Stabilized Blood-to-C_T Nucleic Acid Preparation Kits

Comparison to traditional RNA extraction methods

Green benefits

- Less hazardous: no ethanol, mercaptoethanol or chaotropic salts needed
- Less waste: 89% less plastic waste generated

Introduction

Thermo Fisher Scientific is committed to designing our products with the environment in mind—it's part of how we enable our customers to make the world healthier, cleaner, and safer. This fact sheet provides the rationale behind the environmental claims that use of this product results in reduced exposure to hazardous material and generates less waste than comparative products. Using Invitrogen™ Stabilized Blood-to-C_T™ Nucleic Acid Preparation Kits, as opposed to traditional RNA extraction methods, eliminates the need to use hazardous solvents—and requires far less plastic consumables from sample preparation to final analysis.

Product description

Stabilized Blood-to-C_T Nucleic Acid Preparation Kits include reagents and enzyme mixtures for preparing reverse transcription (RT) and real-time PCR-ready RNA directly from stabilized blood, without the need for a separate RNA isolation step.

Green features

Less hazardous

Traditional RNA extraction protocols require clean-up using hazardous reagents such as:

- Ethanol—highly flammable and causes systemic toxicity
- Mercaptoethanol—may be fatal when absorbed through the skin
- Guanidine thiocyanate—causes irritation and is harmful if swallowed or inhaled
- Guanidine hydrochloride—causes irritation and is harmful if swallowed or inhaled

Using Stabilized Blood-to-C_T kits eliminates the need to use any of the hazardous chemicals mentioned above.

Please review the SDSs for the Stabilized Blood-to-C_T kits at **thermofisher.com/msds**

Less waste

Traditional methodologies for RNA extraction require multiple steps for RNA extraction and clean-up—requiring the use of multiple disposable tubes, vials, pipettes, and pipette tips. Stabilized Blood-to-C_T kits require fewer plastic consumables than traditional technologies (Figure 1), reducing costs associates with lab plastics and waste disposal. A comparison of Stabilized Blood-to-C_T kits with traditional technology showed that 87 g of plastic waste (tubes, pipettes, pipette tips) was generated with traditional RNA extraction as compared to 9 g for Stabilized Blood-to-C_T kits (Table 1).

Table 1. Comparison of the amount of waste generated using traditional RNA extraction methods compared to Stabilized Blood-to-C_T™ kits.

Traditional blood RNA extraction methods				
Step in procedure	Plastic description	# used	Piece weight (g)	Total mass (g)
Add 100% ethanol to Buffer BR4	50 ml pipette	1	20.75	20.75
Prepare DNase I stock solution	1 ml tip	1	0.85	0.85
Aliquot DNase I solution	200 µL tip	5	0.28	1.40
Remove supernatant	10 ml pipette	1	9.74	9.74
Pipet sample to spin column twice	1 ml tip	2	1.00	2.00
Discard 1.5 ml microfuge tube	1.5 ml tube	1	1.00	1.00
Discard 2 ml collection tube	1 tube	2	1.00	2.00
Pipet 350 µL BR3	1 ml tip	1	1.00	1.00
Pipet RDD into 1.5 ml tube	200 µL tip	1	0.28	0.28
Add DNase I stock to RDD	10 µL tip	1	0.18	0.18
Add DNase I/RDD to column	200 µL tip	1	0.28	0.28
Discard 1.5 ml microfuge tube	1.5 ml tube	1	1.00	1.00
Pipet 350 µL BR3	1 ml tip	1	1.00	1.00
Pipet 500 µL BR4 (twice)	1 ml tip	2	1.00	2.00
Discard 2 ml collection tube	1 tube	2	1.00	2.00
Pipet 40 µL BR5	200 µL tip	1	0.28	0.28
Discard spin column	Column, tube	1	2.93	2.93
Add 100% ethanol to Buffer BR4	50 ml pipette	1	20.75	20.75
Prepare DNase I stock solution	1 ml tip	1	0.85	0.85
Aliquot DNase I solution	200 µL tip	5	0.28	1.40
Remove supernatant	10 ml pipette	1	9.74	9.74

Traditional blood RNA extraction methods				
Step in procedure	Plastic description	# used	Piece weight (g)	Total mass (g)
Use fresh Hemogard closure	Hemogard closure	1	2.62	2.62
Add 4 ml water	5 ml pipette	1	8.98	8.98
Remove supernatant	5 ml pipette	1	8.98	8.98
Discard Blood RNA tube	Blood RNA tube	1	9.44	9.44
Add 350 µL BR1	1 ml tip	1	0.85	0.85
Add 300 µL BR2	1 ml tip	1	1.00	1.00
Add 40 µL proteinase K	200 µL tip	1	0.28	0.28
Discard 1.5 ml microfuge tube	1.5 ml tube	1	1.00	1.00
Transfer sample to Shredder column	1 ml tip	1	1.00	1.00
Discard Shredder column	1 column, tube	1	2.93	2.93
Add 350 µL ethanol	1 ml tip	1	1.00	1.00
Pipet sample to spin column twice	1 ml tip	2	1.00	2.00
Discard 1.5 ml microfuge tube	1.5 ml tube	1	1.00	1.00
Discard 2 ml collection tube	1 tube	2	1.00	2.00
Pipet 350 µL BR3	1 ml tip	1	1.00	1.00
Pipet 500 µL BR5	1 ml tip	2	1.00	2.00
Discard 2 ml collection tube	1 tube	2	1.00	2.00
Pipet 40 µL BR5	200 µL tip	1	0.28	0.28
Discard spin column	Column, tube	1	2.93	2.93
Total				86.77

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Stabilized Blood-to-C_T Nucleic Acid Preparation Kit				
Step in procedure	Plastic description	# used	Piece weight (g)	Total mass (g)
Transfer 500 µL blood to 1.5 ml tube	1 ml tip	1	1.00	1.00
Remove supernatant	1 ml tip	1	1.00	1.00
Add PAXgene Wash (twice)	1 ml tip	2	1.00	2.00
Remove supernatant (twice)	1 ml tip	2	1.00	2.00
Prepare Digestion Solution/DNase	200 µL tip	1	0.28	0.28
	10 µL tip	1	0.18	0.18
Add Digestion Solution	200 µL tip	1	0.28	0.28
Discard 1.5 ml tube	1.5 ml tube	1	1.00	1.00
Prepare Digestion Solution/Xeno	200 µL tip	1	0.28	0.28
	10 µL tip	1	0.18	0.18
Discard 1.5 ml tube	1.5 ml tube	1	1.00	1.00
Total				9.20
Waste reduction				89.4%

Figure 1. Comparison of plastic waste generated using traditional RNA extraction methods to Stabilized Blood-to-C_T Kits.

Find out more at **thermofisher.com/cellstoct**

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