

Automatically extraction and analysis using on-line supercritical fluid extraction (SFE) / supercritical fluid chromatography (SFC) system

Takato Uchikata¹, Hidetoshi Terada¹, Yasuhiro Funada¹, Yoshihiro Izumi^{2,3}, Takeshi Bamba^{2,3}

¹ Shimadzu Corporation, Kyoto, Japan,

² Medical Institute of Bioregulation, Kyushu Univ., Fukuoka, Japan.

³ Dept. Biotech., Grad. Sch. Eng., Osaka Univ., Osaka, Japan.

1. Introduction

The online SFE-SFC-MS system is capable of user-friendly simultaneous multicomponent analysis, with online automation of everything from sample pretreatment to separation and analysis. It will be of practical use in fields where faster and more reliable automatic analysis of multiple samples is required, such as in the examination of residual pesticides in foods, and searches for disease biomarkers.

In the online SFE-SFC-MS system, solid samples are extracted by supercritical fluid and introduced to SFC on-line. The time for pretreatment of samples is drastically shortened. For example, in the analysis of pesticides in food products, the state-of-the-art Nexera UC system takes only five minutes for a complete analysis sample pre-treatment when compared with at least 35 minutes for conventional systems.

In addition, samples are extracted under light-shielding and anaerobic conditions in order to protect labile analytes from degradation.

2. Experimental

2-1. System

Nexera UC system (Shimadzu corporation, Japan) was used for the supercritical fluid sample extraction (SFE) followed by SFC directly (SFE/SFC). The Nexera UC system configuration is shown in Figure 1.

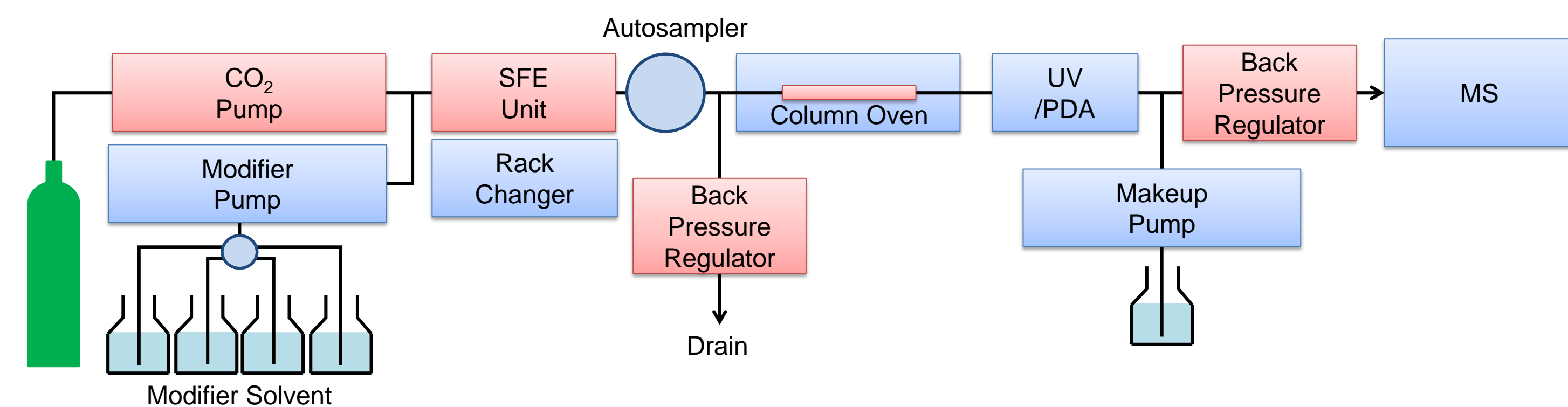
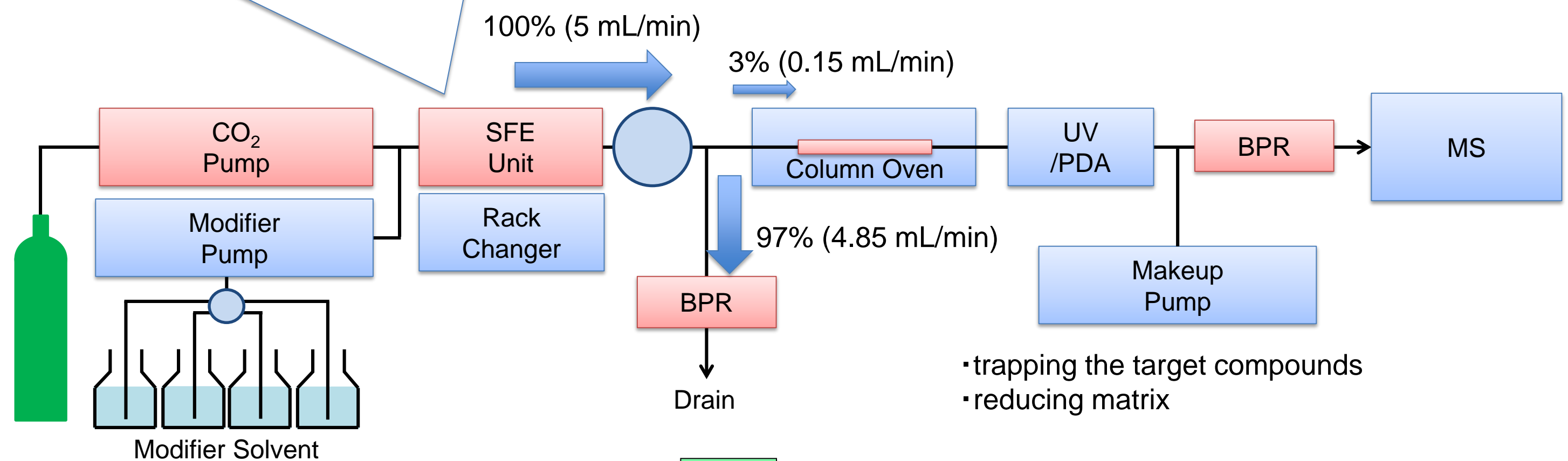
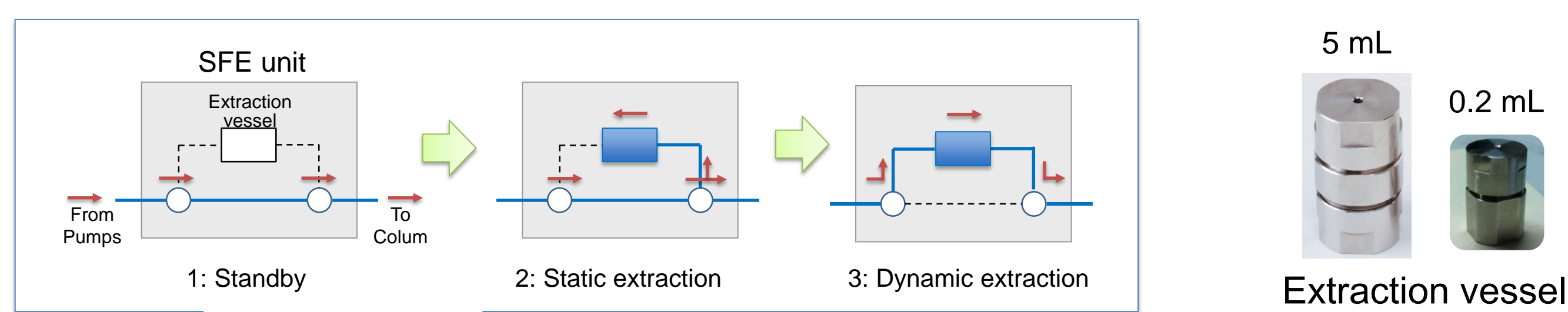


Figure 1 Nexera UC system configuration (On-line SFE-SFC-MS system)

2-2. On-line SFE-SFC-MS Analysis diagram

The schematic diagram for extraction and analysis of on-line SFE-SFC-MS is shown in Figure 2.

Extraction



Analysis

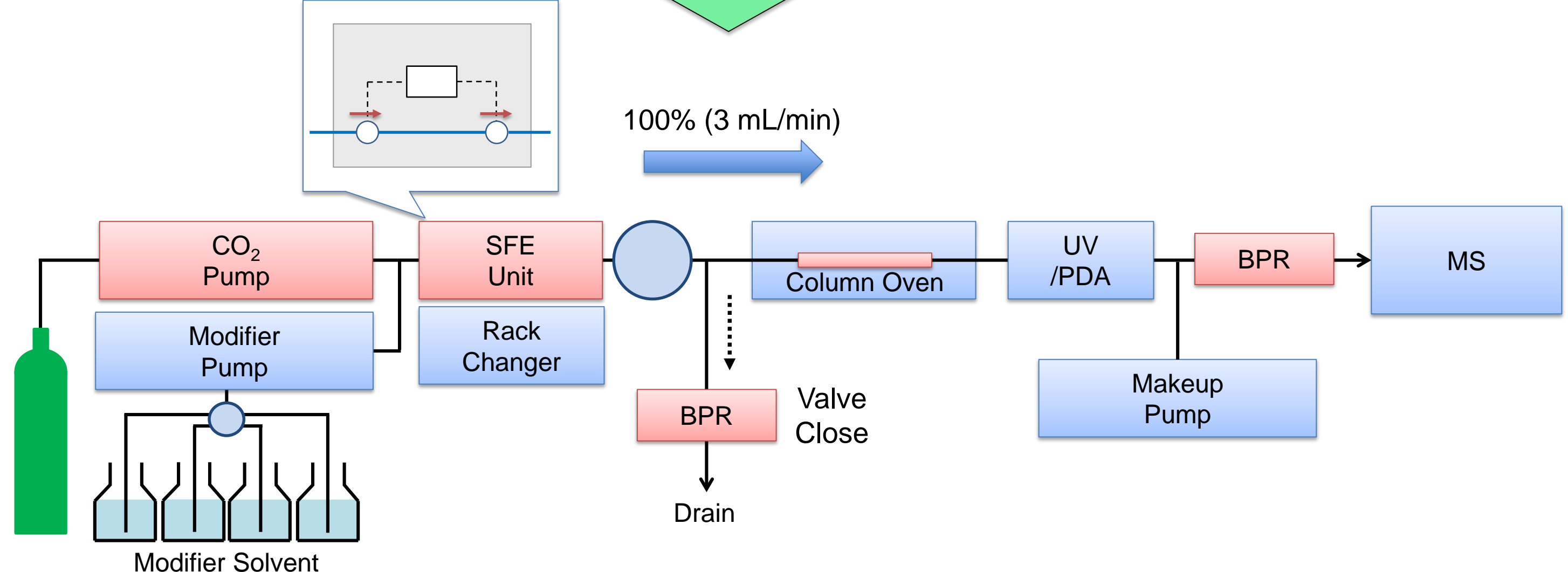
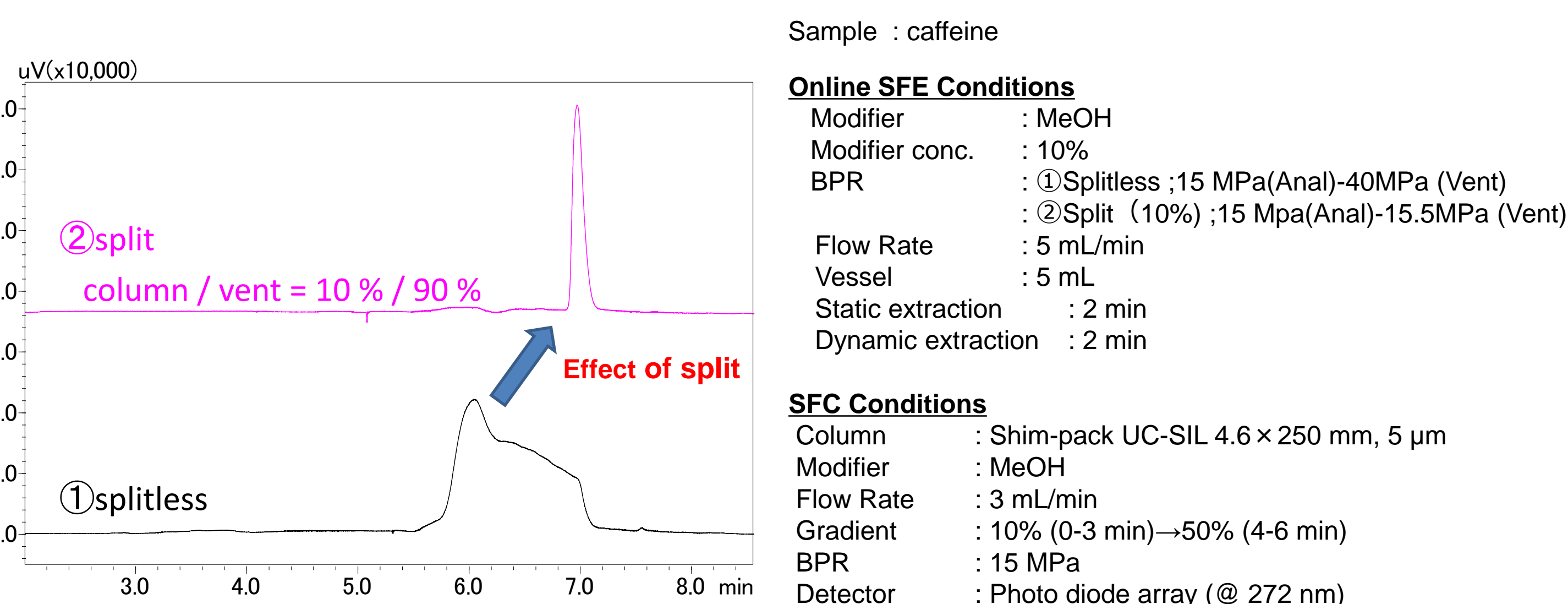


Figure 2 On-line SFE-SFC-MS Analysis diagram

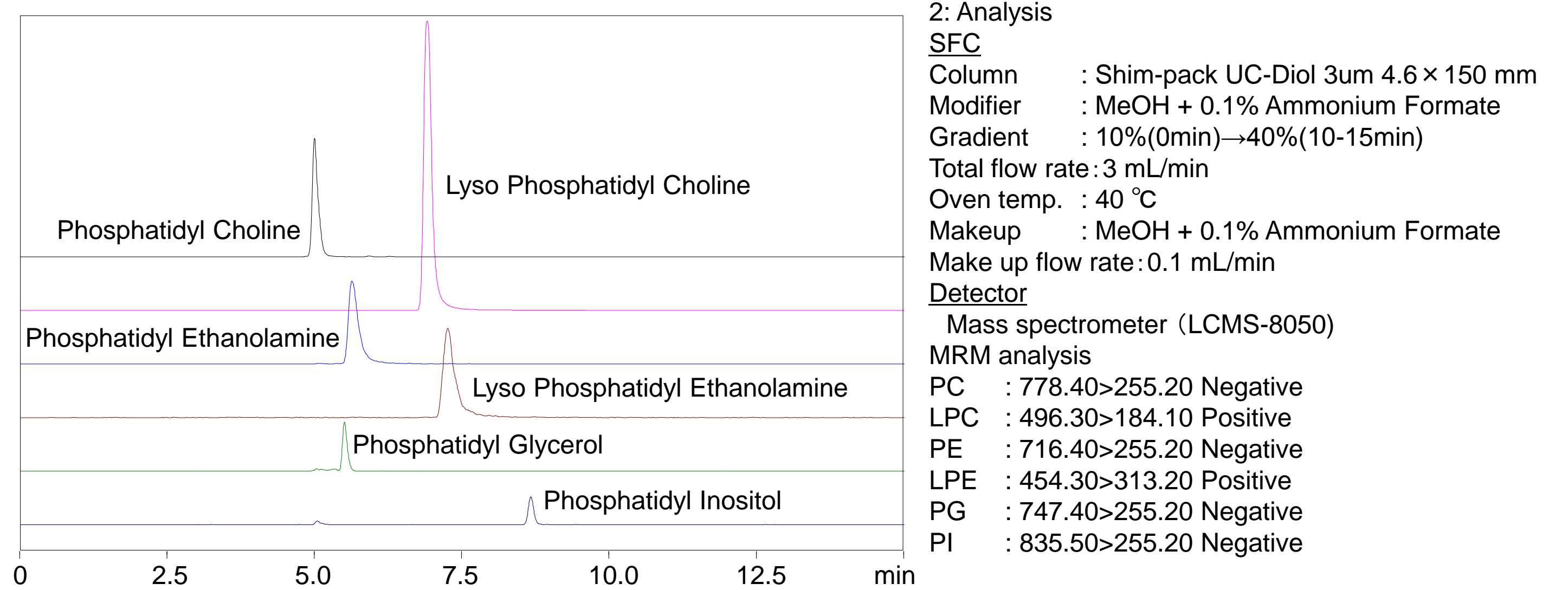
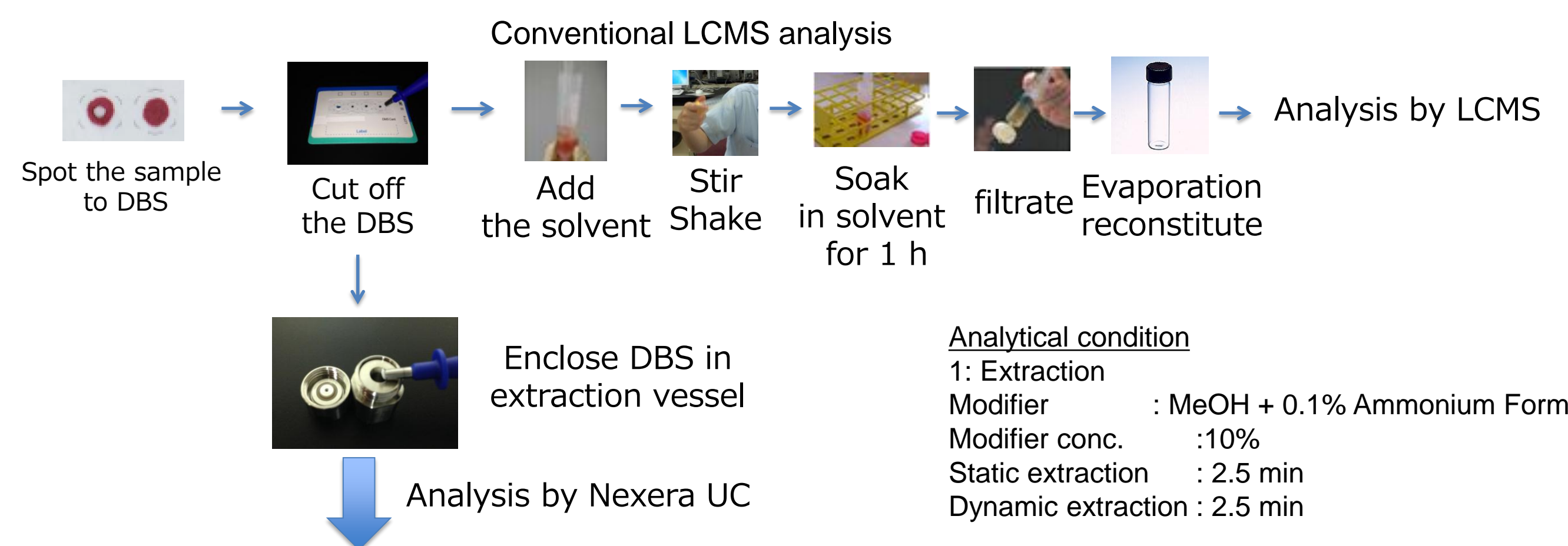
2-3. Effect of split



3. Application

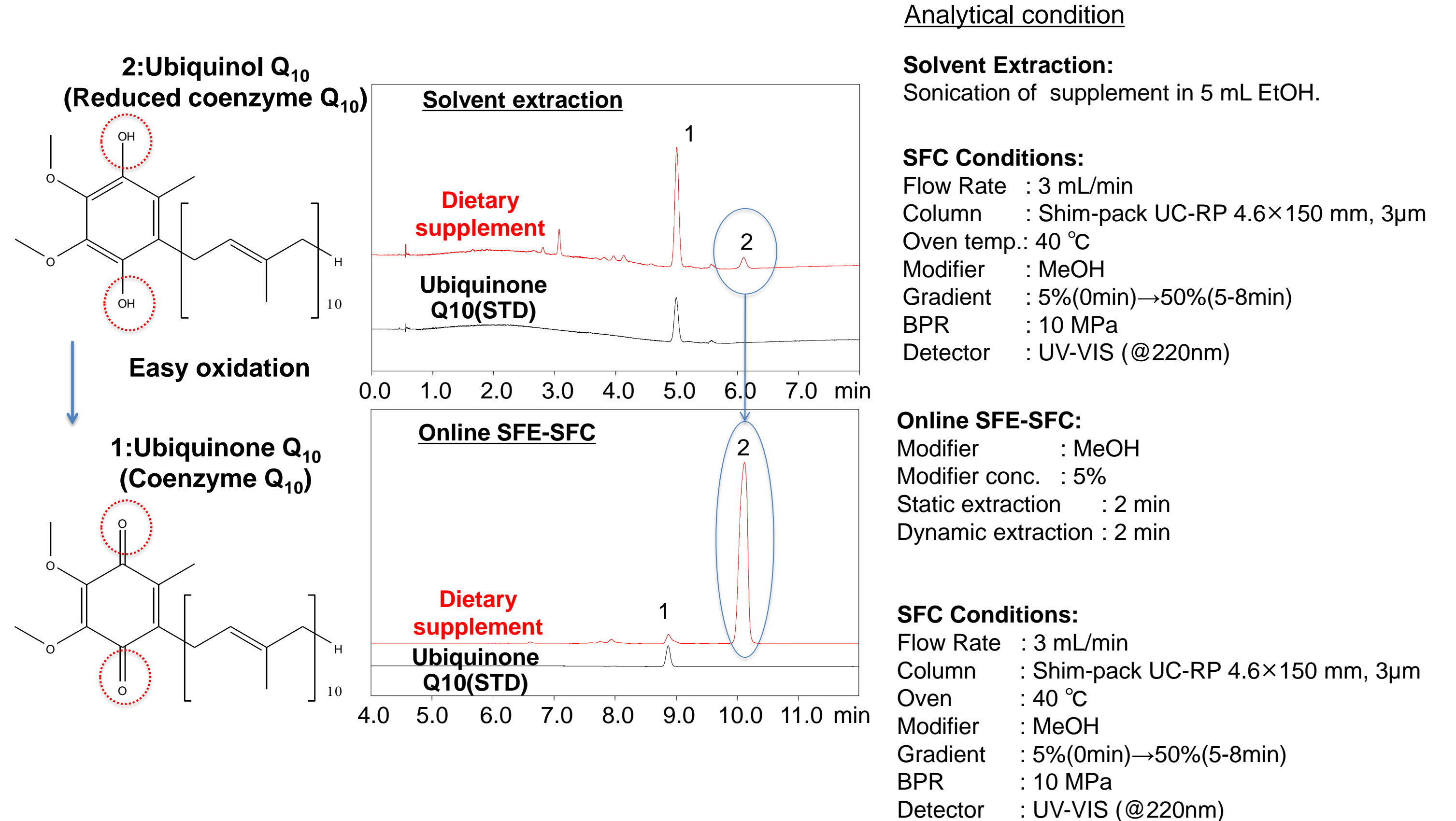
3-1. Analysis of biological compounds from dried blood spot (DBS)

This system was able to extract biological compounds easier than conventional extraction.



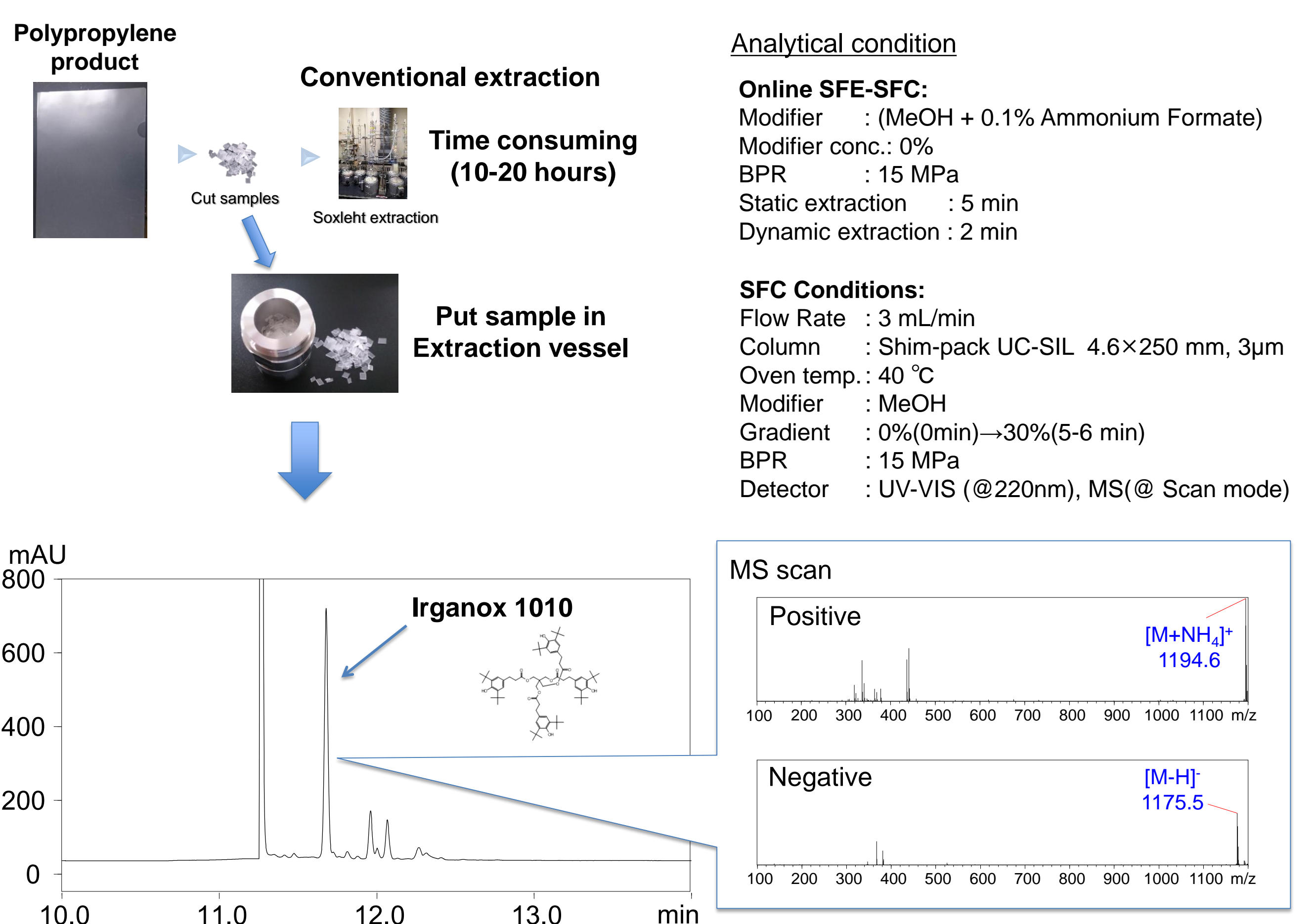
3-2. Analysis of coenzyme Q₁₀ in supplements

This system was able to detect labile compounds without degradation



3-3. Analysis of polymer additives

This system was able to extract additives faster than conventional extraction.



4. Conclusion

- This system was full-automatically able to extract and analyze several compounds.
- This system was able to extract and analyze biological compounds and polymer additives faster than conventional extraction.
- Labile compounds was able to be detected without degradation using on-line SFE-SFC.

5. Acknowledgement

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