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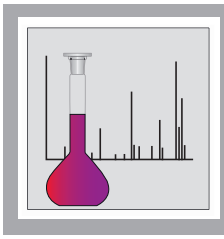

Highlights of Analytical Chemistry in Switzerland

Division of Analytical Chemistry

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Enhancing the Quality and Efficiency of Analytical Method Development as Part of the Quality by Design Framework

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Analytical methods employed in the Pharmaceutical Industry must meet the most stringent demands in order to ensure product quality and patient safety for medicinal products that are released for clinical trials or market. Demands according ICH guidelines on analytical methods remain unchanged also with novel approaches such as QbD for method development and method validation. Contrary to traditional approaches towards method development and validation, employing QbD methodologies will allow for an earlier understanding and identification of potential variables affecting the method performance. QbD tools such as FMEA based upon fishbone evaluation followed by DoE approaches for robustness studies will enable enhanced quality to be integrated into the analytical method upfront.

Variables affecting the method performance are included in a fishbone outline and are prioritized according to occurrence, detection, and impact leading to risk prioritization assessments. Critical method variables are employed for DoE and finally for the definition of the design space of the analytical method. Method performance is dependent on the critical method variables. Method performance per se is given by system suitability test requirements, for example limit of detection, repeatability, and resolution, for HPLC. These requirements define the analytical method target profile. On the other side, the aimed for quality target profile (technical perspective) of the DS or DP dictates what your analytical method performance must be capable of, thus the quality target profile of the DS or DP defines the analytical method target profile. This also includes the possible detection of unexpected impurities, for example new degradation products possibly arising from storage or any unforeseen impurity, for example arising from scale-up effects of the synthesis due to unpredicted hot-spot effects in your reaction vessel.

Applying QbD for analytics enables the reduction of variability of end-product and final release method to achieve the delivery of pre-defined, well-understood and constantly complying quality.

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Reference

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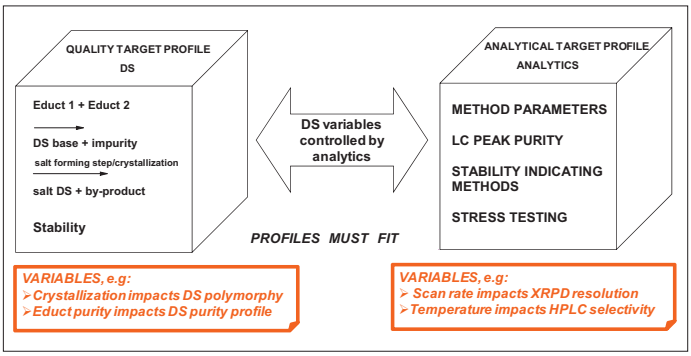
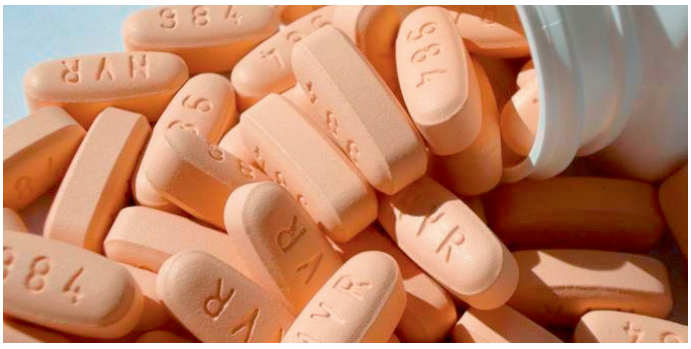
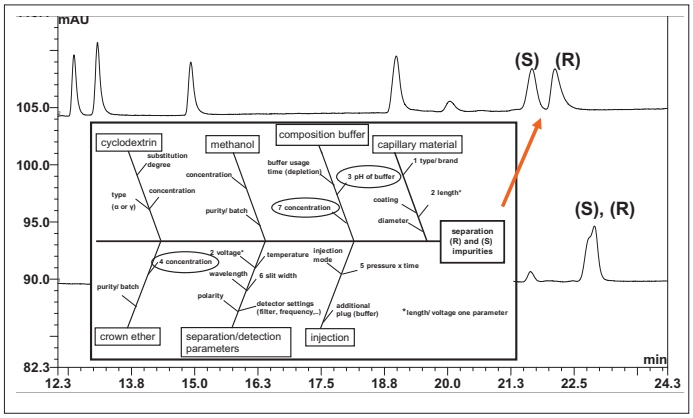


The analytical target profile must fit the quality target profile. Knowledge-driven control of DS (or DP) variables: For example proper control of carry-over of impurities, stability and of the polymorphy of a drug substance.



In addition to the classical ICH guidelines 1–7, the ICH guidelines 8 (Pharmaceutical Development), 9 (Quality Risk Management), and 10 (Pharmaceutical Quality System) have recently been defined to holistically integrate a pharmaceutical quality system throughout the different stages of the lifetime of a product.



Fishbone diagram for a capillary electrophoresis method. Proper control of critical method variables and critical interactions will ensure proper method performance: Crown ether concentration increase leads to separation of (*S*) and (*R*) impurity.

Can you show us your analytical highlight?

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