

Project Outline

DBS-MS high throughput extraction system

Introduction

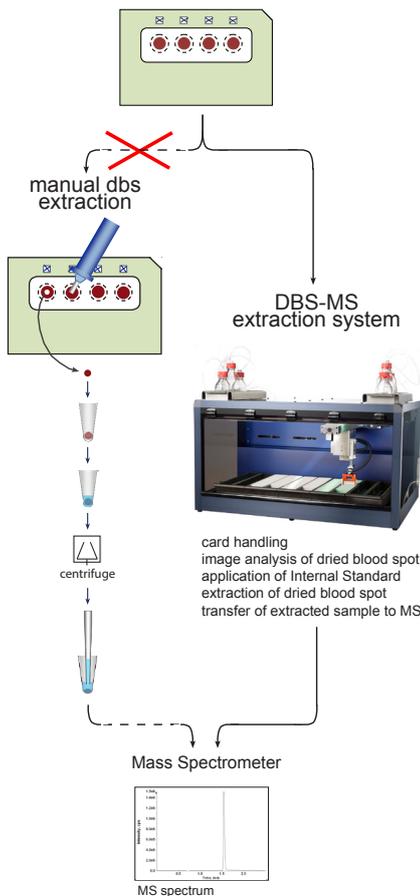
The analysis of microlitre amounts of blood samples which are spotted onto filter paper cards and dried (dried blood spot analysis, DBS) has many benefits compared to conventional blood sampling and analysis methods. These include the reduction in blood volume, storage at ambient temperature, easy transportation and less risk of infection. However, due to the tedious manual extraction procedure the analysis of a large number of DBS cards in a time- and cost-effective manner was not yet possible.

Aims of the project

The project aimed at the development and realization of a lab instrument for automated extraction of dried blood spots that is suitable for high throughput analysis.

Approach

The project covered all phases of product development until start of production. Four different modules are integrated into the DBS-MS extraction system. The handling module consists of an XY kinematic with a customized gripper for firm and precise handling of DBS cards. The optical card recognition module contains a digital camera for the read-in of identification data (barcode) and determination of spot size, position and quality. This module is also used for verification of correct dried blood spot extraction. With the optional Internal Standard Application module an internal standard can be applied to single dried blood spots to compensate for the variability in MS performance and to allow for compound quantification. The central part of the DBS system is the extraction unit which is equipped with a metal plunger with a sealing edge. The metal plunger is pressed onto the DBS card so that the spot to be extracted is sealed liquid-tight. Using high pressure a solvent is directed into the sealed area and the spot is extracted in real-time. The extract is directly transported to the mass spectrometer for analysis. The DBS-MS extraction system is designed for the automated extraction of up to 500 DBS cards. Over-night operation is possible.



Project Partner



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