“Track and Traceability” in the smoking laboratory

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Introduction

“Track and Traceability” is one of the fundamental requirements for “Good Laboratory Practice”.

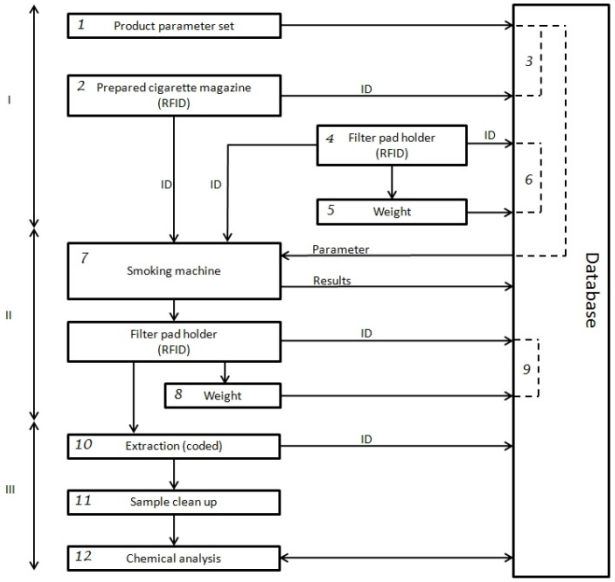
During the whole production process, from incoming goods up to the packed product, cigarettes are thoroughly tracked.

But within the smoking laboratory this is more problematic. The products have to be linked carefully to complex smoking plans including multiple machines and different parameter settings. And finally the products are converted physically into loaded smoke traps continuing their way to the chemical analysis. Along the way there are plenty of possibilities to mix up samples, or data, or to lose the link between the traps and the smoked product.

This poster describes a technical solution of consistent tracking during the whole analytical process. It is based on the automated identification of uniquely id-coded key components used in the smoking machine like cigarette sample magazines, filter pad holders and extraction flasks communicating with a data base.

This procedure will avoid or even eliminate errors and provide on-line information about the current status of the product during the whole analytical process which is an essential and important topic to facilitate laboratory accreditation. It will safeguard the laboratory processes, offering not only the possibility for higher efficiency and higher process automation, but also ensures traceability from smoked product to chemical analysis results.

Process steps



Process steps

Phase I (preparation):

1. Entering sample specific information like sample ID, product parameter, smoking parameter , conditioned weight etc. into the database
2. Load the cigarette magazine and scan its ID
3. The database links the magazine ID to the parameters mentioned above
4. Scan of the filter pad holder ID
5. Determination of the dry weight
6. The database links filter pad holder ID and dry weight

Phase II (machine smoking):

7. The smoking machine identifies the cigarette magazine ID , loads all corresponding parameter from the database, starts the smoke run using an identified filter pad holder and transfers the smoke run relevant results linked to the filter pad holder ID to the database
8. Weighing of the loaded filter holder
9. The determined weight is linked by the database to the filter pad holder ID

Phase III (analytics):

10. Transfer of the filter pad to a coded extraction vessel and communication of the vessel Id to the database
11. Extraction and sample clean up
12. Chemical analysis (quantification) of the respective smoke constituents and data transfer to the database which is now ready to calculate the final results and to generate the full report.

Conclusion

Mostly tracking of samples during the analytical smoking procedure is a manually controlled process with a chance for errors. In order to ensure the reliable allocation of smoking products, parameters and analytical results to the tobacco products tested while guaranteeing there is no data confusion, or loss a new technology is needed.

The described procedure offers a technical solution eliminating these sources of error by tracking only three coded key components of the smoking and analytical process communicating with a database. It can be performed by either tracking fixed uniquely coded compounds or by adding physically all information to a rewritable tag.

This technical solution can be adapted to all types of currently available smoking machines. It also offers the basis for additional automation like as fully automated operating weighing stations or units for a direct filter extraction with an automated transfer to further gas chromatographic or liquid chromatographic measurement systems.