Accepted Manuscript

Title: Simple<!–<query id="Q1">Please check the dochead and correct if necessary.</query>–> and cost-effective determination of ciprofloxacin hydrochloride by electrical micro-titration

Authors: Xu-Zhi Zhang, Meng-Shi Huang, Qian-Qian Yang, Dong-Sheng Ding, Jun Zhao, Wen-Rong Yang, Ke-Ming Qu

PII: S1001-8417(17)30097-9
DOI: http://dx.doi.org/doi:10.1016/j.cclet.2017.03.019
Reference: CCLET 4014

To appear in: *Chinese Chemical Letters*

Received date: 15-12-2016
Revised date: 9-3-2017
Accepted date: 9-3-2017

Please cite this article as: Xu-Zhi Zhang, Meng-Shi Huang, Qian-Qian Yang, Dong-Sheng Ding, Jun Zhao, Wen-Rong Yang, Ke-Ming Qu, Simple and cost-effective determination of ciprofloxacin hydrochloride by electrical micro-titration, Chinese Chemical Lettershttp://dx.doi.org/10.1016/j.cclet.2017.03.019

Original article

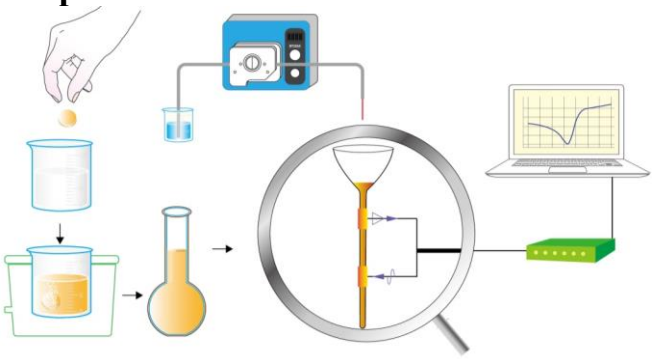
Simple and cost-effective determination of ciprofloxacin hydrochloride by electrical micro-titration

Xu-Zhi Zhang[a], Meng-Shi Huang[a,b], Qian-Qian Yang[a,b], Dong-Sheng Ding[a], Jun Zhao[a], Wen-Rong Yang[c], Ke-Ming Qu[a*]

[a] *Yellow Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences; Qingdao National Laboratory for Marine Science and Technology, Qingdao 266071, China*
[b] *College of Marine Sciences, Shanghai Ocean University, Shanghai 201306, China*
[c] *School of Life and Environmental Sciences, Deakin University, Geelong, VIC 3217, Australia*

∗ Corresponding author.
E-mail address: qukm@ysfri.ac.cn

Graphical Abstract



By employing an electrical micro-titration system, in which a capacitively coupled contactless conductivity detector is used to monitor the reaction process in real time, ciprofloxacin hydrochloride in tablet samples is determined. Because the reaction solutions are isolated from the working electrodes, it shows significant simplicity and cost-effectiveness, by eliminating the requirements for detector exchange/renewal between measurements, and by involving no auxiliary chemicals.

ARTICLE INFO

Article history:
Received 15 December 2016
Received in revised form 13 February 2017
Accepted 2 March 2017
Available online

Keywords:
Ciprofloxacin hydrochloride
Determination
Micro-titration
Capacitively coupled contactless conductivity detector
Pharmaceutical analysis

ABSTRACT

By employing an electrical micro-titration system, in which a capacitively coupled contactless conductivity detector (C^4D) was used to monitor the reaction process in real time, herein a novel method for determining ciprofloxacin hydrochloride (CIPHCl) was developed for the first time. Mode 1: Standard CIPHCl solutions at different concentrations were loaded into reaction cells, respectively, and were titrated with standard Ag^+. Upon the titration, the formation of a precipitate alters the number of ions in the solution, raising the change of conductivity, which was monitored by a special C^4D to construct a titration curve. The endpoint of the titration was located from the peak of the curve. Between the elapsed time and the initial concentration of titrand, a linear relationship was established over the range of 2.0-8.0 mmol/L. Mode 2: Standard Fe^{3+} took the place of Ag^+, and was used as titrant to recognize ciprofloxacin contributed to the formation of complexation, which also resulting a change of solution conductivity. Under optimized conditions, a working range of 1.0-5.0 mmol/L CIPHCl was found. Because the reaction solutions were isolated from the working electrodes, this pioneer work shows significant simplicity and cost-effectiveness, by eliminating the requirements for detector exchange/renewal between different measurements, and by involving no auxiliary chemicals. Both of the two approaches were applied successfully to determine CIPHCl in tablet samples. And the results were in good agreement with those obtained by reference method.