

Accepted Manuscript

Univariate and multivariate spectrophotometric methods for simultaneous determination of avobenzone and octinoxate in pure form and in cosmetic formulations: A comparative study

Amal Mahmoud Abou Al Alamein, Hanan Mohamed Elwy, Safaa Hussein Salah El-Din



PII: S1386-1425(18)30734-0
DOI: doi:[10.1016/j.saa.2018.07.073](https://doi.org/10.1016/j.saa.2018.07.073)
Reference: SAA 16342

To appear in: *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*

Received date: 8 June 2018
Revised date: 23 July 2018
Accepted date: 24 July 2018

Please cite this article as: Amal Mahmoud Abou Al Alamein, Hanan Mohamed Elwy, Safaa Hussein Salah El-Din , Univariate and multivariate spectrophotometric methods for simultaneous determination of avobenzone and octinoxate in pure form and in cosmetic formulations: A comparative study. Saa (2018), doi:[10.1016/j.saa.2018.07.073](https://doi.org/10.1016/j.saa.2018.07.073)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Univariate and Multivariate Spectrophotometric Methods for Simultaneous Determination of Avobenzone and Octinoxate in Pure Form and in Cosmetic Formulations: A Comparative Study.

Amal Mahmoud Abou Al Alamein⁽¹⁾, Hanan Mohamed Elwy⁽²⁾, Safaa Hussein Salah El-Din.⁽²⁾

⁽¹⁾ Analytical Chemistry Department, Faculty of Pharmacy, Cairo University, 11562 Cairo, Egypt

⁽²⁾ National Organization for Drug Control and Research (NODCAR)-Egypt.

Abstract

Simple, economic and precise spectrophotometric and chemometric techniques were used to determine UV filters namely; avobenzone (AV) and octinoxate (OCT) simultaneously in pure form and in cosmetic formulations in concentration range (2 – 10 $\mu\text{g}\cdot\text{mL}^{-1}$) for both drugs. The spectrophotometric technique includes five different methods; Method (A) is first derivative (D^1) spectrophotometry at 380.6 nm for AV and 276.2 nm for OCT, Method (B) is first derivative of ratio spectra (DR^1) at 352.8 nm for AV and 312.2 nm for OCT, Method (C) is ratio difference spectrophotometry (RD) at 356 nm and nm 347.2 nm for AV and at 311.6 nm and 281 nm for OCT, Method (D) is mean centering spectrophotometry (MCR) at 356 nm for AV and 301.8 nm for OCT and method (E) is modified vierordt's method which involves absorbance measurement at 358 nm for AV and 309.2 nm for OCT and determination of the concentration of x and y from the two simultaneous equations. The chemometric technique includes multivariate calibration methods; partial least squares (PLS) and principle component regression (PCR) using the absorption spectra. The proposed methods were applied for determination of (AV) and (OCT) simultaneously in pure form and in cosmetic formulations. These methods were validated according to ICH guidelines.

Keywords: Avobenzone; Octinoxate; UV filters; Spectrophotometry; Chemometry.

1- Introduction:

Ultraviolet (UV) light differs in its effect according to its wavelength; **UVA** (wavelengths 320 to 400 nm) contributes to the long-term harmful effects of photoageing and cancers and can be subdivided into UVA-I (340 to 400 nm) and UVA-II (320 to 340 nm), **UVB** (wavelengths 290 to 320 nm) contributes to malignant changes and **UVC** (wavelengths 200 to 290 nm) are highly cytotoxic to human skin but the ozone layer protect earth's surface from its

Download English Version:

<https://daneshyari.com/en/article/7667137>

Download Persian Version:

<https://daneshyari.com/article/7667137>

[Daneshyari.com](https://daneshyari.com)