

RNA Purification from Plant Samples with the Thermo Scientific KingFisher Pure RNA Plant Kit

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Goal

This technical note describes the purification of total RNA from 20–50 mg of fresh or frozen plant samples using the Thermo Scientific™ KingFisher™ Pure RNA Plant Kit, together with Thermo Scientific™ KingFisher™ magnetic particle processors. The results indicate that the purified total RNA has high integrity and is free of contaminants and inhibitors.

Introduction

The KingFisher Pure RNA Plant Kit is designed to purify high-quality total RNA from fresh or frozen plant samples. The entire sample preparation process, including sample collection, storage conditions and RNA purification, should be designed to preserve RNA as these aspects have a great effect on the yield and quality of the purified RNA. In addition, the RNA purification process should also be efficient and fast.

With the KingFisher Pure RNA Plant Kit in combination with the Thermo Scientific™ KingFisher™ Flex or Thermo Scientific™ KingFisher™ Duo magnetic particle processors, purification is both rapid and requires very little hands-on time.

The KingFisher Flex instrument enables automation of 96 samples in a high-throughput format, while a lower throughput instrument, the KingFisher Duo, is available for up to 12 samples per run.

Materials and Methods

Total RNA was purified from 50 mg of various plant parts (leaves, shoots, sprouts, stalks, roots, or fruits) from 12 different plant species using the KingFisher Pure RNA Plant Kit (Cat. No. 98060196 and 98060496) and the KingFisher Flex. The plant species and sample types used for the purification are specified in Table 1.

One run on the KingFisher Duo or KingFisher Flex takes approximately 60 minutes, and after purification, the total RNA is eluted into 100 μ L of nuclease-free water. This volume can be adjusted.

Comparative tests were performed on the KingFisher Pure RNA Plant Kit and two competitive magnetic bead kits, using leaf samples from four different plant species including tobacco, thale cress, canola, and tomato. Purification was performed in accordance with the instruction manuals of the respective kits.



Table 1. Typical RNA yields from various plant samples.

No.	Sample (50 mg)	RNA yield (μ g)
1	Tobacco leaf	15 - 19
2	Thale cress (<i>Arabidopsis th.</i>) leaf	18 - 20
3	Wheat shoots	27 - 36
4	Barley sprout	22 - 33
5	Rice sprout	16 - 19
6	Maize (corn) leaf	11 - 30
7	Tomato leaf	21 - 52
8	Spinach leaf	20 - 30
9	Potato stalk	8 - 10
10	Rapeseed (Canola) stalk	7 - 28
11	Rapeseed (Canola) root	18
12	Cucumber fruit	13 - 18
13	Tomato fruit	6 - 10
14	Rapeseed (Canola) seeds	13 - 35
15	Sunflower seeds	10 - 47

Results

Examples of the typical total RNA yields obtained with the KingFisher Pure RNA Plant Kit are listed in Table 1. Figure 1 shows an agarose gel image of total RNA eluates from 15 different plant samples. The clear bands and lack of smears indicates intact RNA.

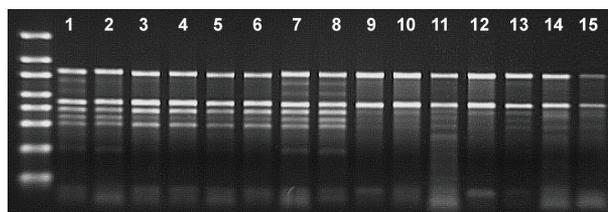


Figure 1. Agarose gel image of total RNA purified from various plant species listed in Table 1.

Figure 2 demonstrates that the KingFisher Pure RNA Plant Kit performed considerably better than the two other magnetic bead kits, which purified some RNA, but significantly lower RNA yields than the KingFisher Pure Kit.

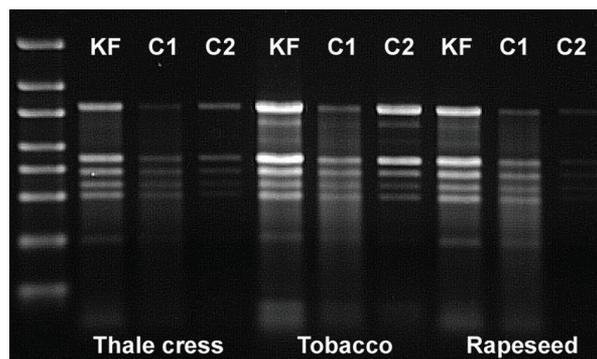


Figure 2. Gel image comparing three different magnetic bead kits: KingFisher Pure RNA Plant Kit (KF), and competitors 1 and 2 (C1 and C2).

Conclusion

The KingFisher Pure RNA Plant Kit provides efficient RNA purification from a wide variety of plant samples. The purified RNA is of high integrity and contaminants or inhibitors are washed away during the process, so the eluate is suitable for direct use in different downstream applications.

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