

VAMS – what are the best transport and storage conditions? A case study.

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Background: Therapy drug monitoring (TDM) in Anti-Arrhythmic Drugs (AAD) is essential for patient management. Important aspect of successful TDM include sample stability during transport and storage, especially when it comes to samples collections at home. In this work we present an approach for successful transport and storage conditions determination during the development of an assay named “CardioCarePack”, applied in quantitation of 17 antiarrhythmic drugs in capillary blood samples collected by VAMS.

Methods: Transport and storage parameters were determined in the Binder KBF240 climatic chamber. 5 major settings were selected for temperature (T) and humidity (H): T:20°C, H:50%; T:10°C, H:50%; T:30°C, H:50%; T:20°C, H:30%; T:20°C, H:70%. 20 µl Mitra[®] samplers with blood spiked at 2.5/25/250 µg/L concentration of analytes were incubated in closed string bags and freely. The relative amount of the tested substances was determined on the basis of the average of the three repetitions of peak areas obtained in the LC-MS/MS analysis after 0, 1, 2, 3, 4 and 7 days of incubation. Results remaining at level of 85% compared to day 0 were considered stable. Samples were subjected to optimized and validated procedure including MRM-based analysis of 17 selected compounds on QTRAP 5500+ LC-MS/MS system (SCIEX) followed by data processing and quantitation in SciexOS software (SCIEX).

Results: All 17 compounds were stable up to 7 days under T:10°C, H:50%. Similar result was achieved for T:20°C, H:30%, excluding amiodarone which was stable only for 3 days. In other 3 tested conditions some compounds were stable up to 3rd-4th day (ex. digoxin, metoprolol, bisoprolol, spironolactone), while others (ex. amiodarone, desethylamiodarone, perindopril, enalapril, propafenone, dronedarone) was not stable even for the first 24 hours of experiment. As a trade-off between sample stability and reasonable transport time and conditions it was recommended to transport samples for maximum 3 days, at a temperature up to 20°C in a string bags containing a desiccant.

Conclusions: Transport conditions for VAMS-collected samples are compound dependent and needs to be checked and optimized before any clinical study or routine diagnostics to avoid underestimation of compounds of interest.

Key Words: VAMS, cardiac arrhythmia, TDM, CE-IVD, correlation, lc-ms/ms