

Automated sample preparation for high-throughput metabolomic profiling using Waters Andrew+ pipetting robot with biocrates MxP® Quant 500 kit

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INTRODUCTION

- Quantitative metabolomic profiling provides meaningful insights for biological and clinical research in numerous fields, which often involve large sample cohorts.
- The commercially available biocrates MxP® Quant 500 kit offers quantitative metabolomic profiling of up to 630 metabolites from 26 biochemical classes in a variety of biological matrices.
- Automated sample preparation using robotics can improve reproducibility and throughput while reducing personnel time for such high-throughput analytical methods.

METHODS

- Pooled human plasma, human stool, mouse adrenal gland tissue, and macrophage cell pellets were obtained from independent pilot studies.
- Sample matrices listed above were prepared and measured in replicate (n=6), along with MxP® Quant 500 kit QCs (n=5), according to manufacturer protocol and using our automated protocol with Waters Andrew+ pipetting robot.
- Metabolomic profiles were generated using an Agilent 6496C LC-QQQ-MS coupled to an Agilent 1290 Infinity II UHPLC system.
- Results were processed using biocrates WebIDQ software. Statistical analysis was conducted using R modules.

Automated protocol is compatible with multiple common sample matrices

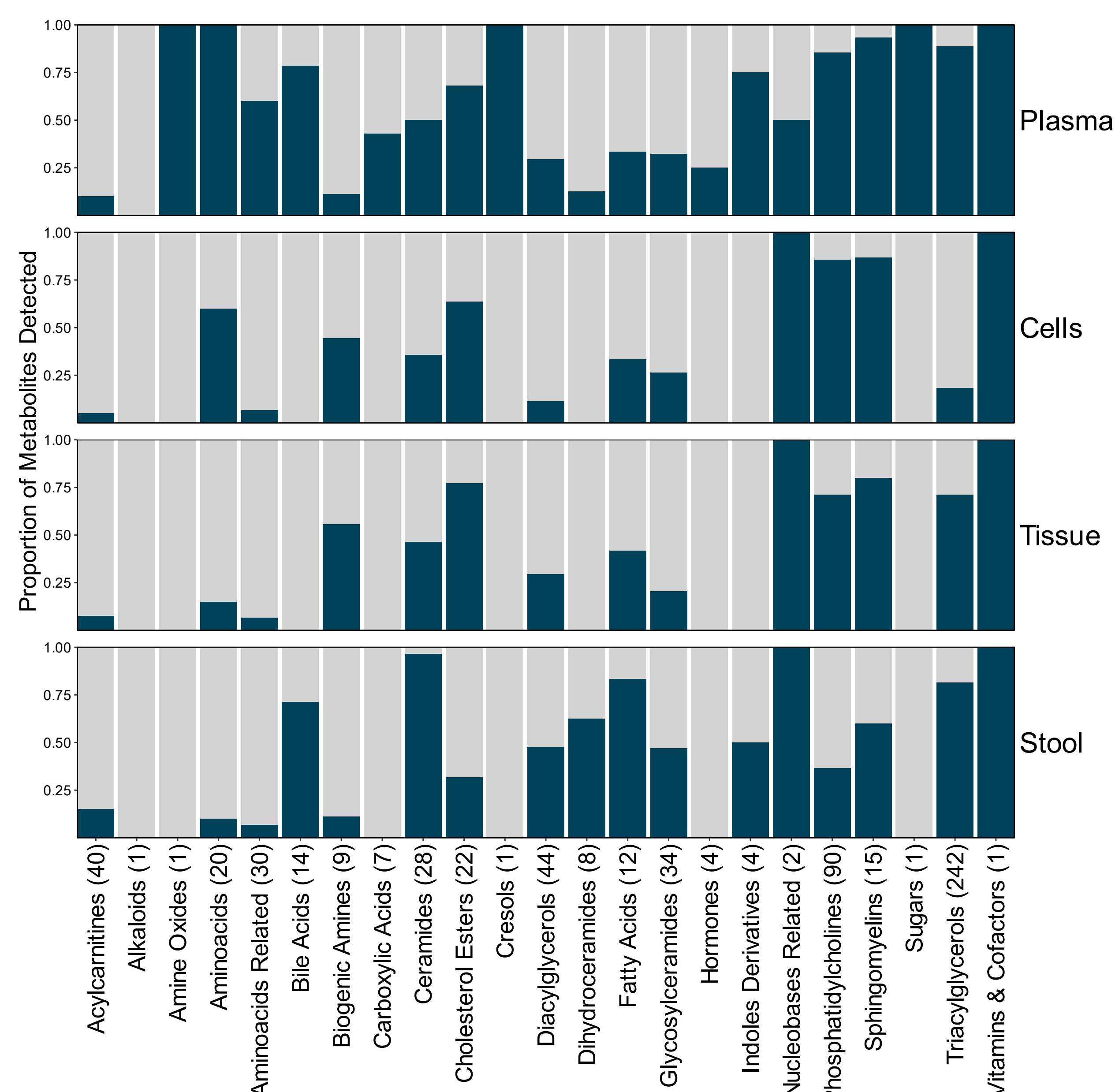
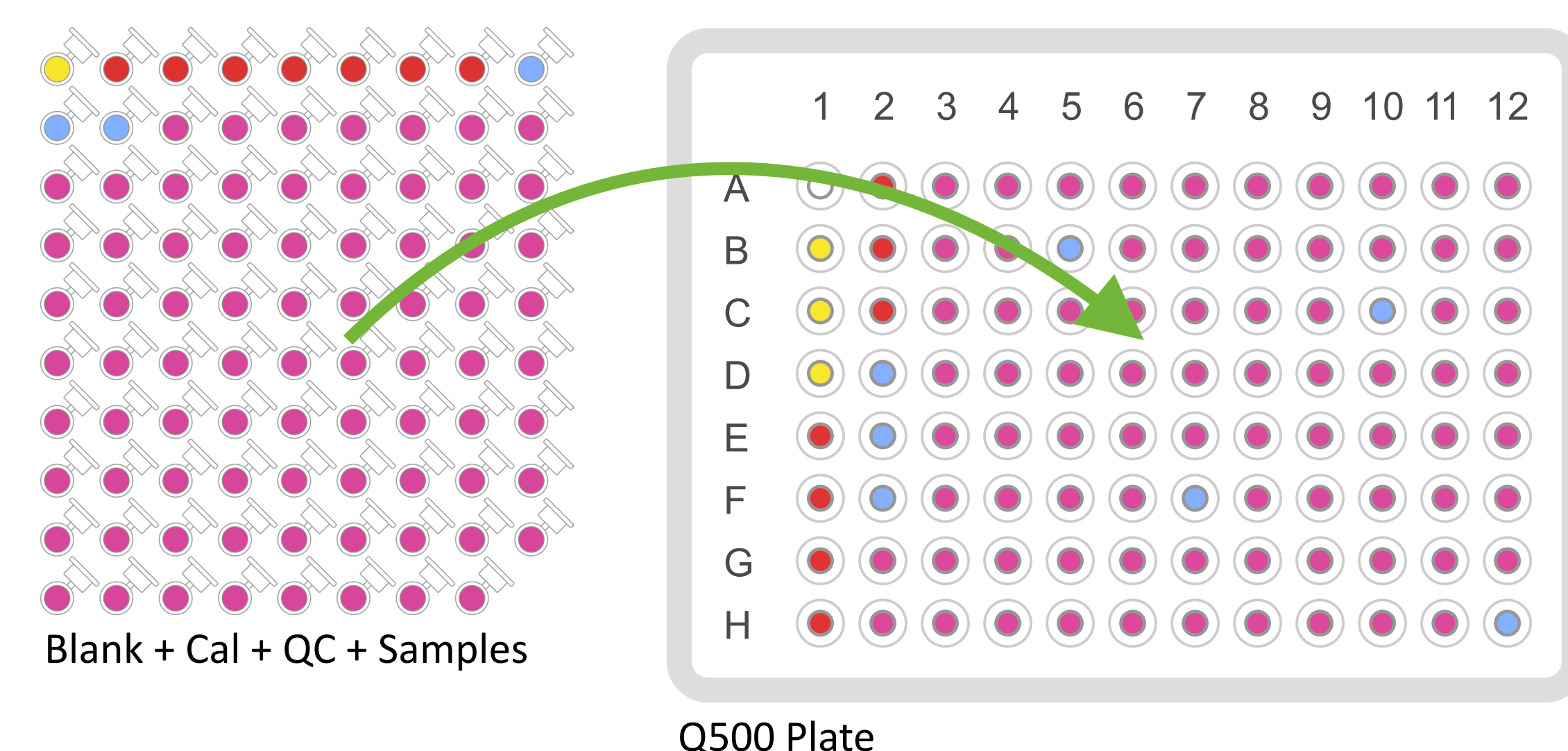


Figure 1. Metabolite detection profile of various sample matrices.

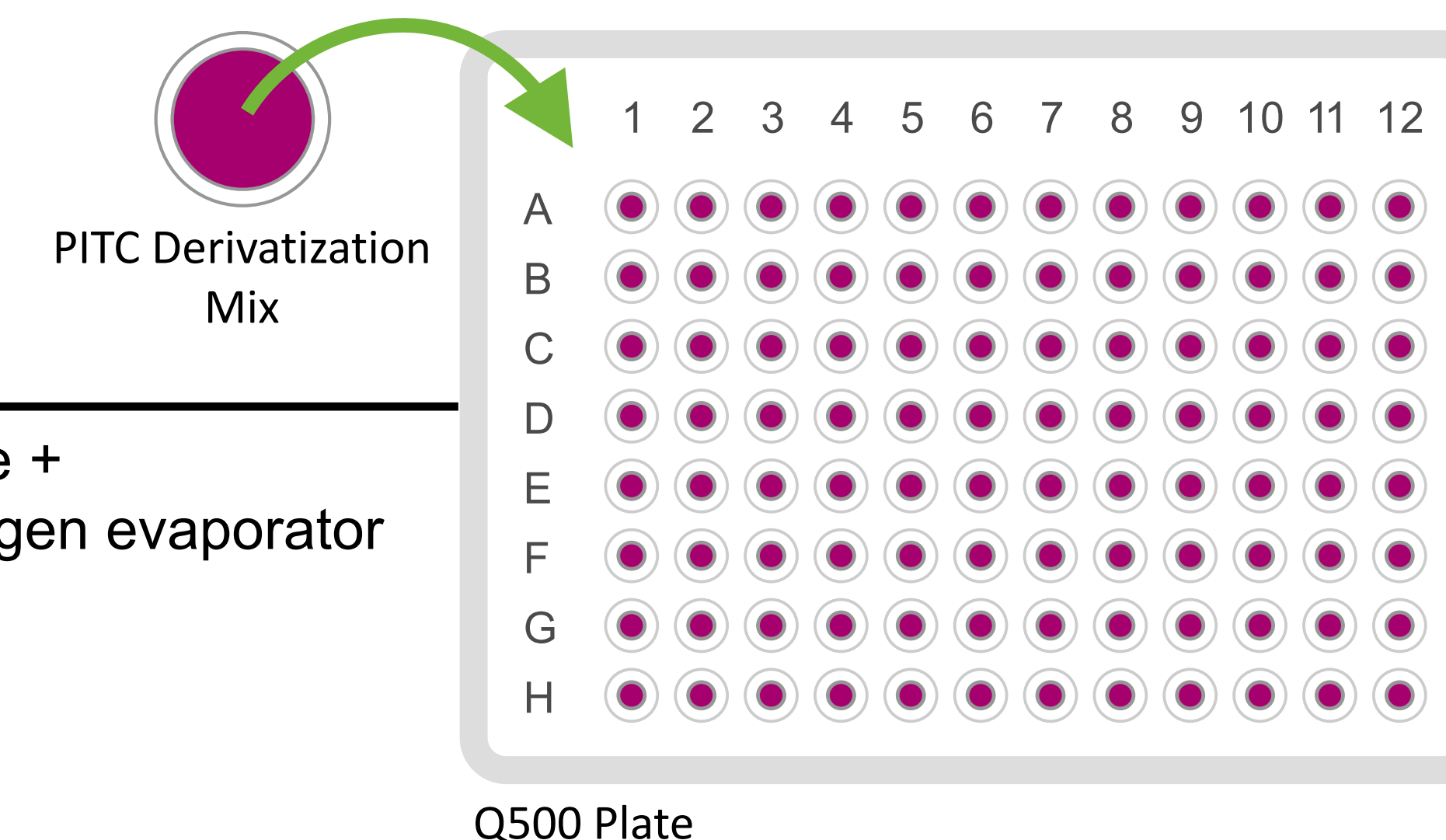
Andrew+ Automated Sample Preparation Protocol

PROTOCOL 1: Plate Loading



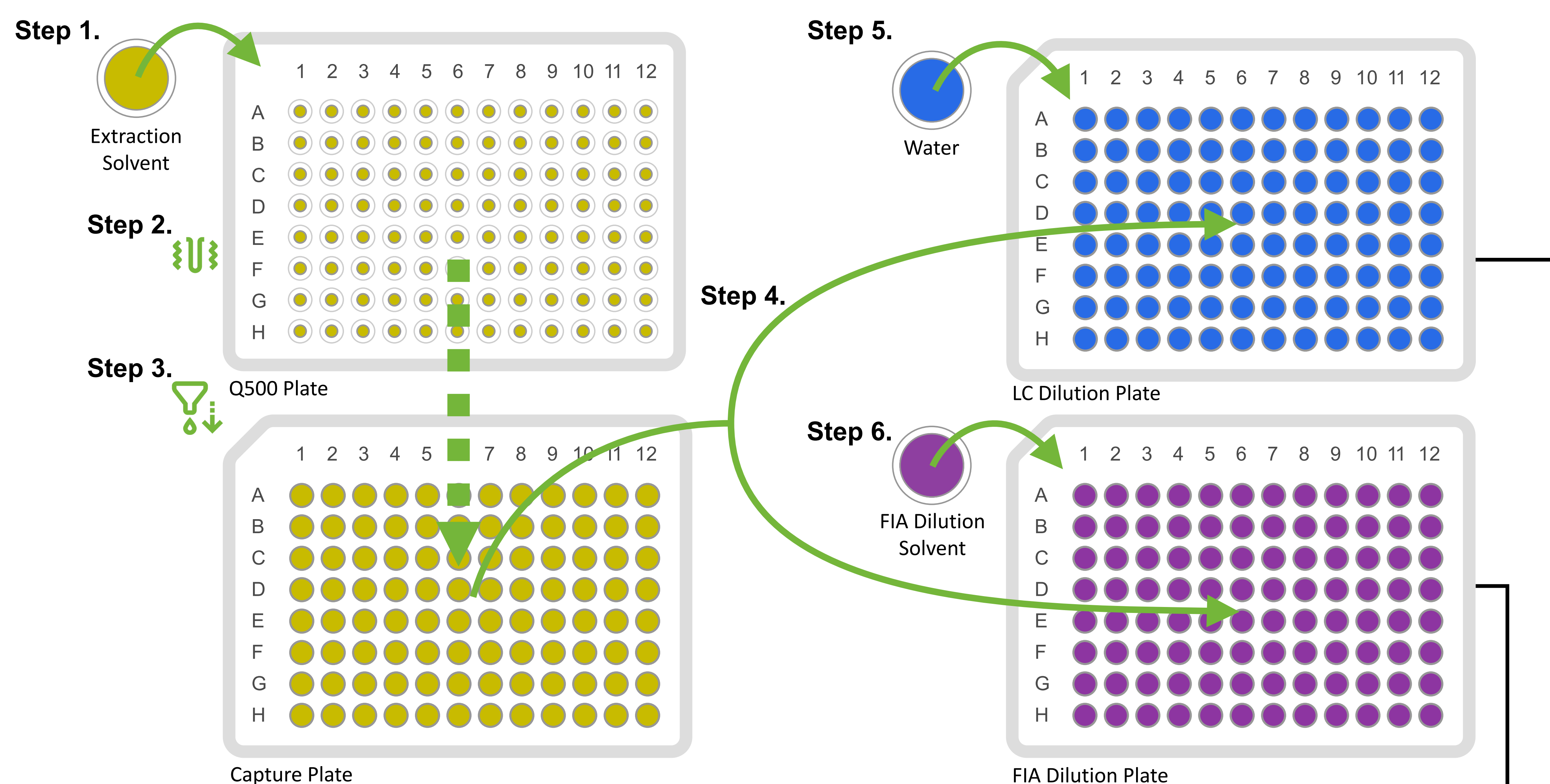
Dry 30min using positive pressure manifold/nitrogen evaporator

PROTOCOL 2: Derivatization



Incubate 1hr at room temperature + Dry 1hr using positive pressure manifold/nitrogen evaporator

PROTOCOL 3: Elution/Dilution



FIA-MS/MS Analysis

LC-MS/MS Analysis

Figure 2. Complete 3-step automated kit preparation workflow for biocrates MxP® Quant 500 kit using Waters Andrew+ pipetting robot. **Actions performed by Andrew+ are shown in green.** Complete biocrates MxP® Quant 500 kit preparation workflow requires Andrew+ associated devices: Extraction+ vacuum manifold and Microplate-Shaker+. An offline positive pressure manifold or nitrogen evaporator is used for drying steps in PROTOCOL 1 and 2.

Automated protocol produces comparable results to manual preparation

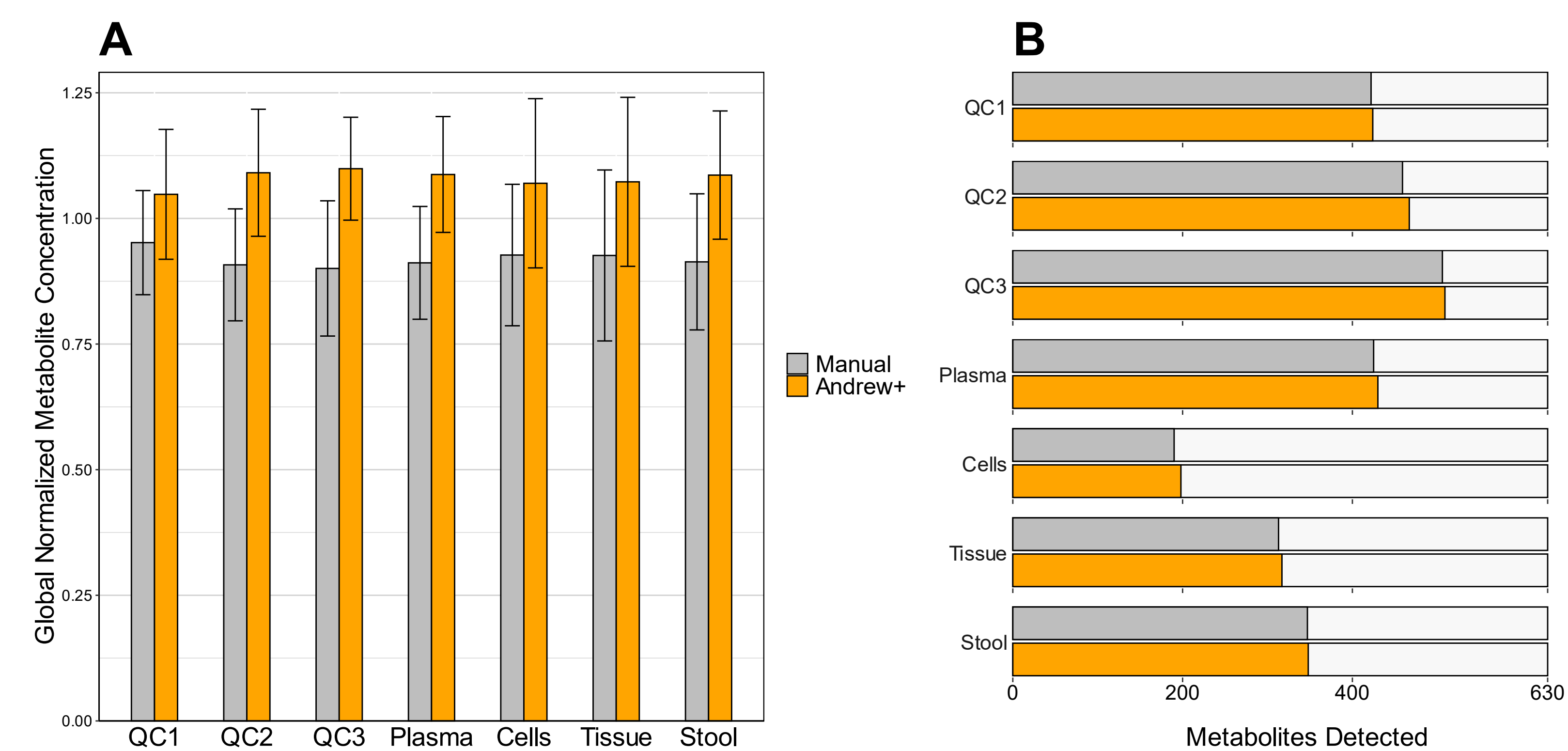


Figure 3. (A) Global metabolite concentrations and (B) Metabolite detection rates for automated Andrew+ protocol and manual preparation.

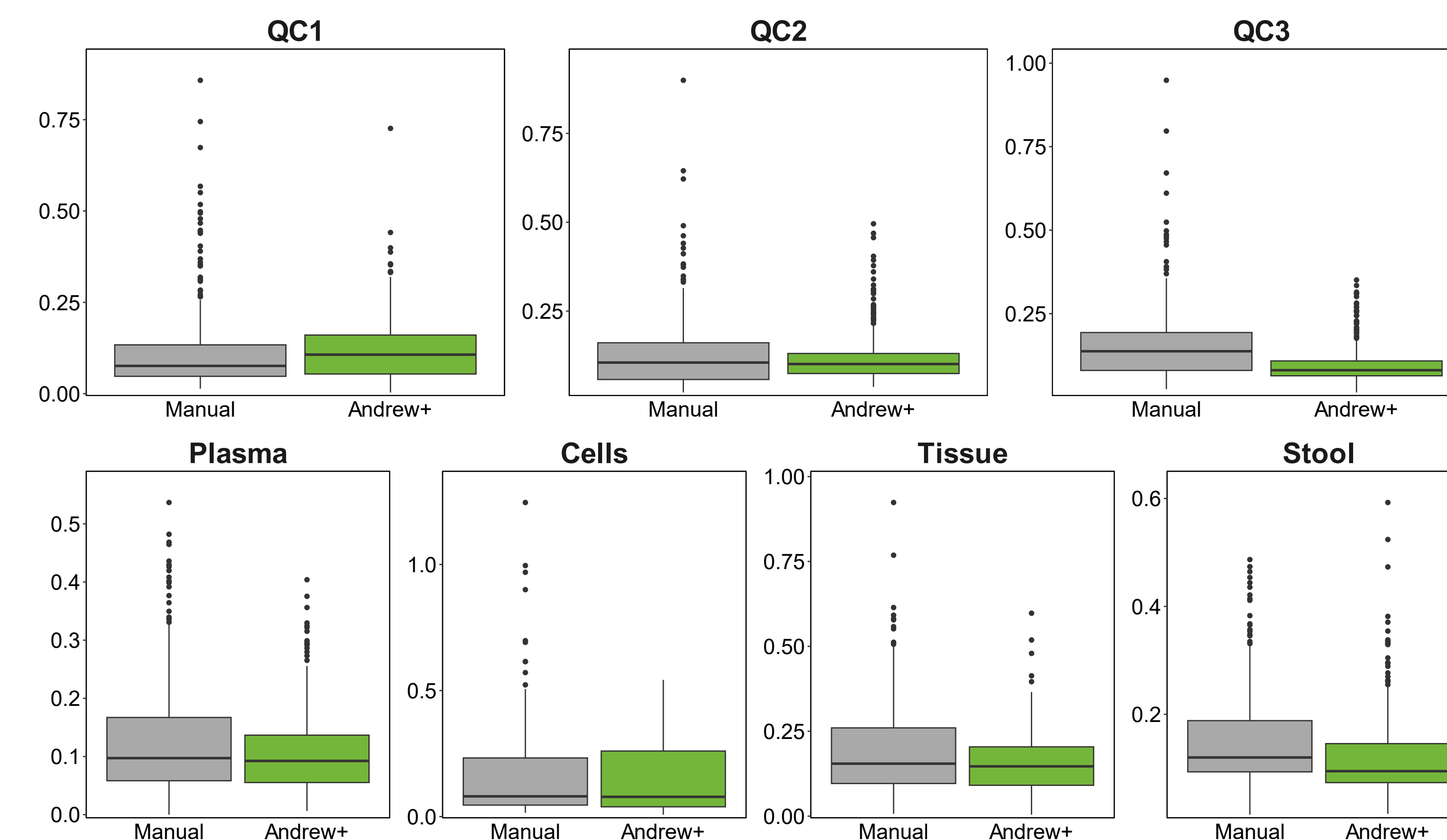


Figure 4. Coefficients of variation (CV) of metabolite concentrations measured for automated Andrew+ protocol and manual sample preparation.

CONCLUSIONS

- High throughput metabolomic profiling can be performed with numerous sample matrices using the biocrates MxP® Quant 500 kit with automated sample preparation by Waters Andrew+ pipetting robot.
- Automated sample preparation by Andrew+ produces comparable results to manual preparation in terms of metabolite detection and variability.
- Automated protocol improves throughput, reduces personnel time, and improves reproducibility for biocrates MxP® Quant 500 kit, expanding application for large-scale studies.

	Manual	Andrew+
Time, total	~6hr	~5hr
Time, hands-on	~3hr	~1hr

ACKNOWLEDGEMENTS

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