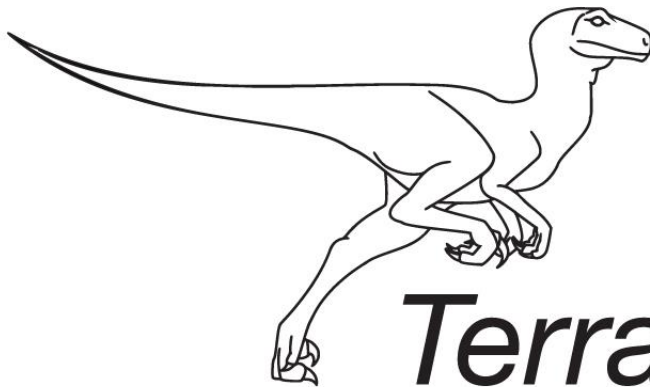


A Bead Beating Lysis Instrument for use Anywhere in the WORLD!



TerraLyzer™
pat. pend.

“Take the Lab to the Field”

Catalog Number: S6022



ZYMO RESEARCH

The Beauty of Science is to Make Things Simple

For Research Use Only

Ver. 1.0.1

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PRECAUTIONARY INSTRUCTIONS





Be sure to read all safety instructions in this manual carefully and thoroughly. Pay attention to warnings before using the *TerraLyzer™*. Failure to follow all instructions may lead to injury.


 **Warning:** Indicates a potential hazard which should be avoided.

Electrical Safety

 **Plug the Battery Charging Station into the Power Converter if using a 220V power source**

 Avoid contact with grounded surfaces


 Outlets for charging must match the power tool plug – Adapters may be needed

 Do not use the *TerraLyzer™* in the rain or under wet conditions

 Do not misuse the cord

Safety Equipment

✓ The *TerraLyzer™* can be very loud, it is recommended to use ear protection during use.

 For further safety information regarding the driver, battery, power converter, and charging station please see accompanying literature.



It is recommended to keep the original packaging intact should you need to return the product for any reason to your distributor or to Zymo Research Corporation.

Note: Zymo Research is not responsible for any harm or damage resulting directly/indirectly from the use of the *TerraLyzer™* or related product components, materials, or technologies.

Some reagents in the included trial kits are irritants. Wear protective gloves and eye protection and follow the safety guidelines and rules enacted by your research institution or facility. Refer to product/reagent specific MSDS information available on our website.

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“Take the Lab to the Field”



INTRODUCTION



Degradation and contamination of biological samples have been obstacles to scientific study, and may be particularly problematic in highly sensitive molecular-analysis techniques (e.g., PCR of low copy DNA). Use of cryogenic freezing methods for environmental/forensic sample preservation may often be too impractical to be employed. The solution is the *TerraLyzer™* and environmental DNA purification kits from Zymo Research. The *TerraLyzer™* is a cordless, hand-held device developed for vigorous sample disruption (*bead beating*) that allows the researcher/investigator to “*Take the Lab to the Field*” and to the site of sample collection.

The *TerraLyzer™* can be used to lyse microbes in soil, sediment, sludge, and fecal samples and can effectively process tough-to-lyse fungal, algal, plant, and animal tissues. It can be used at any remote location and in most weather conditions when immediate sample collection, processing, and preservation are required by the researcher. The device is compatible with most 2.0 ml tubes containing lysis matrix, though ZR *BashingBead™* Tubes should be used to obtain maximum yields of DNA/RNA/Protein from tough-to-lyse and environmental sample sources.

The *TerraLyzer™* consists of a cordless, electric drive unit mounted to a unique, proprietary lysis chamber. It is designed to operate at full speed for as long as the trigger on the device is actuated and charge remains in the battery. This allows the researcher to maintain precise control of the time and extent of sample lysis.

Highlights

- ✓ For cordless, portable, and convenient processing of tough-to-lyse biological and environmental samples.
- ✓ Allows the researcher to “*Take the Lab to the Field*” and to the site of sample collection with Zymo Research’s state of the art products for environmental DNA and RNA purification.
- ✓ Ideal for *both* field and lab use.



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PRODUCT CONTENTS

- 1) One (1) *TerraLyzer™*
- 2) One (1) Lithium Ion Rechargeable Battery
- 3) One (1) Battery Charging Station
- 4) One (1) Universal Power Converter
- 5) One (1) Zymo Research Timer
- 6) Two sets (4 total) Ear Plugs
- 7) Assorted Product Manuals and Literature

Also, to begin isolating DNA from environmental samples...

- 8) One (1) Trial-Sized (5 prep.) ZymoBIOMICS™ DNA Miniprep Kit w/ 0.1 & 0.5 mm BashingBeads™



Battery Charging
Station



TerraLyzer™
Instrument


ZR BashingBead™ Lysis
Tubes (2.0 ml)

DIAGRAM OF THE TERRALYZER™





TerraLyzer™ Operating Instructions

Battery Charging

 Connect the battery charging station to an appropriate power outlet. The charging station is designed for 120 Volt, 60 Hz AC input.

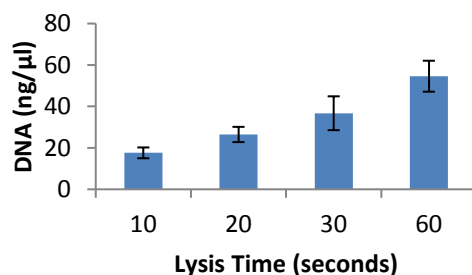
A power converter has been included with the TerraLyzer™ for use with the charging station outside of North America. Some regions will require an adapter to use the power converter and should be provided by the user.

 Place the battery in the charging station by aligning the raised ribs of the battery pack with the slots in the charging station. Lights on the charging station should flash green while the battery is charging. *The battery pack is fully charged when the green lights stop flashing and remain on.*

 A flickering red light while charging indicates a defective battery or faulty connection. Check the connection of the battery with the charging station.

Sample Processing

- ✓ *Sample Sources* – The TerraLyzer™ device can be used to effectively lyse microbes in soil, sediment, sludge, and fecal samples and can effectively process tough-to-lyse fungal, algal, plant, and animal tissue. For best results, we recommend using skirted sample tubes like the ones provided with Zymo Research’s environmental DNA and RNA purification kits. Tubes having conical bases are compatible with the TerraLyzer™, however these may not hold up to the extreme pulverizing forces generated by the device.
- ✓ *Operating Temperatures* – (Optimum -20°C to 45°C) Severe cold conditions can drain the battery and effect the number of samples that can be processed with the TerraLyzer™. Keeping the battery warm (e.g., in the pocket of a jacket or parka) prior to use can extend battery life in colder climates and operating conditions.
- ✓ *Processing Times* – (Generally <3 minutes) The extent of sample lysis will vary according to the processing time (see figure below). Due to the extreme pulverizing forces generated by the TerraLyzer™, the temperature of samples can increase as a function of lysis time. This may affect the integrity of DNA/RNA/protein released from biological material. If longer processing times (>3 minutes) are required, it may be necessary to let the sample cool down for a few minutes before continuing with sample processing.



DNA yield versus lysis time for yeast spore samples processed with the TerraLyzer™. Error bars represent one standard deviation from three replicate measurements.

TerraLyzer™ Operating Instructions

1. Attach the battery into the bottom of the *TerraLyzer™* drive unit.
2. Depress the rotation lock button to adjust the *TerraLyzer™* lysis chamber to the desired angle (90°, 135°, or 180°) of operation. Release the lock button to set the angle; an audible snap will indicate a secure setting. Use 180° for best results in a shorter time.
3. Make sure the screw top of a 2.0 ml lysis tube (e.g., ZR *BeadBashing™* Tube) containing a sample is tight before placing it into the lysis chamber of the *TerraLyzer™* as shown below...
 - ✓ Place the bottom of the lysis tube into the lysis chamber. Push the lysis tube down and backward to “snap” the lysis tube into the lysis chamber. The tube will be secured by the two set screws on either side of the chamber.



- ✓ Slide the chamber shield over and down to the base of the lysis chamber. The chamber shield should sit below the stop screw at the top.



4. Process the sample by depressing the red trigger for the desired time. Begin with a processing time of 30 seconds [however, tougher tissues (e.g., plant, fibrous tissue) may require longer processing times].
5. After processing, remove the chamber shield and take out the lysis tube. The lysed material (lysate) can be used immediately for DNA/RNA isolation, or if processed using a stabilization reagent (e.g. DNA/RNA Shield) it can be stored/transported for DNA isolation at a later time.

Please refer to specific product instructions for details concerning subsequent isolation of DNA/RNA/Protein from lysed material.

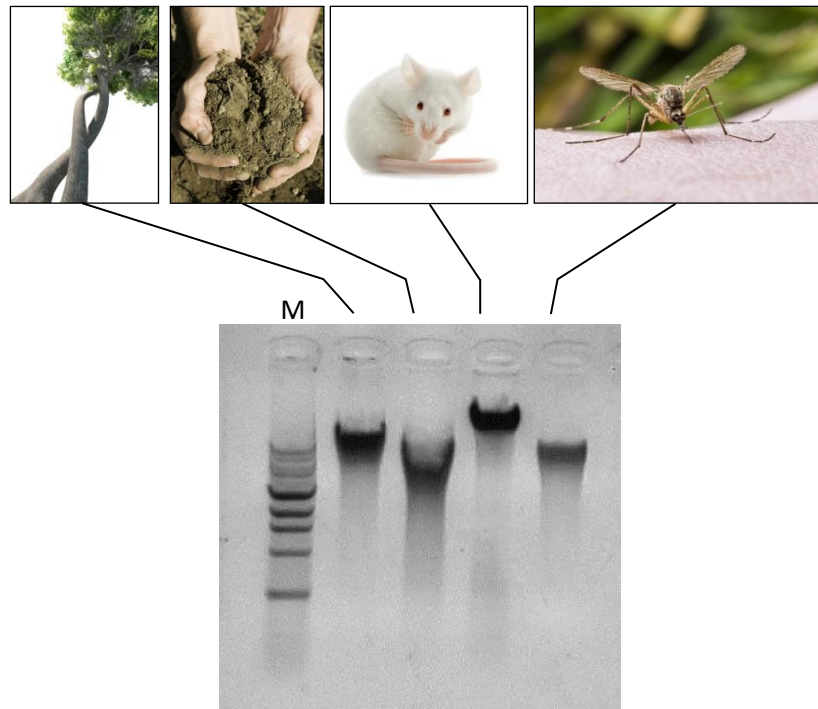
Cleaning the *TerraLyzer*[™] Drive Unit and Lysis Chamber

⚠ Make sure the battery is disconnected from the *TerraLyzer*[™] before cleaning. *Wear protective gloves (latex/nitrile) during all cleaning procedures.*

Clean the *TerraLyzer*[™] as necessary. The exterior of the *TerraLyzer*[™] and the chamber shield can be cleaned with a damp (water, dilute EtOH) paper towel or similar. Clean the lysis chamber by wiping down the inner walls. Allow all components to air dry prior to use.

⚠ Should a lysis tube fracture or break in the sample chamber during processing, stop processing and immediately clean it as recommended above.

Anticipated Results



The *TerraLyzer*[™] effectively processes tough-to-lyse materials for subsequent high yield DNA isolation. Following sample processing with the *TerraLyzer*[™], DNA was isolated from plant, soil, mouse, and insect tissue using specific Zymo Research environmental DNA kits (pg. 11) and then separated in a 0.8% (w/v) TAE/agarose/EtBr gel. DNA from source material is graphically represented above the gel image and “M” is a 1 kb molecular weight DNA marker (Zymo Research)

“Take the Lab to the Field” and to the Site of Sample Collection with Environmental DNA Purification Technologies from Zymo Research

Environmental DNA Miniprep Kits	Cat. No. (50 preps.)
ZymoBIOMICS™ DNA Miniprep Kit	D4300
Quick-DNA™ Fecal/Soil Microbe Miniprep Kit	D6010
Quick-DNA™ Fungal/Bacterial Miniprep Kit	D6005
Quick-DNA™ Plant/Seed Miniprep Kit	D6020
Quick-DNA™ Tissue/Insect Miniprep Kit	D6016

Stabilization Reagent	Cat. No.
DNA/RNA Shield™	R1100-50 & R1100-250



For Research Use Only

All of our products are intended for research use only. Not for use in diagnostic procedures.

Warranty

This product is guaranteed for one (1) year from the time of receipt. See below for repair/return policy.

Returns

For repairs made under warranty, the Goods must be returned to Zymo Research intact (*non-tampered with, non-disassembled*) with all components together and in their original packaging. Goods may not be returned for credit except with Seller's (i.e., Zymo Research Corporation) permission, and then only in strict compliance with Seller's return shipment instructions. Returned Goods (other than defective products) must be returned freight prepaid by the Customer and will not be accepted without prior authorization of Zymo Research. The Goods must be returned in their original packaging and in resaleable condition. Any returned items may be subject to a 20% processing (restocking) fee.

Terms of Purchase

We warrant to you, our direct customer, that our goods shall conform substantially to the description of such goods as provided in our catalogs and literature accompanying the goods until their respective expiration dates. THIS WARRANTY IS EXCLUSIVE, AND WE MAKE NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. Our warranty shall not be effective if we determine, in our sole discretion, that you have altered or misused the goods or have failed to use or store them in accordance with instructions furnished by us. Our sole and exclusive liability and your exclusive remedy with respect to goods proved to our satisfaction (applying analytical methods reasonably selected by us) to be defective or nonconforming shall be the replacement of such goods free of charge, upon the return of such goods in accordance with our instructions, although at our discretion we may provide a credit or refund. IN NO EVENT SHALL WE BE LIABLE UNDER ANY LEGAL THEORY (INCLUDING BUT NOT LIMITED TO CONTRACT, NEGLIGENCE, STRICT LIABILITY IN TORT OR WARRANTY OF ANY KIND) FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES (INCLUDING BUT NOT LIMITED TO LOST PROFITS), EVEN IF WE HAD NOTICE OF THE POSSIBILITY OF SUCH DAMAGES. If we manufacture custom goods for you based on instructions, specifications, or other directions you provide to us, we shall not be liable for the lack of sufficiency, fitness for purpose or quality of the goods to the extent attributable to such instructions, specifications, or other directions. We shall not be liable for any loss, damage or penalty as a result of any delay in or failure to manufacture, deliver or otherwise perform hereunder due to any cause beyond our reasonable control.

Patent/Trademark Disclaimer

Some technologies of the *TerraLyzer™* are patent pending. Unless stated otherwise, no license or immunity under any patents shall be either granted or implied by the sale of Zymo Research Corporation products.

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Popular Environmental DNA/RNA Purification Products from Zymo Research

Product	Format	Kit Size	Cat No.
Environmental DNA Isolation			
ZymoBIOMICS™ DNA Kits	MicroPrep. Bead Bashing, Spin Column Format (up to 5 µg/prep.)	50 preps.	D4301
	MiniPrep. Bead Bashing, Spin Column Format (up to 25 µg/prep.)	50 preps.	D4300
	96-Well Format. Bead Bashing (up to 5 µg/well)	2x96 preps.	D4303
	96-Magnetic Bead Format. Bead Bashing (up to 10 µg/prep.)	2x96 preps.	D4302
Quick-DNA™ Fungal/Bacterial Kits	MicroPrep. Bead Bashing, Spin Column Format (up to 5 µg/prep.)	50 preps.	D6007
	MiniPrep. Bead Bashing, Spin Column Format (up to 25 µg/prep.)	50 preps.	D6005
	MidiPrep. Bead Bashing, Spin Column Format (up to 125 µg/prep.)	25 preps.	D6105
	96-Well Format. Bead Bashing (up to 5 µg/well)	2x96 preps.	D6006
Quick-DNA™ Fecal/Soil Microbe Kits	MicroPrep. Bead Bashing, Spin Column Format (up to 5 µg/prep.)	50 preps.	D6012
	MiniPrep. Bead Bashing, Spin Column Format (up to 25 µg/prep.)	50 preps.	D6010
	MidiPrep. Bead Bashing, Spin Column Format (up to 125 µg/prep.)	25 preps.	D6110
	96-Well Format. Bead Bashing (up to 5 µg/well)	2x96 preps.	D6011
Quick-DNA™ Tissue/Insect DNA Kits	MicroPrep. Bead Bashing, Spin Column Format (up to 5 µg/prep.)	50 preps.	D6015
	MiniPrep. Bead Bashing, Spin Column Format (up to 25 µg/prep.)	50 preps.	D6016
	96-Well Format. Bead Bashing (up to 5 µg/well)	2x96 preps.	D6017
ZR Plant & Seed DNA Kits	MiniPrep. Bead Bashing, Spin Column Format (up to 25 µg/prep.)	50 preps.	D6020
	96-Well Format. Bead Bashing (up to 5 µg/well)	2x96 preps.	D6021
Environmental RNA Isolation			
ZymoBIOMICS™ RNA Kit	MiniPrep. Bead Bashing, Spin Column Format (up to 100 µg/prep.)	50 preps.	R2001
Quick-RNA™ Fungal/Bacterial Kits	MicroPrep. Bead Bashing, Spin Column Format (up to 5 µg/prep.)	50 preps.	R2010
	MiniPrep. Bead Bashing, Spin Column Format (up to 25 µg/prep.)	50 preps.	R2014
Quick-RNA™ Tissue/ Insect MicroPrep™	MicroPrep. Bead Bashing, Spin Column Format (up to 5 µg/prep.)	50 preps.	R2030
Quick-RNA™ Plant MiniPrep™	MiniPrep. Bead Bashing, Spin Column Format (up to 25 µg/prep.)	50 preps.	R2024

(Also, see our website at: www.zymoresearch.com for additional kit sizes and formats)



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