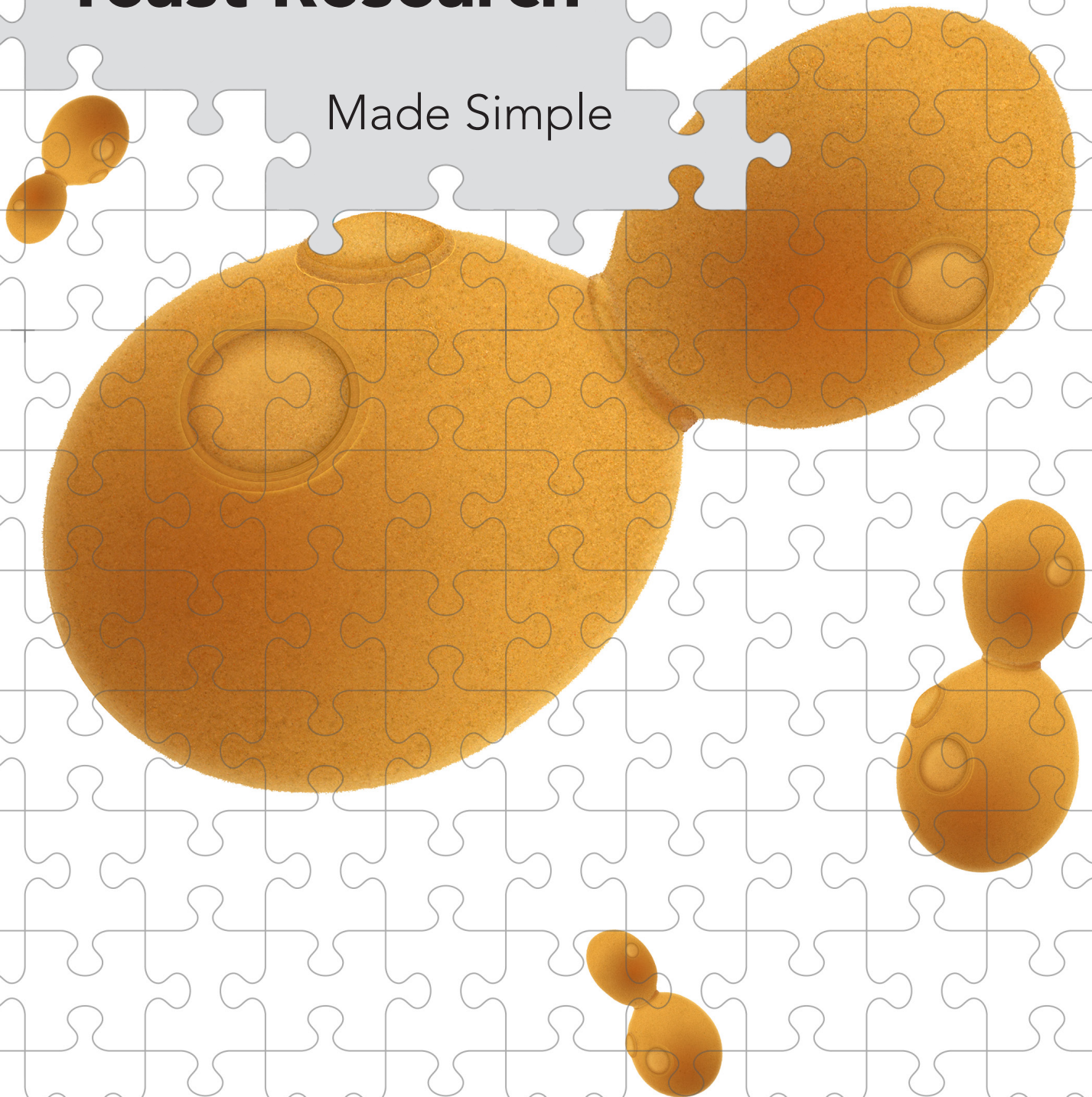
ZYMO RESEARCH

The Beauty of Science is to Make Things Simple®

Yeast Research

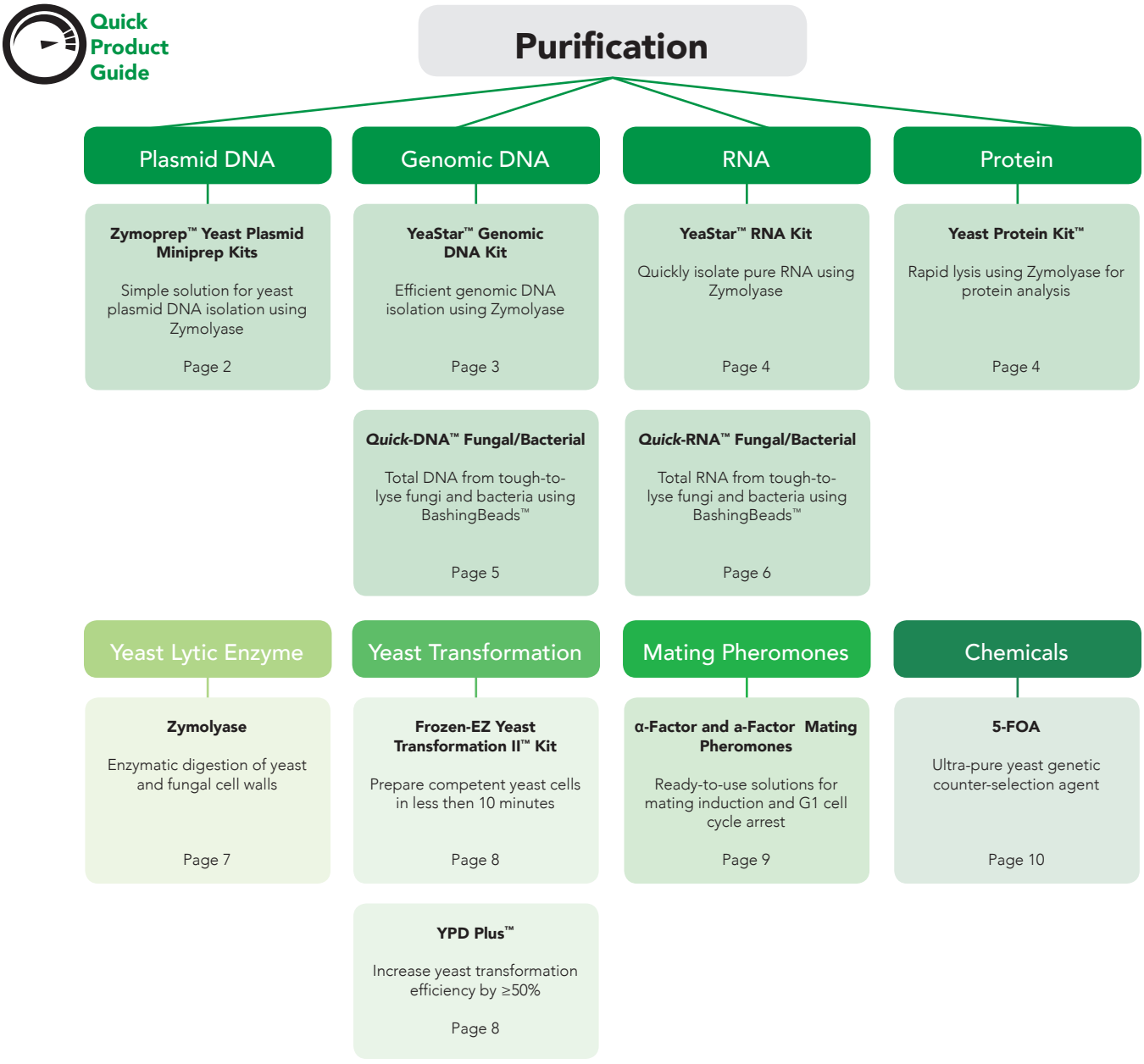
Made Simple



Yeast. Our Foundation for Innovation.

Leading the field of yeast research for over 20 years

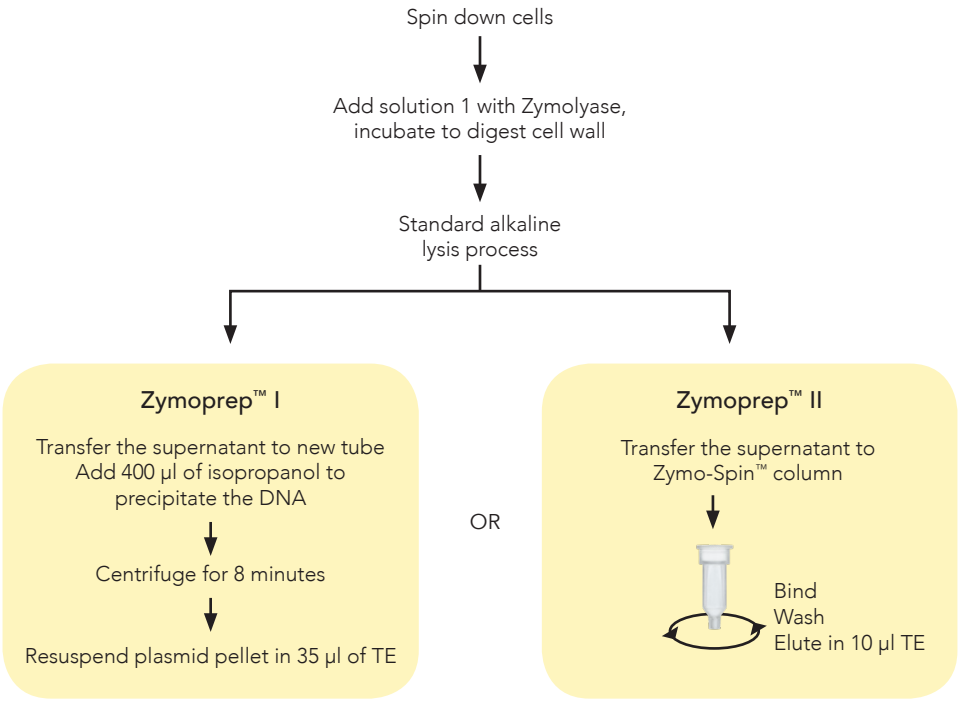
The first products by Zymo Research were for yeast, which inspired the three "budding yeast" that are a part of the company logo. In addition to technologies for yeast DNA and RNA purification, Zymo Research provides yeast growth and transformation products. For transformation of yeast and fungus, a uniquely-formulated YPD medium (YPD Plus™) increases the transformation efficiencies for most yeast strains by ≥ 50%. The Frozen-EZ Yeast Transformation II™ Kit was designed to make yeast transformation easier and more efficient compared to conventional methods. Several specialty products are available for yeast researchers that include α-Factor/a-Factor Mating Pheromones and 5-Fluoroorotic Acid. The Zymolyase and Yeast Protein Kit remain important reagents for yeast lysis and protein purification, respectively.



Zymoprep™ Yeast Plasmid Miniprep Kits

- **Simple:** Quickly and easily rescue plasmid from yeast.
- **Efficient Isolation:** Works well with low-copy and hard-to-isolate plasmids.
- **High-Quality:** Isolated plasmid DNA is ideal for molecular biology techniques, such as PCR, transformation, hybridization, etc.

Simple Procedure for Zymoprep™ Yeast Plasmid Miniprep I & II



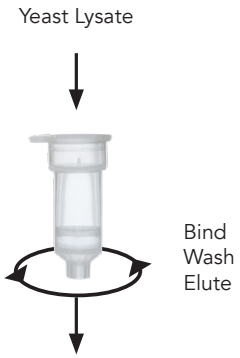
The Zymoprep™ Yeast Plasmid Miniprep provides all the necessary reagents for plasmid isolation from *S. cerevisiae*, *C. albicans*, *S. pombe*, and any fungi whose cell walls are susceptible to yeast lytic enzyme lysis. The procedure is simple and efficient, with no need for glass beads or phenol. Reliably recover plasmid DNA from yeast colonies, patches on plates, or as liquid cultures. The system is ideal for low-copy number and hard-to-isolate plasmids. Eluted plasmid DNA can be used directly for *E. coli* transformation, PCR, and Southern blot analysis.

Product	Cat. No.	Size	Processing Time	Minimum Elution	Input
Zymoprep™ Yeast Plasmid Miniprep I	D2001	100 preps	≤ 30 minutes	N/A	≤ 1.5 ml
Zymoprep™ Yeast Plasmid Miniprep II	D2004	50 preps	≤ 25 minutes	≥ 10 µl	≤ 1.5 ml
Zymoprep™-96 Yeast Plasmid Miniprep	D2005 D2006 D2007	2 x 96 preps 4 x 96 preps 8 x 96 preps	≤ 60 minutes	≥ 10 µl	≤ 1.5 ml

YeaStar™ Genomic DNA Kit

- **Simple:** Fast spin-column procedure yields pure yeast genomic DNA without using glass beads or phenol.
- **Versatile:** Efficient DNA isolation from a broad spectrum of fungal species susceptible to Zymolyase.
- **High-Quality:** Isolated genomic DNA is ready for Southern blotting, PCR, restriction enzyme digestion, etc.

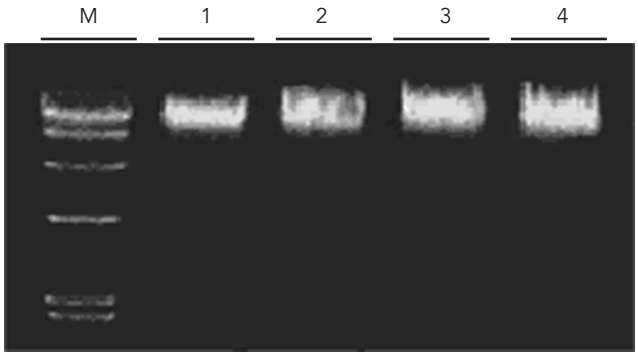
Fast Spin-Column Procedure



Ultra-pure DNA for...

- ✓ PCR
- ✓ Southern Blotting
- ✓ Endonuclease Digestion

Works with any Fungal Species Susceptible to Zymolyase



Genomic DNA yield and concentration from 4 different yeast strains prepared using the YeaStar™ Genomic DNA kit. The eluted plasmid DNA was visualized post agarose gel electrophoresis. Lanes: M: λ-DNA Hind III marker; 1: *S. cerevisiae*; 2: *P. pastoris*; 3: *C. albicans*; 4: *S. pombe*.

Product	Cat. No.	Size	Processing Time	Binding Capacity	Minimum Elution	Input
YeaStar™ Genomic DNA Kit	D2002	40 preps	1.5 hours	≤ 25 µg	≥ 60 µl	≤ 1.5 ml

YeaStar™ RNA Kit

- **Simple:** Fast spin-column procedure yields pure yeast RNA without using glass beads or phenol.
- **Versatile:** Efficient RNA isolation from a broad spectrum of fungal species susceptible to Zymolyase.
- **High-Quality:** Isolated RNA is suitable for use in RT-PCR, northern blotting, etc.

Fast Spin-Column Procedure

Ultra-pure RNA for...

✓ Reverse Transcription
✓ Northern Blotting

Yeast Protein Kit™

- **Convenient:** Rapid method for efficient lysis of yeast for downstream protein and DNA analyses.
- **Versatile:** Procedure suitable for any fungal species susceptible to Zymolyase.
- **Effective Spheroplasting:** Ideal protocol for western blotting and PCR.

Rapid Spheroplasting Workflow

Digest Yeast with Zymolyase
(Spheroplasting)

Use directly for PCR

Add SDS-PAGE sample buffer

PAGE and western blot analysis

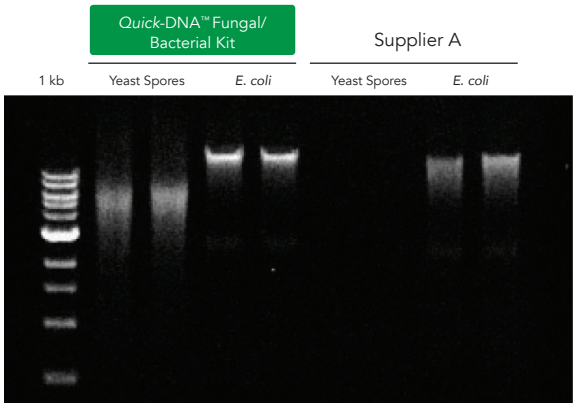
Product	Cat. No.	Size	Processing Time	Binding Capacity	Minimum Elution	Input
YeaStar™ RNA Kit	R1002	40 preps	30 minutes	≤ 25 µg	≥ 60 µl	≤ 1.5 ml
Yeast Protein Kit™	Y1002	200 preps	35 minutes	N/A	N/A	≤ 500 µl

Quick-DNA™ Fungal/Bacterial Kits

Total DNA isolation from Gram (+) bacteria, Gram (-) bacteria, yeast, filamentous fungi, unicellular algae, filamentous algae, or protist

- **Boost Detection:** Included BashingBeads™ ensure complete lysis of tough-to-lyse samples.
- **Ultra-Pure:** Ready for qPCR, Next-Gen Sequencing, arrays, etc.
- **Simple Workflow:** Fastest workflow (< 20 minutes).

Highest Yields



DNA isolated from *Saccharomyces cerevisiae* (spores) and *E. coli* using the *Quick*-DNA™ Fungal/Bacteria Kit was high-quality and structurally intact. Equivalent amounts of yeast and bacteria were processed using the *Quick*-DNA™ Fungal/Bacterial Kit or the Supplier A kit. Equal volumes of eluted DNA were analyzed on a 0.8% (w/v) agarose gel stained with EtBr.

Simple Workflow

Homogenize sample with ZR BashingBead™ Lysis Tube

Filter Lysate with Zymo-Spin™ III-F

Bind, Wash, Elute DNA with Zymo-Spin™ IIC

PCR Ready, Ultra-Pure DNA

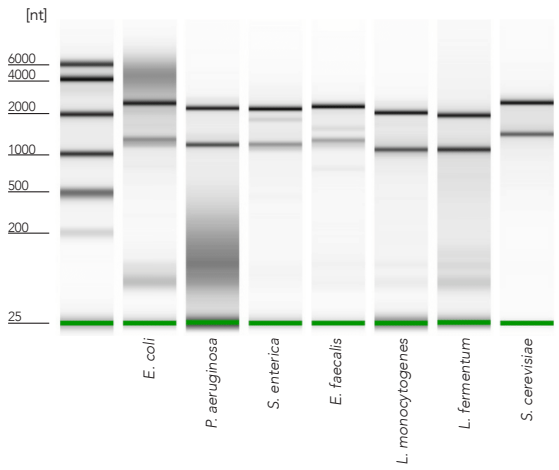
Product	Cat. No.	Size	Processing Time	Binding Capacity	Minimum Elution	Input
Quick-DNA™ Fungal/Bacterial Microprep Kit	D6007	50 preps	≤ 15 minutes	≤ 5 µg	≥ 10 µl	10 - 20 mg wet weight
Quick-DNA™ Fungal/Bacterial Miniprep Kit	D6005	50 preps	≤ 15 minutes	≤ 25 µg	≥ 35 µl	50 - 100 mg wet weight
Quick-DNA™ Fungal/Bacterial Midiprep Kit	D6105	25 preps	≤ 20 minutes	≤ 125 µg	≥ 150 µl	250 - 500 mg wet weight
Quick-DNA™ Fungal/Bacterial 96 Kit	D6006	2 x 96 preps	≤ 40 minutes	≤ 5 µg	≥ 25 µl	10 - 20 mg wet weight

Quick-RNA™ Fungal/Bacterial Kits

Total RNA isolation from Gram (+) bacteria, Gram (-) bacteria, yeast, filamentous fungi, unicellular algae, filamentous algae, or protist

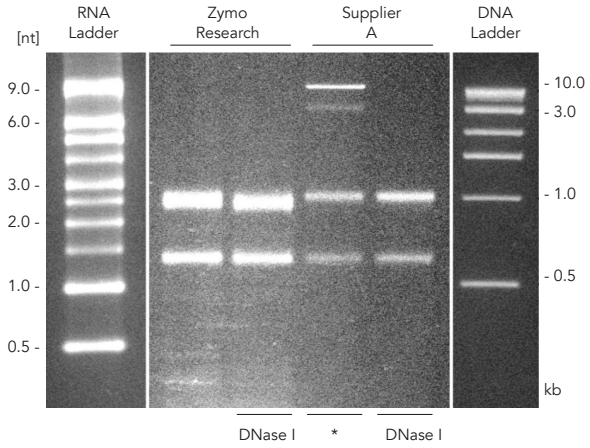
- **Simple:** Efficient isolation of total RNA from all types of tough-to-lyse fungi and bacteria in ≤ 10 minutes using ultra-high density BashingBeads™.
- **High-Quality:** Eluted RNA is ready for Next-Gen Sequencing, RT-qPCR, microarray, hybridization, etc.
- **Superior Concentration:** Zymo-Spin™ Column technology allows RNA to be eluted into as little as 6 µl.

Isolate High-Quality Total RNA in 10 Minutes



High-quality total RNA was isolated from different microbial species including Gram-negative bacteria (*E. coli*, *P. aeruginosa*, *S. enterica*), Gram-positive bacteria (*E. faecalis*, *L. monocytogenes*, *L. fermentum*), and yeast (*S. cerevisiae*) using the *Quick*-RNA™ Fungal/Bacterial Miniprep Kit. RNA was visualized using the Agilent 2200 TapeStation® system.

Eluted RNA is Free of DNA



RNA isolated using the *Quick*-RNA™ Fungal/Bacterial system is free of DNA contamination. Total RNA was isolated from equal amounts of *E. coli* cells containing plasmid DNA (pGEM) using the *Quick*-RNA™ Fungal/Bacterial Microprep kit and a kit from Supplier A. The eluates +/- DNase I treatment were analyzed on a 2% (w/v) agarose gel stained with EtBr.

* Genomic (> 10 kb) and plasmid (> 3 kb) DNA contamination

Product	Cat. No.	Size	Processing Time	Binding Capacity	Minimum Elution	Input
Quick-RNA™ Fungal/Bacterial Microprep Kit	R2010	50 preps	≤ 10 minutes	≤ 10 µg	≥ 6 µl	10 - 20 mg wet weight
Quick-RNA™ Fungal/Bacterial Miniprep Kit	R2014	50 preps	≤ 10 minutes	≤ 50 µg	≥ 25 µl	50 - 100 mg wet weight

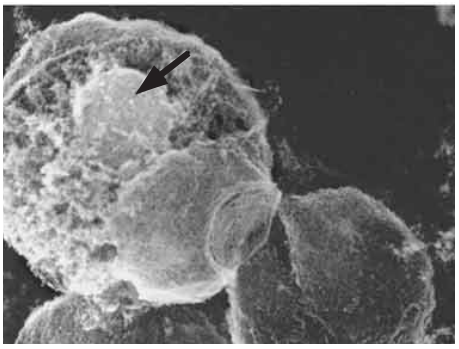
Zymolyase - Yeast Lytic Enzyme

- **100T Equivalent:** Prepared from *Arthrobacter luteus*. Essential enzyme activities are β-1,3-glucanase and β-1,3-glucan laminaripentao-hydrolase.
- **Convenient:** Provided lyophilized along with a storage buffer for reconstitution.
- **Efficient Cell Wall Digestion:** Supplied storage buffer has been optimized to confer maximum levels of enzymatic activity.

Compatible with a Variety of Fungi

Susceptible fungal genera:	
Asbya	*Kloekera*
Candida	*Kluyveromyces*
Debaryomyces	*Lipomyces*
Eremothecium	*Metschikowia*
Endomyces	*Pichia*
Hansenula	*Pullularia*
Hanseniaspora	*Saccharomyces*
Saccaromycodes	*Saccharomycopsis*
Schizosaccahromyces	*Torulopsis*

Effective Spheroplast Formation



Zymolyase can be used for enzymatic digestion of yeast glycan coats and for spheroplast formation. The arrow indicates the nucleus and intracellular components of a spheroplast through a partially digested plasma membrane.*

*Source: A protocol for isolation and visualization of yeast nuclei by scanning electron microscopy (SEM). Elena Kiseleva, Terry D Allen, Sandra A Rutherford, Steve Murray, Ksenia Morozova, Fiona Gardiner, Martin W Goldberg & Sheona P Drummond. Nature Protocols 2, 1943 - 1953 (2007) Published online: 9 August 2007 doi:10.1038/nprot.2007.251

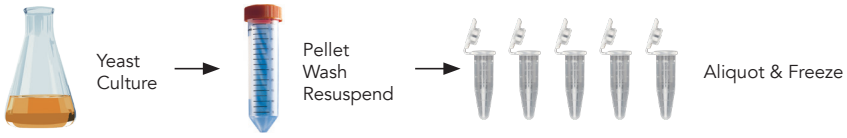
Product	Cat. No.	Size	Enzyme Concentration	Total Protein Concentration	Uses
Zymolayse	E1004 E1005	1,000 U* 2,000 U*	5 U/µl	10 - 15 mg/ml	Spheroplast/protoplast formation; Yeast cell fusion; Yeast transformation; Other fungi
R-Zymolayse (with RNase)	E1006	1,000 U*	5 U/µl	10 - 15 mg/ml	

* Unit Definition: One lytic unit (U) is defined as a 10% decrease in O. D. at 800 nm for 30 minutes

Frozen-EZ Yeast Transformation II™ Kit

- **Fast:** Yeast cells with high transformation efficiencies can be prepared in under 10 minutes.
- **Simple:** Easy method to transform yeast with single or multiple plasmids in ≤ 1 hour without carrier DNA.
- **Versatile:** Can be used with *S. cerevisiae*, as well as other fungi, including *C. albicans*, *S. pombe*, and *P. pastoris*. Compatible with both circular and linear DNA.

Simple 10 minute Protocol



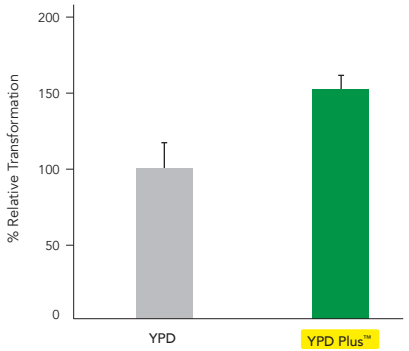
Product	Cat. No.	Size	Transformation Efficiency	Transformation DNA Input	Competent Cell Stability	Uses
Frozen-EZ Yeast Transformation II™ Kit	T2001	120 rxns	10^5 - 10^6 cfu/µg	0.2 - 1.0 µg	≥ 1 year at -70°C	Competent yeast cell preparation; Compatibility: *S. cerevisiae, S. pombe, C. albicans, P. pastoris*

YPD Plus™

- **Maximize Transformation Efficiency:** Specially-formulated yeast outgrowth medium increases yeast transformation efficiencies by > 50%.
- **Better Results:** Recommended for mutant yeast strains exhibiting poor growth characteristics that are not amenable to transformation.
- **Simple:** Just supplement the yeast transformation reaction mixture with YPD Plus™ to achieve consistent increases in yeast transformation efficiencies.

Maximize Yeast Transformation Efficiencies

Comparison of YPD vs. Zymo Research's YPD Plus™ medium. Yeast transformations were followed by outgrowth performed in either standard YPD or YPD Plus™ medium. The relative percentages of transformants are shown in the graph to the right. Each plot represents the relative transformation efficiency averaged from six individual transformations.

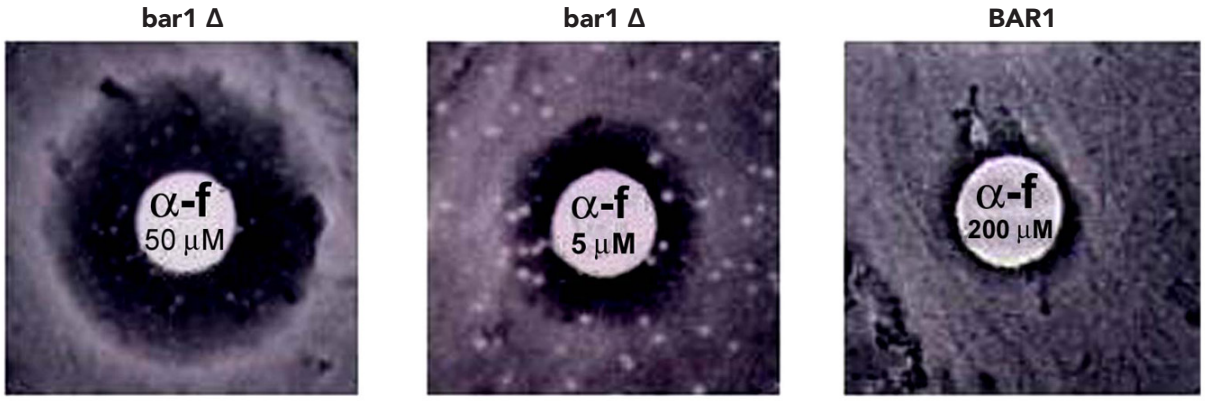


Product	Cat. No.	Size	Uses
YPD Plus™	Y1003-50 Y1003-100	50 ml 100 ml	Yeast Transformation & Outgrowth

α-Factor and a-Factor Mating Pheromones

- **Aqueous Solution:** Convenient ready-to-use solutions of yeast α-factor and a-factor mating pheromones for mating induction and G1 cell cycle arrest.
- **Robust and Efficient:** Liquid solutions have been optimized for both activity and stability and are guaranteed to retain biological function through multiple freeze-thaw cycles.
- **Easy:** Widely-used simple method for studying the cell cycle, cellular morphology, transcriptional induction, and signal transduction pathways.

G1 Phase Arrest Using α-Factor



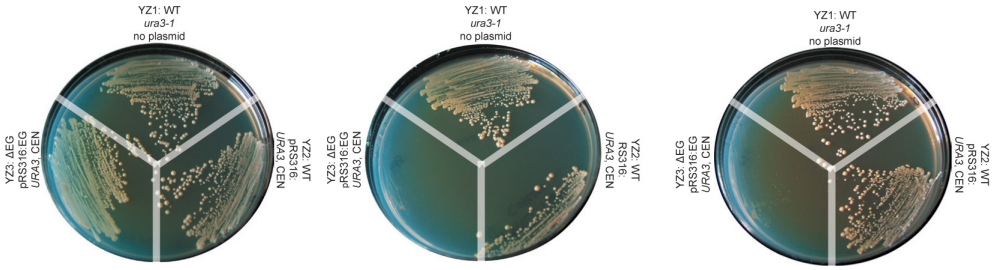
Activity test of α-Factor: α-Factor peptide pheromone (10 µl) was applied to sterile filters on a lawn of MATa cells, which were either wild-type for the BAR1 (200 µM, right) protease or bar1 Δ (50 µM, left; 5 µM, center). Sensitivity to the α-factor was evident at the zone of clearing (G_1 arrested cells). Cells that had the BAR1 protease deletion were more sensitive to α-Factor than BAR1 protease-positive wild strain, which required ~20 - 50X more pheromone to arrest the cells.

Product	Cat. No.	Size	Concentration	Purity	Molecular Weight	Uses
α-Factor Mating Pheromone	Y1001	240 µl	10 mM in 0.1 M Sodium Acetate, pH 5.2	> 98% by HPLC	1684.0	Yeast mating induction; G1 phase arrest
a-Factor Mating Pheromone	Y1004-500	500 µl	1 mg/ml in methanol	> 80% by HPLC	1630.0	

5-Fluoroorotic Acid (5-FOA)

- **Yeast Genetic Counter-Selection Agent:** Commonly used for curing yeast strains of plasmids, plasmid shuffling, allelic replacement, and two-hybrid screens.
- **Convenient:** Available as a pure powder or ready-to-use solution in DMSO.
- **Ultra-Pure:** Determined > 98% by thin-layer chromatography (TLC), melting point, and lot comparison.

Counter-Selection of Yeast using 5-FOA



1: Synthetic Complete: SC | 2: SC-5FOA: Powder | 3: SC-5FOA: 100X Solution

Yeast strains auxotrophic for uracil (ura3-1) were tested for their ability to grow on 5-FOA containing media. Three strains were tested: wt alone (YZ1), wt with URA3 marked low copy plasmid (YZ2), and a mutant strain with a deletion of an essential gene (ΔEG) that could not lose a complementing URA3 plasmid (YZ3).

From left to right, top to bottom were synthetic complete glucose medium (SC): 1. SC, synthetic complete no 5FOA; 2. Standard – SC-F-FOA (SC-F-FOA made from ultra-pure 5-FOA powder, 1 g/liter). 3. SC-5-FOA made from 100X 5-FOA solution.

For each plate, Top: Yeast strain: YZ1 wild-type, Ura- (wt, ura-3-52), Right: Yeast Strain: YZ2, wt carrying a low copy, URA3 plasmid alone, and Left: Yeast strain: YZ3: ΔEG, containing the complementing plasmid (pRS316: EG, URA3, CEN). The counter-selection against strain YZ3 was evident for all media containing 5-FOA with no 5-FOA colonies evident (see left panels, YZ3: in plates 2, and 3). Cells from control strainsYZ1 and YZ2 were able to grow on 5-FOA media.

Product	Cat. No.	Size	Concentration	Purity	Molecular Weight	Uses
5-FOA (powder)	F9001-1 F9001-5	1 g 5 g	N/A	> 98 %	1630.0	Yeast counter-selection; Yeast two-hybrid screen; Plasmid curing; Plasmid shuffling; Allelic replacement
100X 5-FOA Solution (in DMSO)	F9003	10 ml	100X (100 mg/ml)	> 98 %	1630.0	

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