Abstract

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Title of thesis: Testing of stability of antivirotic drugs using ultra-high performance liquid chromatography.

This thesis is concerned with determining the stability of five antiviral drugs (ledipasvir, sofosbuvir, tenofovir and the monoester and diester of tenofovir) under various temperature conditions. The study employed ultra-high performance liquid chromatography with a photodiode array detector detection at 259 nm. The tested antiviral drugs are new medicinal products used in treating serious diseases such as AIDS and hepatitis C.

Two types of stability were tested: short-term and long-term. The short-term stability of the substances was tested in acetonitrile and methanol at 4 °C and 22 °C for 24 hours. The long-term stabilities of sofosbuvir and the monoester and diester of tenofovir in 50 % acetonitrile, ledipasvir in 100 % acetonitrile and tenofovir in water were determined while maintaining the substances at three temperatures in the medium: – 20 °C, 4 °C and 22 °C for a period of 28 days. In addition the substances were tested in phosphate buffers for 90 days for storage at – 20 °C. The storage conditions and the time during which the medicinal substances remain stable can be determined from the results of these tests.

The chromatographic stability conditions were taken from the previous study and were optimised. The stability was tested in gradient modes. An aqueous solution of 0.1% formic acid and acetonitrile were used as the mobile phases in the tests of short-term and long-term stability and stability in buffers. The antiviral drugs were eluted from a C18 column at a temperature of 40 °C. The flow rate was increased from 0.3 ml/min to 0.6 ml/min for the stability test in the buffer.

Keywords: UHPLC, stability, testing, antiviral drugs