

# Bead Beating & Homogenisation

Homogenisation is a popular method of cell disruption through lysis (breaking up) the sample using a homogeniser. This is achieved through mixing at high speeds in tubes with either steel, glass (silica) or zirconium beads added to grind the sample and release subcellular contents of DNA, RNA and proteins.

There are lots of homogenisers on the market as well as types and sizes of bead, allowing the process to be carried out on any sample type. Mechanical and bead beating techniques each offer their own benefits and specific uses.

This guide has been designed to offer insight into homogenisers and beads, how to choose the right one for your needs and ways to optimise the process for consistently effective cell disruption. If you'd like to talk to an expert about your homogenisation needs please get in touch and one of our team will be happy to help.

## Consider Your Sample

### Size

The size and resilience of your sample is extremely important. These factors combined dictate not only how much you need to prep your sample (and possibly adjust its size and shape), but also the correct size and type of beads and model of homogeniser you should use. For disrupting microorganisms, a vortex mixer should be sufficient.

### Shape

Larger samples will naturally take more time to process, however shape is also very important as larger rounded pieces of some samples (such as tissue), will take more time and power to homogenise than thinner strips.

### Tailor Your Approach

You should tailor each aspect of the homogenisation process to suit your sample type and needs, so once you have chosen the right type of beads and tube size (you should always limit the size of solid samples like tissue to 5% the volume of the tube), you should also check to make sure that your homogeniser has the required speed, power and capacity.

As a guideline, the larger your sample, the larger the beads you use should be (our table can help you to decide).

### Balance

Ensure that there is a concise balance between the sample, beads used and buffer (if using). Always be sure not to overload your tubes. The total volume of sample, beads and buffer shouldn't be more than 50% of the tube volume or this may prevent the beads and sample from moving and colliding effectively.

Sample	Suggested Bead Type & Size
Bacteria, cultured microbes	Standard glass 0.1mm Triple-Pure zirconium 0.1 mm
Yeast	Standard glass 0.5 mm Triple-Pure zirconium 0.5 mm
Filamentous fungi	Standard glass 1.0 mm Triple-pure zirconium 1.0 mm
Plant leaves & soft vegetables (E.G potato)	Triple-Pure zirconium 1.5 and 3.0 mm
Shoots and stalks	Triple-pure zirconium 3.0 mm
Seeds	Triple-pure zirconium 3.0 mm
Soft tissue (liver, brain, kidney, adipose, hypothalamus)	Triple-pure zirconium 1.0 mm
Resilient or fibrous tissue (spleen, tail, heart, muscle lung, cornea)	Triple-pure zirconium 3.0 mm Stainless steel beads

## Zirconium Beads

Made primarily from zirconium oxide and silicon oxide, offering an extremely hard and smooth ceramic.

They're dense and perfectly round, non-binding and non reactive and can be used with most popular bead beaters, blasters and homogenisers.

The triple purification process involves quality testing and special handling during the filling process.

DNase, RNase, protease, and nucleic acids are therefore completely eliminated from the product, making them perfect for molecular biology applications.

Size	Product Code	Price
0.1mm	D1032-01	£120
0.5mm	D1032-05	£120
1.0mm	D1032-10	£120
1.5mm	D1032-15	£120
3.0mm	D1032-30	£120

## Glass Beads

Prefilled tubes of standard glass (scilica) beads can be used with not only the range of homogenisers below, but with other manufacturers' instruments too.

Size	Product Code	Price
0.1mm	D1031-01	£85
0.5mm	D1031-05	£85
1.0 mm	D1031-10	£85

## Custom Beads

We are also able to offer bespoke custom beads to order, developed specifically for your requirements and specific uses (E.G a soil kit). These can include stainless steel beads which are more effective when lysing very tough samples, but do produce heat.

Please contact us to discuss and to place an order.

Type	Price
Zirconium, or mixes of Zirconium, scilica and steel	£95
Scilica (glass) only	£80



There are many different types of homogenisers on the market including mechanical and bead beating models. When making your choice it's important to consider not only what it'll be used for as part of your current work but also possible future applications in order to future proof your purchase.

## Speed control and temperature control

- if your sample is heat sensitive it's important to make sure that your equipment can pulse in short bursts so as not to overheat. You can also ice samples in between bursts.
- If your samples are relatively soft it's likely that homogenizing at extremely high speeds won't be necessary, so extremely powerful models could be a waste of Watts.
- The option to vary speeds and increase it incrementally helps to ensure that you're in control throughout the process. Many models have the option to alter speed as well as set timers to promote consistency and reproducibility.

## Quantity of samples

- High capacity homogenisers like the Bead Blaster are useful if you have a lot of samples that you're looking to process simultaneously.
- For low to medium throughput labs, however, it could be more convenient to choose a hand-held or lower capacity model and conserve yourself some all important bench space.

## Volume of Samples

- Some instruments (like the Handheld Homogeniser) allow for a variety of sample sizes/volumes to be effectively disrupted using different sized generator probes.

## Size Matters

- You know the size and layout of your lab better than we do and how important it is to ensure that your space is maximized when working, so when choosing your new homogeniser be sure to balance the weight, size and shape of your equipment with the necessary motor size and sample capacity.

## BeadBug™ Homogeniser



- A high energy bench top Bead Beating homogeniser
- Simultaneous homogenisation of up to 3 samples (often within 45 seconds) inside the disposable 2ml screw cap microtube
- Compact – takes up very little bench space
- Efficient – homogenise 1, 2 or 3 samples at a time
- Rapid – samples can be completely homogenised in 30 seconds
- Choice – Use variety of beads for different needs, offering longevity across multiple research projects
- 2 years warranty

Product Code	Price
D1030-E	£640

# The BeadBlaster™ 24 Homogeniser



- Speed - Fast, efficient homogenisation in about 35 seconds
- High speed 3D motion produces high energy impacts
- For all sample types: from soft tissue to bone, seeds and plants
- Capacity - Mix up to 24 tubes simultaneously
- Sealed 2.0ml tubes eliminate cross contamination
- Digitally displayed operating parameters
- Versatility - Protect fragile or heat sensitive samples by shortening the cycle and including a rest period
- Up to 50 programs of chosen cycles can be stored for future use
- Transparent lid allows visualization of samples
- 2 years warranty

Product Code	Price
D2400-E	£6575

# Handheld Homogeniser



- Ergonomic - Slimline design
- A rotor stator homogeniser that works by drawing the sample (in liquid) into the generator probe with the variable speed rotor, then forcing it out through the slots in the stator
- This achieves mechanical shearing of the sample
- Speed - Homogenise most samples in under 30 seconds
- Versatility - For volumes from 100µl to 250ml (depending on generator probe used)
- Ideal for use with microtubes
- Supplied with 5mm & 7mm generator probes
- 2 years warranty

Item	Product Code	Price
HandHeld Homogeniser	D1000-E	£750
Optional Generator 10mm x 115mm saw tooth for 15ml & 50ml tubes	D1000-M10	£250
Optional Generator 14mm x 130mm saw tooth for 50ml tubes up to 250ml vessels	D1000-M14	£750

We hope you have found this guide useful. If you would like to speak with us about any of the listed products please get in touch.

To view our full range of laboratory equipment (including a variety of vortex mixers, shakers and rockers) and molecular biology reagents please visit our website, or you can download our full 2018 brochure here.

