

Determination of vanillin in imitation vanilla essence

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Experiment Overview

In this experiment students will determine the concentration of vanillin in imitation vanilla flavouring. The method of analysis involves the following steps:

- ☐ Extraction of the vanillin from the other components of the essence using an organic solvent, dichloromethane.
- ☐ Extraction of the vanillin as its sodium salt into the aqueous phase using dilute sodium hydroxide solution.
- ☐ Preparation of standards and construction of a calibration curve.
- ☐ Determination of the concentration of vanillin in the aqueous extract by ultra-violet spectrophotometry.

Learning Experience

In this experiment students apply key principles of analytical chemistry to the analysis of a common food additive (vanillin). This includes calibration curves, extractions, Beer's law and spectrophotometry.

Aims and Objectives

This experiment aims to introduce students to some basic analytical techniques including preparation of standards, construction of a calibration curve, use of a spectrophotometer, solvent extraction of an analyte (vanillin) and application of Beer's law to determine concentration of an unknown.

Level of Experiment

First year analytical chemistry

Keyword Descriptions of the Experiment

Domain

analytical chemistry, spectrophotometry

Specific Descriptors

standards, calibration, dilutions, extraction, Beer's law

Course Context and Prerequisite Knowledge and Skills

Previously part of a first year unit on analytical chemistry. Will be incorporated into one of the main-stream first year chemistry units.

Time Required to Complete

Prior to Lab: 1 hour

In Laboratory: 3 hours

After Laboratory: 1 hour

Experiment History

The experiment was an adaptation of that described by Ainscough in JCE 1990. We believe it has been part of the analytical chemistry laboratory at Curtin for many years.

References

Ainscough, E.W. and Brodie, A.M., 1990, *Journal of chemical education*, 67, 1070

Skoog, D.A., *et al.* *Fundamentals of analytical chemistry*, 8th Edition, 2004, Thomson Brooks/Cole: California. (suggested pages 911 – 914)