quantification of paracetamol in a tablet formulation by high pressure liquid chromatography (HPLC) using a reversed phase column and an external standard is described. Method comprises tablet extraction, standard and sample preparation, dilutions and analysis. Pharmaceutical analysis requires accurate results testing the students standard and sample preparation thoroughly.

Introduction and Structures

A method for quantification of paracetamol in a tablet formulation by high pressure liquid chromatography (HPLC) using a reversed phase column and an external standard is described.

A Tablet extract containing approximately 0.02 % w/v of paracetamol is prepared and about 2 µg of paracetamol is injected into the column in 10 µl of extract solution. The paracetamol is detected using UV detection at a wavelength of 243 nm and quantification is achieved against a five-point calibration curve.



Paracetamol $C_8H_9NO_2$ 151.16 $g \cdot mol^{-1}$

Reagents and Safety

Paracetamol	-	Harmful if ingested in quantity; irritant; reproductive effects
Acetic acid	-	Corrosive; harmful to skin and eyes; flammable; vesicant
Acetonitrile	-	Highly flammable; toxic by ingestion, inhalation and skin contact; may be mutagen / teratogen

Avoid skin and eye contact with reagents by wearing a lab coat, gloves and safety glasses. Do not expose acetonitrile to a source of ignition. Avoid inhalation of acetonitrile vapour.

Provided the recommended precautions are adopted, the risk to operators during this procedure is minimal.

Apparatus

- Balance capable of weighing 0.0001 g
- Volumetric flask
- Glass or electronic pipettes
- Mortar and pestle
- Weighing boats

Mobile Phase Preparation

MOBILE PHASE A – Water + 0.1% Acetic Acid

- 1 mL Acetic Acid to 1 L of HPLC Grade water

MOBILE PHASE B - Acetonitrile

- 1L of HPLC or Gradient Grade Acetonitrile

Standard Preparation

Stock Solution (0.5 mg/mL)

- Weigh 125 mg (± 10 mg) of paracetamol – analytical grade into a 250 mL volumetric
- Fill to the mark with Mobile Phase A

Calibration Standards

- Prepare standards at the following nominal concentration:

  5, 10, 15, 20 and 25 μg/mL in Mobile Phase A
- Example of preparation of 20 mg/mL solution:

  1 mL of stock solution made to mark in a 25 mL volumetric with Mobile Phase A

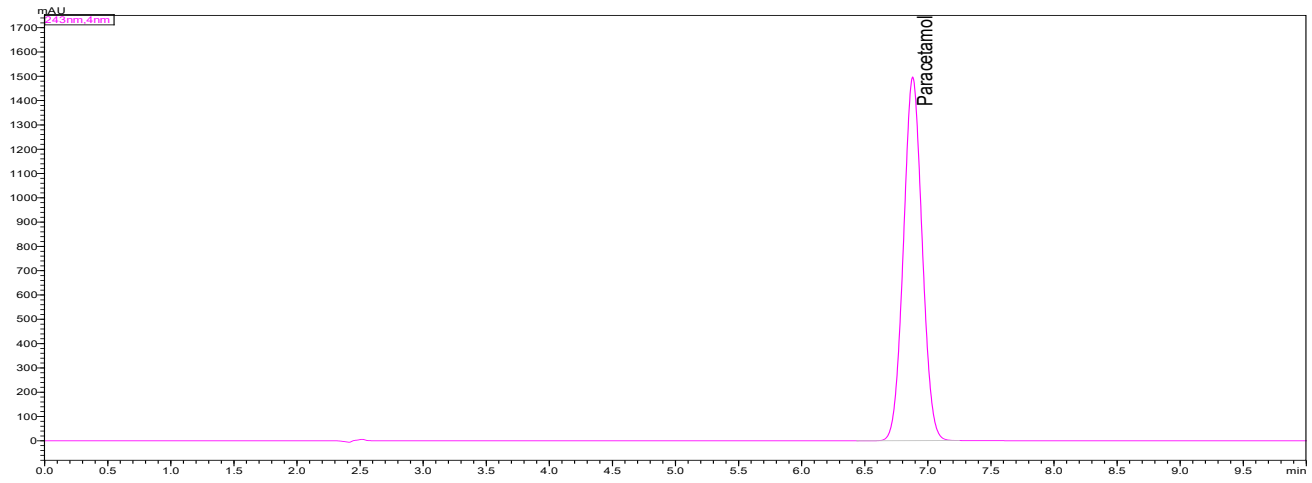
Sample Preparation

- Take 1 tablet containing 500 mg of paracetamol
- Grind the tablet into a find powder
- Dissolve (in duplicate) 125 ± 10 mg of the ground paracetamol tablet into 250 mL volumetric flask
- Add approximately 150 mL of mobile phase A
- Shake or sonicate until dissolved
- Fill volumetric to mark (if sonication is used make sure the solution has cooled first)
- Prepare a further dilution of each solution within the calibration curve

Analytical Conditions

- Column : Shimadzu Shimpak GIST C18-AQ 150 x 4.6 mm 5µm
- Temperature : 20°C
- Injected volume : 10 µL
- Mobile phases : A : 0.1% Acetic Acid in Water
  : B : Acetonitrile
  : C: Water
- Isocratic :90% A : 10% B :
- Flow rate : 1.0 mL/min
- Wavelength : 243 nm (cell at 40 °C)
- Runtime : 10 minutes
- Column Wash : 50:50 Acetonitrile: Water

Typical Chromatography



Information to be recorded

- Preparation of mobile phase

- Weight and Volume of Standard used
- How calibration curve solutions were prepared

- Sample preparation from tablet
- Weight and Volume of each sample solution
- Further dilution details

- Set up of Instrumentation
- Vial positions
- How long column was equilibrated for

- R and R^2 values of calibration curve
- Results for samples, included % of nominal and %RSD
- % from nominal for pharmaceutical analysis is typically ± 2% of nominal