Development and application of total error strategy in the validation of LC methods to detect substandard antibiotics.

ABSTRACT

A major cause of the increasing failures rate in the management of infectious diseases in low-income countries resides in the use of low-quality antibiotics. In this context, it is opportune to combat the circulation of substandard antibiotics by promoting their detection and then take appropriate measures to eradicate their market. This study has the objective to develop and validate simple, accurate and low-cost analytical HPLC methods in order to ensure the quality control of antibiotic drugs. The study focuses on four antibiotics (azithromycin, cefadroxyl, chloramphenicol and erythromycin) used in DR Congo to treat infectious diseases. The method was validated according to guidelines of the International Conference on Harmonization ICH Q2 (R1). The strategy of total error represented by the accuracy profile has been used as tool decision for the validation. Methods for the assay of azithromycin and cefadroxil were validated, taking into account selectivity, trueness, precision (repeatability and intermediate precision), accuracy, linearity, limit of detection / limit of quantitation, and dosing range. These validated methods were subsequently applied to pharmaceuticals samples collected in the formal and informal pharmaceutical markets in Lubumbashi. Data indicate that 34% (10/29) of tested samples were under-dosed (6 cefadroxyl and 4 azithromycin drugs) according to USP specifications (90 – 110 % for cefadroxyl and 90 - 120 % for azithromycin); the under-dosed samples contained the active ingredients in amounts ranging 66 to 88 %. The routine use of these methods will promote the strengthening of quality control laboratories in DR Congo.