Platinum Direct PCR Universal Master Mix

Introduction

We are committed to designing our products with the environment in mind. This fact sheet provides the rationale behind the environmental claims that the Invitrogen™ Platinum™ Direct PCR Universal Master Mix reduces the use of hazardous reagents and generates 99% less plastic waste than traditional DNA extraction workflows using spin columns.

Product description

Platinum Direct PCR Universal Master Mix is designed to amplify DNA directly from various samples without the need to purify DNA. It contains high-performing, engineered Invitrogen™ Platinum™ II Taq Hot-Start DNA Polymerase with dNTPs in an innovative buffer that enables universal primer annealing for superior performance in direct PCR applications.

Platinum Direct PCR Universal Master Mix is designed to work for a variety of samples of different origins, such as animal, human, plant, insect, worm, and bacterial samples. The kit includes optimized reagents to achieve superior results. The quick lysis protocol enables efficient amplification from templates up to 8 kb and co-cycling of fragments of different lengths. Samples in the lysis buffer can be stored for later use. Platinum Direct PCR Universal Master Mix is provided with Platinum GC Enhancer for optional specific amplification and improved yields of GC-rich targets.

Green features

Less hazardous

Traditional DNA extraction protocols require cleanup using hazardous reagents such as:

- **Ethanol**—is 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

Since the Platinum Direct PCR Universal Master Mix provides a more streamlined protocol for DNA extraction, there is no need for ethanol, mercaptoethanol, or guanidine salts.

Figure 1. Platinum Direct PCR Universal Master Mix.

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Less waste

Traditional methodologies for DNA extraction require multiple steps and cleanup, requiring the use of several disposable tubes, vials, pipettes, and pipette tips. The Platinum Direct PCR Universal Master Mix requires far fewer plastic consumables than traditional technologies, reducing costs and waste associated with lab plastics and waste disposal.

A comparison of sample preparation using the Platinum Direct PCR Universal Master Mix versus a traditional DNA extraction procedure showed that preparing 10 samples using traditional DNA extraction generated approximately 163 g of plastic waste (tubes, pipettes, pipette tips, and columns), compared to zero plastic used when the samples are added to the PCR reaction directly, or approximately 2 g of plastic waste when the optional quick lysis step is used with Platinum Direct PCR Universal Master Mix sample preparation (Table 1). This represents a plastic waste reduction of approximately 99% or greater. Performing the traditional DNA extraction procedure every week over the course of one year would translate to a total of ~6.7 kg of plastic waste that could be avoided annually by choosing the Platinum Direct PCR Universal Master Mix.

Designing the Platinum Direct PCR Universal Master Mix to generate significantly less hazardous waste and plastic waste is a win for our customers, our company and the planet.

Table 1. Comparison of plastic waste generation using a traditional DNA extraction procedure versus the optional sample preparation step for quick cell lysis with Platinum Direct PCR Universal Master Mix.*

Traditional DNA extraction method		
Steps in procedure	**Plastics used**	**Total weight (g)**
1. Add 100% ethanol to wash buffer 1	One 50 mL pipet	20.8
2. Add 100% ethanol to wash buffer 2	One 50 mL pipet	20.8
3. Add lysis buffer 1	Ten 1 mL tips	9.0
4. Add proteinase K	Ten 100 µL tips	1.4
5. Add lysis buffer 2	Ten 1 mL tips	9.0
6. Tube for hazardous waste	One 50 mL tube	12.6
7. Add 100% ethanol	Ten 1 mL tips	9.0
8. Add wash buffer 1	Ten 1 mL tips	9.0
9. Add wash buffer 2	Ten 1 mL tips	9.0
10. Add water or elution buffer	Ten 100 µL tips	1.4
11. 1.5 mL microcentrifuge tubes	Twenty tubes	20.0
12. 2 mL collection tubes	Ten tubes	12.0
13. Spin columns	Ten columns	29.3
Total plastic waste generated		**163.3**

Optional sample preparation step for quick cell lysis with Platinum Direct PCR Universal Master Mix		
Steps in procedure	**Plastics used**	**Total weight (g)**
1. Add Lysis Buffer	One 200 µL tip	0.28
2. Add Proteinase K to Lysis Buffer	One 20 µL tip	0.14
3. Add Lysis Solution to sample	Ten 20 µL tips	1.40
Total plastic waste generated		**1.82**
Waste reduction		**98.9%**

*Estimate based on preparation of 10 samples.

Find out more at **thermofisher.com/platinum-direct-pcr**