Maxwell® RSC simplyRNA Tissue Kit: A Comparison to the QIAcube® Method

A Maxwell® RSC simplyRNA Tissue Kit Application Note

Materials Required:
- Frozen mouse tissue
- Maxwell® RSC simplyRNA Tissue Kit (Cat.# AS1340)
- GoTaq® Probe 1-Step RT-qPCR System (Cat.# A6120)
- QuantiFluor® RNA System (Cat.# E3310)

Instrument Requirements:
- Maxwell® RSC Instrument (Cat.# AS4500)
- NanoDrop® Spectrophotometer
- Quantus™ Fluorometer (Cat.# E6150)
- Agilent Technologies Bioanalyzer Instrument 2100

Performance Comparison:
- Qiagen RNeasy® Mini Kit automated on the QIAcube® Instrument

The Maxwell® RSC simplyRNA Tissue Kit provides an efficient method that purifies high-quality RNA from tissue samples.

Introduction

The Maxwell® Rapid Sample Concentrator (RSC) provides automated purification of DNA, RNA or total nucleic acids from up to 16 samples in a single run. Used with the prefilled reagent cartridges supplied in the Maxwell® purification kits, the Maxwell® RSC Instrument can purify DNA or RNA from a wide range of sample types. The intuitive graphical user interface makes the instrument easy to use, and the integrated Quantus™ Fluorometer lets you collect purification and quantification data in one report.

The Maxwell® RSC simplyRNA Tissue Kit provides a simple method for purifying RNA from tissue samples. Here we compare the performance of the Maxwell® RSC simplyRNA Tissue Kit with that of the RNeasy® Mini Kit automated on the QIAcube® Instrument.

Methods

RNA was purified from 10mg of frozen mouse liver, lung and small intestine tissues using both the Maxwell® RSC simplyRNA Tissue Kit/Maxwell® RSC and the RNeasy® Mini Kit/QIAcube® methods. Equivalent elution volumes (50µl) were used for both methods, and all purifications were performed in triplicate.

Results

RNA yield and purity: Figure 1 compares the concentration of RNA isolated from tissue samples. Purified RNA was quantified using absorbance- (NanoDrop®1000) and fluorescence-based (QuantiFluor® RNA System) methods. For all samples, equivalent or greater RNA concentrations were obtained using the Maxwell® RSC simplyRNA Tissue Kit than with the RNeasy® method. RNA purity determined by A_{260}/A_{280} ratio, was consistently good (Figure 2).

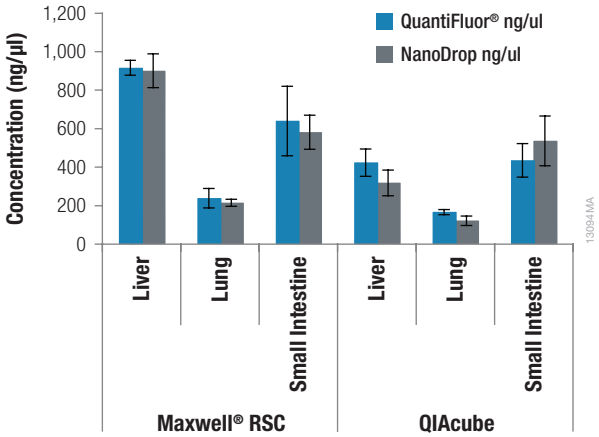

Figure 1. Concentration of RNA isolated from frozen mouse tissues using the Maxwell® RSC simplyRNA mand RNeasy®/QIAcube® methods. Data show the mean and standard deviation for three replicate samples from 10mg of each tissue type using a 50µl elution volume.

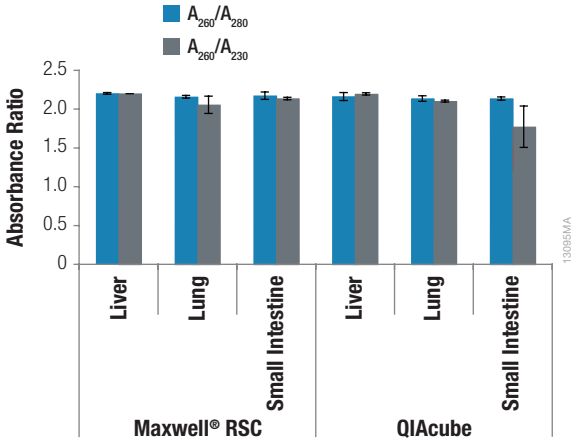

Figure 2. Purity of RNA isolated from frozen mouse tissues using the Maxwell® RSC simplyRNA Tissue Kit and RNeasy®/QIAcube® methods. Data show the mean and standard deviation for three replicate samples from each tissue type.

RT-qPCR Performance: RNA yield was calculated by RT-qPCR with the GoTaq® Probe 1-Step RT-qPCR System (Figure 3). Yields from Maxwell® RSC method were similar to those obtained with the QIAcube® method for lung and small intestine, and higher for liver samples.

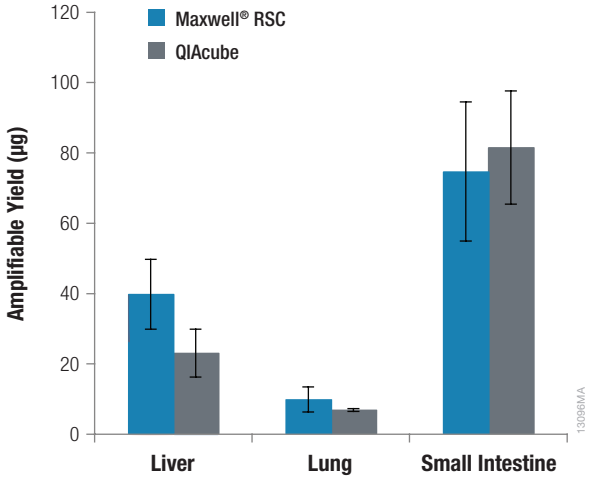

Figure 3. Yield of RNA isolated from frozen mouse tissues determined by RT-qPCR. Data show the mean and standard deviation for three replicate samples.

Bioanalyzer Analysis: RNA integrity was determined using an Agilent 2100 Bioanalyzer. RNA integrity number (RIN) values were determined for each sample, with 10 being the highest possible score (Figure 4). Samples purified with the Maxwell® RSC simplyRNA Kit showed equivalent RIN values compared to RNeasy®/QIAcube®-purified samples.

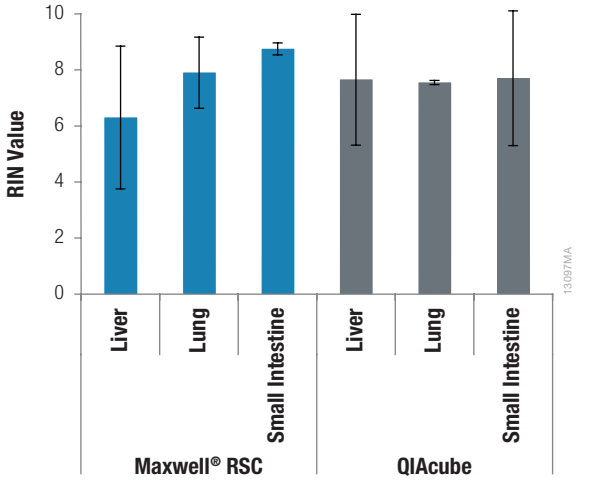

Figure 4. RIN values of RNA isolated from frozen mouse tissues. Data show the mean and standard deviation for three replicate samples from each tissue type and purification method.

Table 1. Summary of Results from Experiments Comparing the Maxwell® RSC simplyRNA Tissue Kit and the RNeasy® Mini Kit automated on the QIAcube® Instrument.

Purification Kit	Concentration by QuantiFluor®	Input	Elution Volume	Amplifiable Yield	Preprocessing Time
Maxwell® RSC simplyRNA Tissue Kit	238–916ng/µl	10mg	50µl	10–75µg	~15–20 minutes
RNeasy® Mini Kit	167–435ng/µl	10mg	50µl	7–81µg	~25–30 minutes

Conclusion

The Maxwell® RSC simplyRNA Tissue Kit consistently isolates high-quality RNA from frozen tissue samples. The data presented here show that RNA purified using the Maxwell® RSC method matched or outperformed RNeasy®/ QIAcube® -purified samples for each parameter tested. The concentration and yield data show the efficiency of nucleic acid purification with the Maxwell® RSC simplyRNA Tissue Kit. RT-qPCR results show that the Maxwell® RSC-purifcation method generated equvalent or higher RNA yields than QIAcube®-purified samples. Similar purity ratios and RIN values were observed with both purification methods.

In addition to providing excellent performance, the Maxwell® RSC simplyRNA tissue method has a shorter preprocessing time, saving time and hands-on labor by simplifying instrument setup.

Ordering Information

Product	Cat.#
Maxwell® RSC simplyRNA Tissue Kit	AS1340
Maxwell® RSC Instrument	AS4500
QuantiFluor® RNA System	E3310
GoTaq® Probe 1-Step RT-qPCR System	A6120